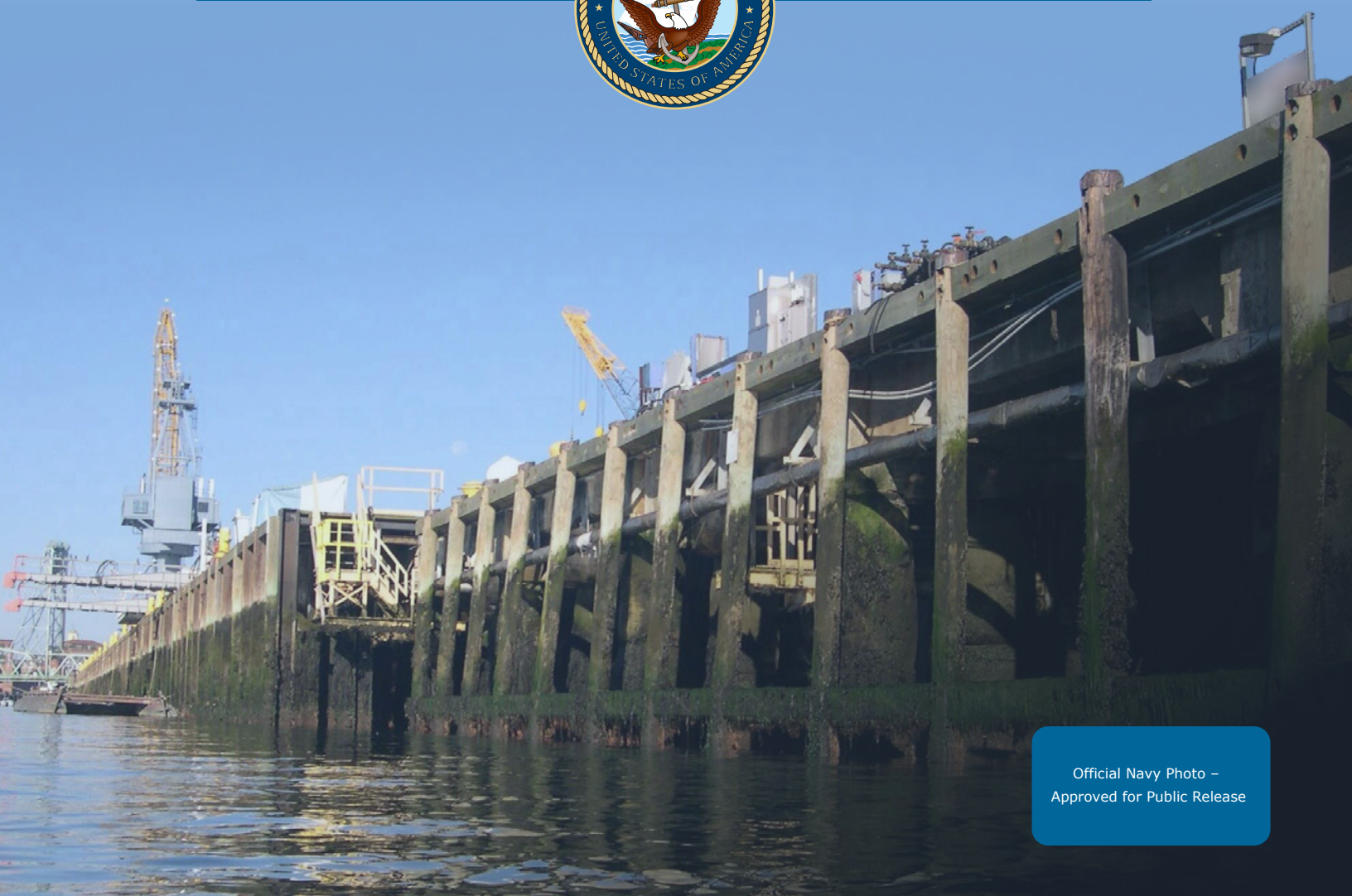
Environmental Assessment for Waterfront Improvement Projects at Portsmouth Naval Shipyard, Kittery, Maine

October 2016

Department of the Navy



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Environmental Assessment for Waterfront Improvement Projects

at

Portsmouth Naval Shipyard, Kittery, Maine

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Abstract

Designation:	Environmental Assessment
Title of Proposed Action:	Waterfront Improvement Projects
Project Location:	Portsmouth Naval Shipyard, Kittery, Maine
Lead Agency for the EA:	Department of the Navy
Cooperating Agency:	None
Affected Region:	York County, Maine
Action Proponent:	Commanding Officer, Portsmouth Naval Shipyard
Point of Contact:	Mr. D. Krause, Environmental Planner, OPEV21:DK Naval Facilities Engineering Command, Mid-Atlantic 9324 Virginia Avenue Norfolk, Virginia 23511-3095 E-mail address: David.J.Krause1@navy.mil
Date:	October 2016

The Department of the Navy has prepared this Environmental Assessment in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality Regulations and Navy regulations for implementing NEPA. The Proposed Action would restore and modernize waterfront infrastructure associated with Dry Docks 1 and 3 at Portsmouth Naval Shipyard in Kittery, Maine, between 2016 and 2022. The Proposed Action would modernize and maximize dry dock capabilities for performing current and future missions efficiently and with maximum flexibility. This EA evaluates the potential environmental impacts associated with the two action alternatives, Alternative 1 (Preferred Alternative) and Alternative 2, and the No Action Alternative to the following resource areas: air quality, water resources, bathymetry, cultural resources, marine biological resources, visual resources, airborne noise, infrastructure, transportation, and hazardous materials and wastes.

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EXECUTIVE SUMMARY

Proposed Action

The U.S. Department of the Navy (the Navy) proposes to restore and modernize waterfront infrastructure associated with Dry Docks 1 and 3 at Portsmouth Naval Shipyard (the Shipyard), located in Kittery, York County, Maine (see Figure ES-1). The Proposed Action would include the following two waterfront improvement projects: structural repairs to Berths 11, 12, and 13 and replacement of the Dry Dock 3 caisson. The waterfront improvement projects would be constructed in phases between October 2016 and October 2022.

The Navy has prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) regulations and Navy regulations for implementing NEPA. The action proponent is the Commanding Officer, Portsmouth Naval Shipyard. No cooperating agencies were involved in preparation of this EA.

Purpose of and Need for the Proposed Action

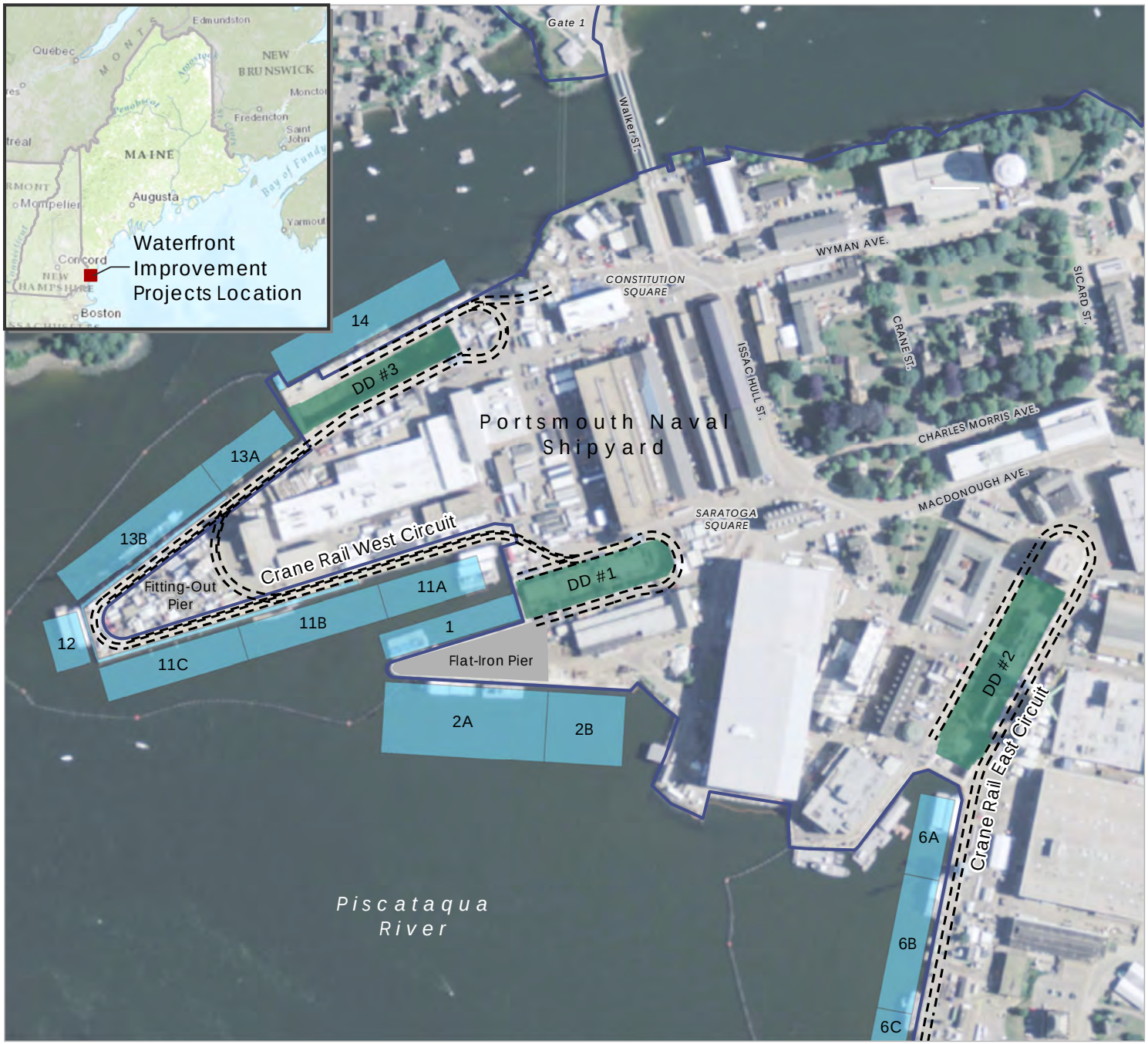
The purpose of the Proposed Action is to modernize and maximize dry dock capabilities for performing current and future missions efficiently and with maximum flexibility. The Proposed Action is needed to correct deficiencies in waterfront facilities and infrastructure and ensure that the Shipyard can continue to support its primary mission to service, maintain, and overhaul submarines. By supporting the Shipyard's mission, the Proposed Action would assist in meeting the larger need for the Navy to provide capabilities for training and equipping combat-capable Naval forces ready to deploy worldwide. In this regard, the Proposed Action furthers the Navy's execution of its congressionally mandated roles and responsibilities under 10 United States Code [U.S.C.] section 5062.

Alternatives Considered

Alternatives were developed for analysis based upon the following reasonable alternative screening factors:

- preventing further loss of portal crane rail load-bearing capacity at Berths 11, 12, and 13
- providing adequate corrosion protection at Berths 11, 12, and 13
- restoring load-bearing capacity at Berths 11, 12, and 13 sufficient to support a minimum 78,000-pound (39-ton) operational load-bearing capacity
- restoring the condition of the Dry Dock 3 caisson so that it meets the requirements of the Naval Sea Systems Command (NAVSEA) Safety Certification Program
- allowing for in-water and upland construction work to occur during times that would not conflict with Shipyard mission schedules
- reducing the Navy's total cost of ownership—i.e., the frequency and cost of maintenance work on waterfront infrastructure
- improving operational efficiencies in and around Dry Docks 1 and 3.

The Navy is considering two action alternatives that meet the purpose and need for the Proposed Action and a No Action Alternative.



ES-1
Dry Docks, Berths, and the Portal Crane Rail System
Portsmouth Naval Shipyard
York County, Maine

Legend

- Dry Dock
- Berth
- Installation Area
- Portal Crane Rail

N

0 250 500 750 Feet

Source: ESRI 2013; Department of Defense 2014.

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Alternative 1 (Preferred Alternative) includes two waterfront projects: 1) structural repairs to Berths 11, 12, and 13, consisting of constructing king pile and concrete shutter panel bulkheads around these berths, and 2) replacement of the Dry Dock 3 caisson (or gate). The Preferred Alternative would incorporate in-water construction techniques for both projects that would require less pile driving, potentially reducing impacts on in-water resources, including marine mammals, fish, and benthic communities, and reducing airborne noise impacts on communities near the Shipyard.

Alternative 2 includes the same waterfront projects that would be implemented under Alternative 1. Under Alternative 2, conventional steel sheet-pile bulkheads would be constructed around Berths 11, 12, and 13. At Dry Dock 3, a temporary cofferdam would be constructed to provide a dry work area in order to allow more extensive repairs at this location. Alternative 2 would incorporate different in-water construction techniques for both projects that would require a greater number of piles and thus more pile driving than Alternative 1.

The No Action Alternative would not result in any changes to waterfront infrastructure at the Shipyard. The infrastructure and operational deficiencies described below in Chapter 1 of this EA would not be addressed, with serious consequences to the Shipyard's ability to meet mission requirements. Because it would fail to support mission requirements, the No Action Alternative would not meet the purpose and need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA and provides a baseline for measuring the environmental consequences of the action alternatives.

Summary of Environmental Resources Evaluated in the EA

CEQ regulations, NEPA, and Navy instructions for implementing NEPA specify that an EA should address those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact.

Several important existing resources were analyzed in the EA. They include surface waters, architectural resources that are considered historic properties eligible for listing on the National Register of Historic Places (NRHP), marine mammals, essential fish habitat, threatened and endangered species, and airborne noise.

The following resource areas have been addressed in this EA: air quality, water resources, bathymetry, cultural resources, marine biological resources (marine vegetation, marine mammals, fish, benthic invertebrates, benthic habitat, and marine threatened and endangered species), visual resources, airborne noise, infrastructure, transportation, and hazardous materials and waste. Because potential impacts on them were considered to be negligible or nonexistent, the following resources were not evaluated in this EA: groundwater, topography, geology and soils, terrestrial biological resources, terrestrial threatened and endangered species, land use, potable water and wastewater, airspace, public health and safety, socioeconomics, and environmental justice.

Summary of Potential Environmental Consequences of the Action Alternatives and Major Mitigating Actions

Surface Water. Short-term impacts on surface water quality in the Piscataqua River would result from dredging, filling, and dewatering during construction. The proposed Berths 11, 12, and 13 structural repairs project would be required to comply with the conditions of an individual USACE permit that will be obtained prior to the start of construction and the Maine Department of Environmental Protection (MEDEP) individual Natural Resources Protection Act (NRPA) permit and a minor amendment to the

Shipyard's Site Location of Development Law permit issued for the Project (see Appendix B). Berths 11, 12, and 13 structural repairs would require filling approximately 95,400 square feet to 117,200 square feet (with Option 1) of the previously filled area beneath the pier and the Piscataqua River bottom within 5 feet of the existing berth faces. Approximately 1,142,000 cubic feet to 1,405,000 cubic feet (with Option 1) of fill would be required. The area that would be filled and amount of fill required would be minimized to the maximum extent practicable by constructing the bulkheads within 5 feet of the existing faces of the berths. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction in accordance with the Maine Natural Resources Protection Act (38 M.R.S.A. §480-Z), sections 404 and 401 of the Clean Water Act (33 U.S.C. §1251 et seq.), and section 10 of the Rivers and Harbors Act (33 U.S.C. §403 et seq.) (MEDEP, 2013b). Fees paid under the Maine In Lieu Fee Compensation Program are used under the Maine Natural Resources Conservation Program for restoration, enhancement, creation, and preservation of Maine's protected natural trust resources, typically in the same biophysical region in which the impacts would occur (MEDEP, 2013a).

No dredging or fill would be required for the Dry Dock 3 caisson replacement and in-water caisson seat repairs proposed under Alternative 1; therefore, impacts on surface waters would be minimal and short-term. In-water work for the Dry Dock 3 caisson replacement project will be required to comply with the conditions of a USACE Maine General Permit that will be obtained prior to the start of construction and an individual NRPA permit and minor amendment to the Shipyard's Site Location of Development Law permit that have been issued for the project (see Appendix B). Standard best management practices (BMPs) would be incorporated to prevent indirect impacts on water quality during upland work for both projects. Erosion control measures would be installed prior to construction, and a Stormwater Management/Erosion and Sedimentation Control Plan would be implemented during construction. Construction activities would comply with the Maine Erosion and Sedimentation Control Law and the Maine Stormwater Management Law.

Alternative 2 would involve additional pile driving during in-water work at Berths 11, 12, and 13 and Dry Dock 3 (resulting from construction and removal of a temporary cofferdam) that would result in greater short-term impacts on surface water quality during construction. Under Alternative 2, the temporary cofferdam at Dry Dock 3 would occupy an estimated footprint of 7,458 square feet. If Alternative 2 is implemented, compensatory mitigation in the form of an in lieu fee would be paid to the MEDEP prior to the start of construction for the temporary and permanent fill proposed under this alternative. Alternative 2 would require a Category II USACE General Permit for the temporary circular, cellular cofferdam at Dry Dock 3. This alternative would incorporate the same BMPs identified for Alternative 1. The No Action Alternative would not result in any changes in surface waters or surface water quality.

Architectural Resources/Historic Properties. Alternatives 1 and 2 would result in an adverse effect under section 106 of the National Historic Preservation Act (NHPA) on Dry Dock 3 as a result of removal and replacement of the caisson and repair of the caisson seats. Dry Dock 3 is a contributing resource within the Portsmouth Naval Shipyard Historic District, and the proposed caisson replacement project would damage its character-defining features. The Navy has consulted with the Maine State Historic Preservation Office (SHPO), the Advisory Council for Historic Preservation (ACHP), federally recognized tribes, and other interested parties regarding the finding of an adverse effect on Dry Dock 3 under Alternative 1, the Preferred Alternative, and a Memorandum of Agreement (MOA) between the Navy and the Maine SHPO has been executed (see Appendices D and E). Alternatives 1 and 2 would not result in adverse effects on any other architectural resources at the Shipyard that are historic properties, and

direct and indirect impacts on architectural resources at the Shipyard under NEPA would be minimal to moderate. No known traditional cultural properties have been identified within the Shipyard; therefore, there would be no direct or indirect impacts on traditional cultural properties. The Navy has consulted with five federally recognized Native American tribes of Maine regarding the Proposed Action (see Appendix E). The No Action Alternative would not result in changes to architectural resources.

Marine Mammals. In-water construction activities under Alternatives 1 and 2 would generate underwater noise that would have the potential to disturb or displace marine mammals that may occur in the lower Piscataqua River. During in-water construction individual marine mammals may be exposed to sound pressure levels from impact/vibratory pile driving, extraction, and drilling that may result in Level B behavioral harassment under the Marine Mammal Protection Act. Any marine mammals that are taken (harassed), may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the area of construction. Any takes would likely have only a minor effect on individuals and no effect on populations. A small number of marine mammals could be injured by construction noise, but the mitigation measures developed in consultation with NOAA Fisheries will minimize the number of animals potentially impacted by sound pressure levels that could cause injury (see Appendix F). Alternative 1 would minimize construction-related impacts by constructing the bulkheads at Berths 11, 12, and 13 with drilled and grouted king piles and concrete shutter panels. The bulkheads proposed under Alternative 2 would be constructed with driven steel sheet piles, resulting in greater temporary construction impacts. Likewise, Alternative 2 would result in greater temporary impacts as a result of construction and removal of the temporary cofferdam at Dry Dock 3.

The Navy submitted an Incidental Harassment Authorization (IHA) application to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service for the proposed waterfront projects under Alternative 1, the Preferred Alternative, on February 10, 2016 (see Appendix F). Supplemental analyses were prepared during consultation with NOAA Fisheries and as a result of the public comment process. Through consultation, the Navy and NOAA Fisheries have agreed on the maximum number of potential takes of marine mammals that would be allowed to occur during the first year of construction and the mitigation measures to minimize these impacts. The Navy will comply with the requirements and mitigation measures in the IHA that will be issued prior to the start of in-water construction.

The potential takes of marine mammals outlined in the IHA application and supplemental analyses represent the maximum expected number of marine mammals that could be exposed to acoustic sources reaching Level A (injury) or Level B harassment (behavioral) levels during the first year of construction. The Navy plans to submit additional IHA applications for each subsequent year of in-water construction. The Navy will employ a number of mitigation measures during each year of in-water construction in an effort to minimize the number of marine mammals potentially affected. Given the short daily duration of noise associated with individual pile driving and removal and the relatively small areas being affected, in-water noise is not expected to result in any long-term, adverse impacts on marine mammal populations, and no significant impacts on marine mammal populations are expected.

Essential Fish Habitat. Potential short-term impacts on managed species with designated essential fish habitat (EFH) would result primarily from temporary re-suspension of bottom sediments and underwater noise during dredging and pile-driving at Berths 11, 12, and 13 and underwater repairs at the Dry Dock 3 caisson. Construction activities would temporarily displace EFH species and their prey from in-water construction areas and may result in the loss of less mobile or sessile organisms. Alternative 1 would minimize construction-related impacts by constructing the bulkheads at Berths 11, 12, and 13 with drilled and grouted king piles and concrete shutter panels. The bulkheads proposed

under Alternative 2 would be constructed with driven steel sheet piles, resulting in greater temporary construction impacts. Construction of a temporary cofferdam at Dry Dock 3 under Alternative 2 also would result in greater temporary construction impacts across a larger area.

Construction of the bulkheads at Berths 11, 12, and 13 would result in the permanent loss of approximately 95,400 square feet (2.19 acres) of benthic habitat, including benthic communities designated as EFH, if the bulkhead at Berth 11C is not constructed and 117,200 square feet (2.69 acres) if the bulkhead at Berth 11C is constructed. The bulkheads would also permanently remove approximately 1.6 to 4.7 million cubic feet of open water. At Dry Dock 3, construction of the temporary cofferdam under Alternative 2 would temporarily impact an estimated 7,458 square feet of habitat, in addition to the area affected at the berths. Loss of habitat as a result of construction of the cofferdam would be temporary, since the cofferdam would be removed once construction is complete. Given the small loss of EFH and the lower Piscataqua River system's ability to return to pre-construction conditions relatively quickly, fish would not be permanently deterred from foraging or otherwise using the habitats within the Action Areas for the Proposed Action. Based on the temporary disturbance associated with in-water construction activities, the previously disturbed nature of the Project area, and the abundance of suitable habitat near the Action Area, impacts on EFH species under either alternative would be short-term and minor. The Navy has prepared an EFH assessment and has consulted with NOAA Fisheries regarding the potential impacts of Alternative 1, the Preferred Alternative (see Appendix G). NOAA Fisheries provided concurrence, based on review of the Project, that Alternative 1 would have minimal adverse effects on EFH for federally managed species (NOAA Fisheries Habitat Conservation Division 2016).

Threatened and Endangered Species. Based on the presence of suitable habitat and known migration routes up the Piscataqua River, two species listed under the Endangered Species Act (ESA) may occur within the Project area: the threatened Atlantic sturgeon and the endangered shortnose sturgeon. Individual sturgeons present in and near the Project area are highly mobile and would be expected to avoid active construction areas. Based on the abundance of suitable habitat within the Great Bay estuary system and lower Piscataqua River, the species' migratory nature, and the temporary disturbance associated with in-water construction activities, individual sturgeon displaced by construction are not expected to be adversely impacted. The permanent impacts from the small loss of benthic habitat under either alternative are not expected to adversely affect these species. Therefore, construction of the Proposed Action may affect, but is not likely to adversely affect, the Atlantic sturgeon or shortnose sturgeon. Impacts under Alternative 2 would be greater than those under Alternative 1 as a result of the increase in pile driving but would still be short-term and minor, given the temporary nature of in-water construction activities and the abundance of suitable habitat in other areas of the estuary. The Navy has consulted with NOAA Fisheries regarding these findings, with this EA serving as the Biological Assessment for the Proposed Action. NOAA Fisheries provided concurrence, based on review of the Project, that the Proposed Action is not likely to adversely affect any listed species that fall under NOAA Fisheries' jurisdiction (NOAA Fisheries Office of Protected Resources, May 2016) (see Appendix H). Therefore, no further consultation pursuant to section 7 of the ESA is required.

On June 2, 2016, NOAA Fisheries proposed designating critical habitat under section 7 of the ESA for the Gulf of Maine and two other distinct population segments (DPS) of Atlantic sturgeon. Based on NOAA Fisheries' guidance, the Navy has determined that effects on proposed critical habitat for the Gulf of Maine DPS of the Atlantic sturgeon would be insignificant or discountable and that conferencing is not

required for the Proposed Action under section 7(a)(4). NOAA Fisheries has indicated this determination is appropriate (Trefry 2016).

Airborne Noise. Construction of the proposed waterfront projects under Alternative 1 and Alternative 2 would generate temporary noise due to the use of heavy construction equipment, trucks, and other vehicles. Given the temporary and intermittent nature of the proposed construction work, the impacts on nearby residential receptors during construction would be considered minor to moderate under Alternative 1 and moderate under Alternative 2, as a result of increased pile driving at Berths 11, 12, and 13 and pile driving at Dry Dock 3, closer to the nearest residential receptors. Construction would occur only during daylight hours and would comply with local noise ordinances under either alternative. Therefore, implementation of the Proposed Action under either alternative would not result in significant impacts on the noise environment during construction. Noise levels during continued operations of the berths and Dry Dock 3 would be similar to existing baseline noise levels; therefore, long-term noise impacts are not expected.

Table ES-1 provides a summary of the potential impacts on the resources associated with each of the alternative actions analyzed.

Table ES-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Air Quality	No change in emissions. No change in the vulnerability of Shipyard waterfront infrastructure to the impacts of climate change.	Annual direct emissions of criteria pollutants during construction and after implementation would not result in significant impacts on air quality. The temporary increase in greenhouse gas (GHG) emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region. The vulnerability of Shipyard waterfront infrastructure to the impacts of climate change would be reduced.	Annual direct emissions of criteria pollutants during construction and after implementation would not result in significant impacts on air quality. This temporary increase in GHG emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region. The vulnerability of Shipyard waterfront infrastructure to the impacts of climate change would be reduced.
Water Resources	No change in water resources.	Short-term minor impacts on surface water, wetlands, and marine sediments would result from disturbance and potential water quality impacts during construction. No impact on the floodplain would occur. Short-term impacts would be minimized through use of standard best management practices (BMPs) and compliance with applicable federal and state permits and regulations. Long-term, minor impacts on wetlands would result from permanent filling of approximately 95,400 square feet to 117,200 square feet (with Option 1) of the Piscataqua River. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the Maine Department of Environmental Protection (MEDEP) prior to the start of construction.	Greater short-term impacts during construction would result from additional pile driving and the construction of a temporary cofferdam under this alternative. No impact on the floodplain would occur. Short-term impacts would be minimized through use of standard BMPs and compliance with applicable permits and regulations and would be minor. Temporary and permanent fill would impact an area of approximately 106,258 square feet to 126,258 square feet (with Option 1) of the Piscataqua River. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction.

Table ES-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Bathymetry	No changes to bathymetry in the Project area.	Long-term, minor impacts on bathymetry at Berths 11, 12, and 13 would result from permanent removal of river bottom. The Proposed Action would not affect navigation in the Piscataqua River.	Long-term, minor impacts on bathymetry at Berths 11, 12, and 13 would result from permanent removal of river bottom. Temporary and minor impacts on bathymetry at Dry Dock 3 would result from dredging and fill during construction. The Proposed Action would not affect navigation in the Piscataqua River.
Cultural Resources	No change to existing cultural resources in the Project area.	As evaluated under the National Environmental Policy Act (NEPA), no direct impacts on archaeological resources are anticipated, and direct and indirect impacts on architectural resources would be minimal to moderate. As evaluated under section 106 of the National Historic Preservation Act, no effects on archaeological resources that are historic properties are expected. Replacement of the Dry Dock 3 caisson would result in an adverse effect on Dry Dock 3, a contributing resource within the Portsmouth Naval Shipyard Historic District. The Navy has determined that no other architectural resources that are historic properties in the areas of potential effect (APEs) for the waterfront improvement projects would be adversely affected. The Navy has consulted with the Maine State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), federally recognized tribes, and other interested parties regarding the finding of an adverse effect on Dry Dock 3, and a Memorandum of Agreement (MOA) between the Navy and Maine SHPO has been executed. No traditional cultural properties have been identified at the Shipyard. The Navy has consulted with federally recognized tribes regarding the Proposed Action under Alternative 1.	As evaluated under NEPA, no direct impacts on archaeological resources are anticipated, and direct and indirect impacts on architectural resources would be minimal to moderate. As evaluated under section 106, no effects on archaeological resources that are historic properties are expected. Replacement of the Dry Dock 3 caisson would result in an adverse effect on Dry Dock 3, a contributing resource within the Portsmouth Naval Shipyard Historic District. The Navy has determined that no other architectural resources that are historic properties in the APEs for the waterfront improvement projects would be adversely affected. A separate consultation with the Maine SHPO, the ACHP, federally recognized tribes, and other interested parties regarding the Dry Dock 3 caisson replacement would be required if this alternative is implemented due to the different in-water construction method. No traditional cultural properties have been identified at the Shipyard.

Table ES-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Biological Resources	No change to marine biological resources.	Minor impacts on marine vegetation, fish (including managed essential fish habitat [EFH] species), benthic habitat, and species would occur as a result of disturbance, including turbidity and in-water noise, and limited mortality during construction and long-term loss of benthic and open water habitat. In-water noise would not result in long-term adverse effects or significant impacts on marine mammal populations. The Navy would implement various mitigation measures in accordance with the Incidental Harassment Authorizations (IHAs) issued for the Project to reduce the number of marine mammals potentially affected by in-water noise. The Navy has consulted with the National Oceanic and Atmospheric Administration NOAA National Marine Fisheries Service (NOAA Fisheries) regarding potential impacts on marine mammals under the Marine Mammal Protection Act (MMPA) under Alternative 1. Through consultation, the Navy and NOAA Fisheries have agreed on the maximum number of potential takes of marine mammals that would be allowed to occur during the first year of construction and mitigation measures to minimize these impacts. The Navy will comply with the requirements and mitigation measures in the IHA that will be issued prior to the start of in-water construction. The Navy has consulted with NOAA Fisheries regarding potential impacts on EFH for federally managed species under Alternative 1. NOAA Fisheries has determined that Alternative 1 would have minimal adverse effects on EFH. Alternative 1 may affect, but is not likely to adversely affect, two species listed under the ESA, the Gulf of Maine	Impacts resulting from increased pile driving and construction of the temporary cofferdam at Dry Dock 3 would occur over a longer duration and affect a slightly larger area. Overall short- and long-term impacts would be similar to those under Alternative 1 and would be minor. Separate consultations with NOAA Fisheries under section 7 of the Endangered Species Act (ESA) and the MMPA would be required if Alternative 2 is implemented.

Table ES-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
		distinct population segment (DPS) of the Atlantic sturgeon and the shortnose sturgeon. The Navy has consulted with NOAA Fisheries regarding the potential effects on listed species under Alternative 1 and received concurrence that the Proposed Action is not likely to adversely affect any listed species that fall under NOAA Fisheries' jurisdiction. The Navy has determined, based on NOAA Fisheries' guidance, that effects on proposed critical habitat for the Gulf of Maine DPS of the Atlantic sturgeon would be insignificant or discountable and conferencing is not required for the Proposed Action under section 7(a)(4). NOAA Fisheries has indicated this determination is appropriate.	
Visual Resources	No change to existing visual resources.	Minor to moderate short-term visual impacts would occur during construction. Short-term impacts would cease once construction is complete. Long-term visual impacts would be minor. No significant impacts on visual resources would occur.	Minor to moderate short-term visual impacts would occur during construction. Short-term impacts would cease once construction is complete. Long-term visual impacts would be minor. No significant impacts on visual resources would occur.
Noise	No change in existing ambient noise levels. Continued noise from Shipyard operations.	Construction would result in a temporary and intermittent increase in ambient noise levels during daytime hours, and minor to moderate impacts at nearest sensitive receptors.	Construction would result in a temporary and intermittent increase in ambient noise levels during daytime hours, and moderate impacts at nearest sensitive receptors. Increases in ambient noise levels during construction would be greater than under Alternative 1 because of the increase in pile driving at Berths 11, 12, and 13 and construction/removal of the temporary cofferdam at Dry Dock 3.

Table ES-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Infrastructure	No changes to existing infrastructure at the Shipyard.	There would be short- and long-term minor impacts on stormwater management during construction and as a result of expansion of the fitting-out pier deck. Short-term, minor impacts on solid waste management would result from disposal of dredge spoils. No long-term changes in utility demand would result.	There would be short- and long-term minor impacts on stormwater management during construction and as a result of expansion of the fitting-out pier deck. Greater but still short-term, minor impacts on solid waste management would result from disposal of dredge spoils from the berths and Dry Dock 3. No long-term changes in utility demand would result.
Transportation	No change to existing transportation conditions.	Temporary, minor increases in vehicle traffic would occur during construction but would result in no significant impact.	Average peak and daily vehicle trips during construction would be slightly higher under Alternative 2. No significant impact on transportation would result.
Hazardous Materials and Waste	No change associated with hazardous materials and wastes.	Negligible impacts would result from handling hazardous materials, generating and managing hazardous waste, and handling materials with special hazards. Small quantities of materials and wastes would be handled. The Navy and contractors would comply with a framework of federal/state regulations and Navy procedures.	Negligible impacts would result from handling hazardous materials, generation and management of hazardous waste and handling materials with special hazards. Small quantities of materials and wastes would be handled. The Navy and contractors would comply with a framework of federal/state regulations and Navy procedures.

Environmental Assessment for Waterfront Improvement Projects at Portsmouth Naval Shipyard, Kittery, Maine

TABLE OF CONTENTS

Abbreviations and Acronyms vii

1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION 1-1

1.1 Introduction 1-1

1.2 Location 1-5

1.3 Purpose of and Need for the Proposed Action 1-5

1.4 Scope of Environmental Analysis 1-6

1.5 Relevant Laws and Regulations 1-6

1.6 Public Involvement, Agency Participation, and Intergovernmental Coordination 1-7

2 PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Proposed Action 2-1

2.2 Screening Factors 2-1

2.3 Alternatives Carried Forward for Analysis 2-1

2.3.1 No Action Alternative 2-2

2.3.2 Alternative 1 (Preferred Alternative) 2-2

2.3.3 Alternative 2 2-9

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis 2-13

2.4.1 Repair or Replacement of the Existing Piles and Elevated Decks at Berths 11, 12, and 13 2-13

2.4.2 Restoration of the Existing Dry Dock 3 Caisson 2-14

2.4.3 Construction of a Temporary Straight Steel Sheet Pile Cofferdam at Dry Dock 3 2-14

3 AFFECTED ENVIRONMENT 3-1

3.1 Air Quality 3-4

3.1.1 Regulatory Setting 3-4

3.1.2 Affected Environment 3-8

3.2 Water Resources 3-10

3.2.1 Regulatory Setting 3-10

3.2.2 Affected Environment 3-12

3.3 Bathymetry 3-17

3.3.1 Regulatory Setting 3-17
3.3.2 Affected Environment 3-17
3.4 Cultural Resources 3-17
3.4.1 Regulatory Setting 3-18
3.4.2 Affected Environment 3-18
3.5 Biological Resources 3-24
3.5.1 Regulatory Setting 3-25
3.5.2 Affected Environment 3-26
3.6 Visual Resources 3-37
3.6.1 Regulatory Setting 3-37
3.6.2 Affected Environment 3-37
3.7 Noise 3-40
3.7.1 Basics of Sound and A-weighted Sound Level 3-41
3.7.2 Affected Environment 3-44
3.8 Infrastructure 3-46
3.8.1 Regulatory Setting 3-46
3.8.2 Affected Environment 3-48
3.9 Transportation 3-49
3.9.1 Regulatory Setting 3-49
3.9.2 Affected Environment 3-49
3.10 Hazardous Materials and Wastes 3-52
3.10.1 Regulatory Setting 3-52
3.10.2 Affected Environment 3-52
4 ENVIRONMENTAL CONSEQUENCES 4-1
4.1 Air Quality 4-1
4.1.1 No Action Alternative 4-1
4.1.2 Alternative 1 (Preferred Alternative) 4-2
4.1.3 Alternative 2 4-3
4.2 Water Resources 4-5
4.2.1 No Action Alternative 4-5
4.2.2 Alternative 1 (Preferred Alternative) 4-5
4.2.3 Alternative 2 4-11
4.3 Bathymetry 4-14
4.3.1 No Action Alternative 4-14
4.3.2 Alternative 1 (Preferred Alternative) 4-15
4.3.3 Alternative 2 4-15

4.4 Cultural Resources 4-16
4.4.1 No Action Alternative 4-17
4.4.2 Alternative 1 (Preferred Alternative) 4-17
4.4.3 Alternative 2 4-21
4.5 Biological Resources 4-23
4.5.1 No Action Alternative 4-23
4.5.2 Alternative 1 (Preferred Alternative) 4-23
4.5.3 Alternative 2 4-38
4.6 Visual Resources 4-40
4.6.1 No Action Alternative 4-41
4.6.2 Alternative 1 (Preferred Alternative) 4-41
4.6.3 Alternative 2 4-43
4.7 Noise 4-43
4.7.1 No Action Alternative 4-44
4.7.2 Alternative 1 (Preferred Alternative) 4-44
4.7.3 Alternative 2 4-47
4.8 Infrastructure 4-50
4.8.1 No Action Alternative 4-50
4.8.2 Alternative 1 (Preferred Alternative) 4-50
4.8.3 Alternative 2 4-52
4.9 Transportation 4-53
4.9.1 No Action Alternative 4-53
4.9.2 Alternative 1 (Preferred Alternative) 4-53
4.9.3 Alternative 2 4-55
4.10 Hazardous Materials and Wastes 4-56
4.10.1 No Action Alternative 4-56
4.10.2 Alternative 1 (Preferred Alternative) 4-57
4.10.3 Alternative 2 4-58
4.11 Summary of Potential Impacts on Resources and Impact Avoidance and Minimization 4-58
5 CUMULATIVE IMPACTS 5-1
5.1 Definition of Cumulative Impacts 5-1
5.2 Scope of Cumulative Impacts Analysis 5-2
5.3 Past, Present, and Reasonably Foreseeable Actions 5-2
5.3.1 Past Actions 5-2
5.3.2 Present and Reasonably Foreseeable Actions 5-6
5.4 Cumulative Impact Analysis 5-9

5.4.1 Air Quality 5-9
5.4.2 Water Resources 5-10
5.4.3 Bathymetry 5-12
5.4.4 Cultural Resources 5-13
5.4.5 Biological Resources 5-14
5.4.6 Visual Resources 5-17
5.4.7 Noise 5-19
5.4.8 Infrastructure 5-20
5.4.9 Transportation 5-22
5.4.10 Hazardous Materials and Wastes 5-23
6 OTHER CONSIDERATIONS REQUIRED BY NEPA 6-1
6.1 Consistency with other Federal, State, and Local Laws, Plans, Policies, and Regulations 6-1
6.2 Irreversible or Irretrievable Commitments of Resources 6-5
6.3 Unavoidable Adverse Impacts 6-6
6.4 Relationship between Short-term Use of the Environment and Long-term Productivity 6-7
7 REFERENCES 7-1
8 LIST OF PREPARERS 8-1
9 PERSONS CONTACTED LIST 9-1

List of Photos

Photo 1-1 Portal Cranes 1-4
Photo 1-2 Piles at Berth 11 with Corrosion Visible near the Water Line 1-4

List of Figures

Figure 1-1 Location Map, Portsmouth Naval Shipyard 1-2
Figure 1-2 Dry Docks, Berths, and the Portal Crane Rail System, Portsmouth Naval Shipyard 1-3
Figure 2-1 Berths 11, 12, and 13 Bulkhead, Phases 1 and 2, Portsmouth Naval Shipyard 2-4
Figure 2-2 Berth 11 Bulkhead Conceptual Design, Alternative 1, Portsmouth Naval Shipyard 2-5
Figure 2-3 Berths 11, 12, and 13 Bulkhead with Option 1, Phases 1 and 2, Portsmouth Naval Shipyard 2-8
Figure 3.2-1 Water Resources, Portsmouth Naval Shipyard 3-13
Figure 3.2-2 FEMA Flood Zones, Portsmouth Naval Shipyard 3-16
Figure 3.4-1 Cultural Resources Areas of Potential Effect, Portsmouth Naval Shipyard 3-19
Figure 3.5-1 Eelgrass Beds, Portsmouth Naval Shipyard 3-27

Figure 3.5-2 Benthic Survey Locations, Portsmouth Naval Shipyard 3-28
Figure 3.6-1 Visually Sensitive and Scenic Areas, Portsmouth Naval Shipyard 3-38
Figure 3.7-1 A-Weighted Sound Levels from Typical Sources 3-42
Figure 3.9-1 Transportation, Portsmouth Naval Shipyard 3-50
Figure 4.5-1 Combined Zone of Influence for Underwater Vibratory Hammer and Underwater Impact Hammer, Portsmouth Naval Shipyard 4-28
Figure 4.5-2 Action Areas at Berths 11, 12, and 13 and Dry Dock 3, Portsmouth Naval Shipyard 4-32
Figure 4.7-1 Increase in Cumulative Noise Levels Allowed by Criteria (dBA) 4-44
Figure 5.3-1 Past Actions, Portsmouth Naval Shipyard 5-3
Figure 5.3-2 Present and Reasonably Foreseeable Future Actions, Portsmouth Naval Shipyard 5-4

List of Tables

Table 2-1 Construction Timeframes for the Proposed Waterfront Improvement Projects, Alternative 1 2-2
Table 2-2 Lengths of Bulkheads under Alternatives 1 and 2 2-3
Table 2-3 Numbers of Piles under Alternative 1, King Pile and Concrete Shutter Panel Bulkhead 2-6
Table 2-4 Construction Timeframes for the Proposed Waterfront Improvement Projects, Alternative 2 2-9
Table 2-5 Numbers of Piles under Alternative 2, King-Pile and Sheet-Pile Bulkhead 2-11
Table 2-6 Total Numbers of Piles under Alternatives 1 and 2 2-12
Table 3.0-1 Federally Listed Threatened, Endangered, and Protected Terrestrial Species Potentially Occuring Near Portsmouth Naval Shipyard 3-2
Table 3.1-1 National Ambient Air Quality Standards 3-6
Table 3.1-2 Metropolitan Portland Intrastate Air Quality Control Region (MPIAQR) 110 Air Emissions Inventory (2011) 3-9
Table 3.1-3 Reported Criteria Pollutant Air Emissions Inventory for Portsmouth Naval Shipyard 3-9
Table 3.2-1 Maine and New Hampshire Designated Uses for the Piscataqua River near Portsmouth Naval Shipyard 3-14
Table 3.5-1 Marine Mammal Species Potentially Occurring in the Piscataqua River Near Portsmouth Naval Shipyard 3-29
Table 3.5-2 Species with Designated Essential Fish Habitat near Portsmouth Naval Shipyard 3-31
Table 3.7-1 Subjective Responses to Changes in A-Weighted Decibels 3-41
Table 3.7-2 Portsmouth Naval Shipyard Nearest Noise-sensitive Receptors 3-44
Table 3.7-3 Ambient Sound Levels Recorded at Berths 11, 12, and 13 3-45

Table 3.9-1 Average Annual Daily Traffic in the Vicinity of Portsmouth Naval Shipyard 3-51
Table 4.1-1 Estimated Construction Emissions, Alternative 1 (Preferred Alternative) 4-3
Table 4.1-2 Estimated Construction Emissions, Alternative 2 4-4
Table 4.5-1 Pile Installation and Removal Activity for the Berths 11, 12, and 13 Structural Repairs under Alternative 1 (with Option 1) 4-24
Table 4.5-2 Injury and Disturbance Thresholds for Underwater and Airborne Sounds 4-26
Table 4.5-3 Pile Installation and Removal Activity for the Berths 11, 12, and 13 Structural Repairs and Dry Dock 3 Cofferdam under Alternative 2 (with Option 1) 4-39
Table 4.7-1 Alternative 1 (Preferred Alternative) Construction Hourly Sound Equivalent Level at Various Distances.....4-45
Table 4.7-2 Alternative 1 (Preferred Alternative) Construction Noise Summary.....4-46
Table 4.7-3 Alternative 1 (Preferred Alternative) Cumulative Construction Noise Exposure at Nearest Sensitive Receptors 4-46
Table 4.7-4 Alternative 2 Construction Noise Summary 4-48
Table 4.7-5 Alternative 2 Construction Noise Exposure at Nearest Sensitive Receptors.....4-49
Table 4.9-1 Average Daily Truck Trips and Privately Owned Vehicle (POV) Trips for the Proposed Waterfront Improvement Projects, Alternatives 1 (Preferred Alternative) and 2 4-54
Table 4.9-2 Overall Peak Construction Traffic as a Percentage of Existing Average Annual Daily Traffic (AADT), Alternative 1 (Preferred Alternative).....4-54
Table 4.9-3 Overall Peak Construction Traffic as a Percentage of Existing Average Annual Daily Traffic (AADT), Alternative 2 4-56
Table 4.11-1 Summary of Potential Impacts on Resource Areas.....4-59
Table 4.11-2 Impact Avoidance and Minimization Measures 4-64
Table 5.3-1 Cumulative Action Evaluation 5-5
Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action 6-1

Appendices

Appendix A General Construction Methods for in-Water Projects
Appendix B Clean Water Act and Coastal Zone Management Act Documentation
Appendix C Air Quality Calculations
Appendix D National Historic Preservation Act Section 106 Documentation
Appendix E Tribal Government-to-Government Documentation
Appendix F Marine Mammal Protection Act Documentation
Appendix G Magnuson-Stevens Fishery Conservation and Management Reauthorization Act Documentation
Appendix H Endangered Species Act Documentation
Appendix I Notice of Intent

Abbreviations and Acronyms

Acronym	Definition
AADT	average annual daily traffic
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
AOC	area of concern
APE	area of potential effects
AST	aboveground storage tank
BMP	best management practice
°C	degrees Celsius
C&D	construction and demolition
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIA	controlled industrial area
cm	centimeter
CNO	Chief of Naval Operations
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DERP	Defense Environmental Restoration Program
DNL	day-night average sound level
DoD	United States Department of Defense
DOT	Department of Transportation
DPS	distinct population segment
EA	environmental assessment
EFH	essential fish habitat
EIS	environmental impact statement
EISA	Energy Independence and Security Act
EO	Executive Order
ER	Environmental Restoration (Program)
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FTA	Federal Transportation Agency
GHG	greenhouse gas
HAP	hazardous air pollutant
ICRMP	Integrated Cultural Resources Management Plan
IHA	Incidental Harassment Authorization
kV	kilovolt
LBP	lead-based paint
L_{eq}	equivalent sound level
LID	low-impact development
MEDEP	Maine Department of Environmental Protection
mm	millimeter
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPDES	Maine Pollutant Discharge Elimination System
MPIAQCR	Metropolitan Portland Intrastate Air Quality Control Region
M.R.S.	Maine Revised Statutes
MSAT	mobile source air toxic
MT	metric ton
MW	megawatt
MWH	megawatt-hour
NAAQS	National Ambient Air Quality Standards
NAVSEA	Naval Sea Systems Command
Navy	U.S. Department of the Navy
NEPA	National Environmental Policy Act

Acronym	Definition
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NOAA Fisheries	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRPA	Natural Resources Protection Act
NWI	National Wetland Inventory
OPNAVINST	Chief of Naval Operations Instructions
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PNSY	Portsmouth Naval Shipyard
POV	privately owned vehicle
PSD	prevention of significant deterioration
psi	pounds per square inch
RMS	root mean square
ROI	region of influence
S.R.	State Route
SEL	sound exposure level
Shipyard	Portsmouth Naval Shipyard
SHPO	State Historic Preservation Office/Officer
SIP	State Implementation Plan
SPCC	Spill Prevention, Control, and Countermeasures
TMDL	total maximum daily load
tpy	tons per year
U.S.	United States
U.S.C.	U.S. Code
UFC	United Facilities Criteria
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
ZOI	zone of influence

1 Purpose of and Need for the Proposed Action

1.1 Introduction

The U.S. Department of the Navy (Navy) proposes to restore and modernize waterfront infrastructure associated with Dry Docks 1 and 3 at Portsmouth Naval Shipyard (the Shipyard) in Kittery, York County, Maine (Figure 1-1). Construction associated with the action would take place in phases between October 2016 and October 2022. This section briefly identifies the Proposed Action and the responsible agency or agencies involved, including any cooperating agencies. It provides a succinct summary of the history of events and other relevant background information leading up to the Proposed Action. It also identifies the regulatory authority under which the National Environmental Policy Act (NEPA) document is being prepared.

The Navy has prepared this environmental assessment (EA) in accordance with NEPA, as implemented by the Council on Environmental Quality (CEQ) regulations and Navy regulations for implementing NEPA. The action proponent is the Commanding Officer, Portsmouth Naval Shipyard. No cooperating agencies were involved in preparing this EA.

Existing waterfront facilities that support the missions at Dry Docks 1 and 3 have reached the end of their design lives and are not able to meet evolving Shipyard mission requirements. Continuous maintenance and repair of waterfront facilities, including the pier structure at Berths 11, 12, and 13 and the Dry Dock 3 caisson (or gate) and its concrete seats, result in excessive costs and schedule delays and, therefore, impact the Shipyard's ability to efficiently achieve its mission.

Berths 11, 12, and 13. The pier infrastructure at Berths 11, 12, and 13 supports part of the west circuit of the Shipyard's portal crane rail system (see Figure 1-2). Portal cranes, which are track-mounted cranes on a central shaft atop four steel legs, are used to pre-assemble pieces of submarines, move them to a dry dock, and lift or reposition them as needed. Portal cranes also are used to lift and move large equipment (see Photo 1-1).

Age-related structural weaknesses in this pier, called the "fitting-out" pier, directly impact operation of the west circuit of the portal crane rail system and, consequently, impact maintenance schedules and the associated costs of maintenance services at Dry Docks 1 and 3. The sides of the pier are open at Berths 11, 12, and 13, and water action has corroded the steel piles over the decades, weakening the overall structure that supports the portal crane rail system (see Photo 1-2). Accelerated corrosion of the piles at Berths 11, 12, and 13 has reduced and will continue to reduce the rated load-bearing capacity of these piles—or the maximum weight they can support with limited risk of failure—which prevents the Shipyard's portal cranes from operating at their full 60-ton load-bearing capacity. The Shipyard has been maintaining the piles at the fitting-out pier by installing pile jackets (i.e., fabric pouches that are installed around a pile over steel reinforcing bars and then filled with mortar). However, when pile jackets are installed, the rated load-bearing capacity of the piles must be reduced because of a combination of the reduced strength of the piles and the added weight of the pile jackets. Erosion of soil from the open sides of the pier and age-related failure of the pier deck additionally affect the structural integrity of these berths.

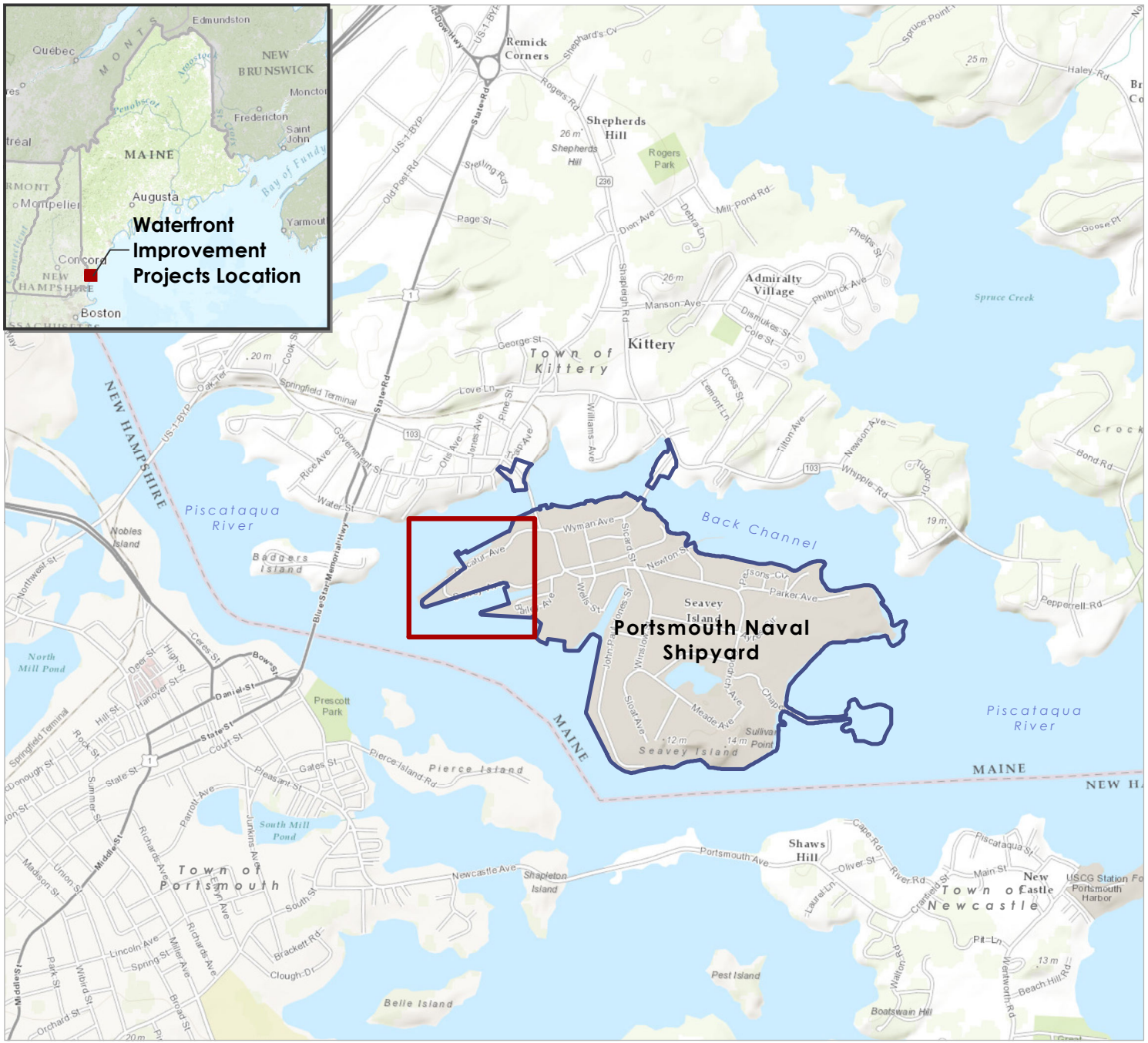

Figure 1-1
Location Map
Portsmouth Naval Shipyard
York County, Maine

Legend

Installation Area

0 1,000 2,000 3,000 4,000 Feet

Source: ESRI 2013; Department of Defense 2014.

Path: L:\Buffalo\Portsmouth_Railway\Maps\MXD\Reports\DOPPA\Figure_1-1_Regional Map_8.5x11.mxd

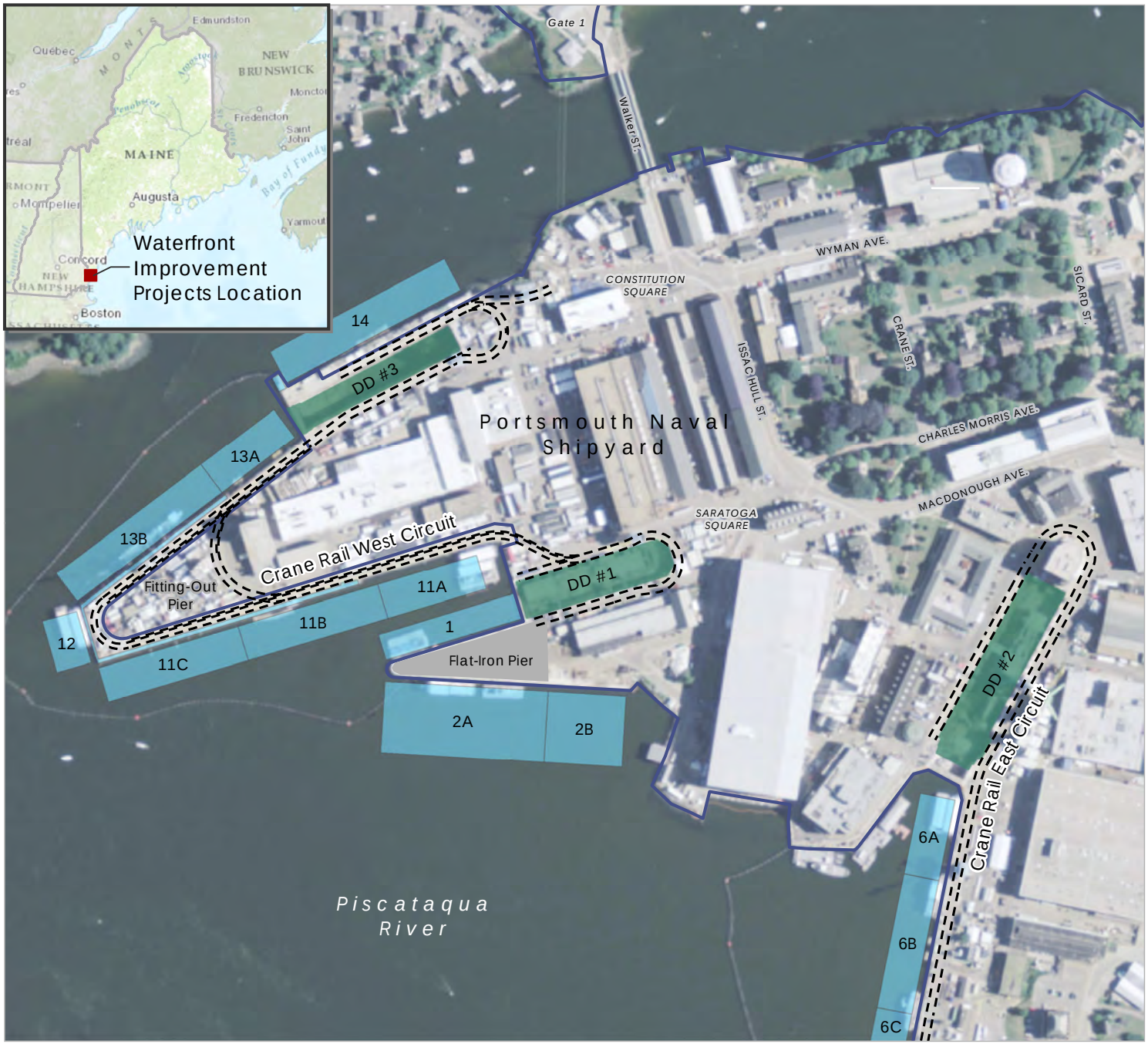

Figure 1-2
Dry Docks, Berths, and the Portal Crane Rail System
Portsmouth Naval Shipyard
York County, Maine

Legend

- Dry Dock
- Berth
- Installation Area
- Portal Crane Rail

N

0 250 500 750 Feet

Source: ESRI 2013; Department of Defense 2014.

Path: \\prtbhp1\GIS\Buffalo\Portsmouth_Railway\Maps\MXD\Reports\DOPPA\Figure_1-2_Dry Docks and the Portal Crane Rail System.mxd 1/25/2016

Photo 1-1 Portal Cranes

Photo 1-2 Piles at Berth 11 with Corrosion Visible near the Water Line

Dry Dock 3 Caisson and Seats. The steel caisson and seats at the entrance to Dry Dock 3 form the watertight enclosure for the dry dock. The existing caisson has been in use since 1962, has reached the end of its service life, and is showing signs of deterioration. At the inner and outer caisson seats, spalled concrete (i.e., concrete that has broken, flaked, or become pitted) allows some seawater to infiltrate the dry dock. Failure of either the caisson or caisson seats would cause uncontrolled flooding of the dry dock, potentially resulting in major damage to multi-billion-dollar vessels and injuries to personnel working in the dry dock. The caisson and caisson seats may no longer meet the requirements of the Naval Sea Systems Command Safety Certification Program for dry-docking facilities if they continue to deteriorate (DoD Standard Practice 1625C[SH] [MIL-STD-1625C[SH] 1987).

Major restoration and modernization of the infrastructure described above are needed to meet operational requirements and ensure safe operating environments for employees, industrial facilities and processes, and vessels.

1.2 Location

Established in 1800, Portsmouth Naval Shipyard is one of four remaining Navy shipyards in the nation. The Shipyard is centrally located about 50 miles from Boston, Massachusetts; Portland, Maine; and Manchester, New Hampshire, at the southernmost tip of Maine. The Shipyard fully encompasses Seavey Island, which lies at the mouth of the Piscataqua River. This federally owned island lies across the harbor from Portsmouth, New Hampshire, with access to the mainland by two bridges that connect to Kittery, Maine (Figure 1-1).

The Shipyard comprises more than 297 acres, including the main base and a family housing site off-base in Kittery, Maine. Many of the buildings located at the Shipyard are in an historic district, and 49 buildings are listed on the National Register of Historic Places (NRHP). The Shipyard has three dry docks and is capable of docking all active classes of submarines.

Portsmouth Naval Shipyard's primary mission is the overhaul, repair, and modernization of *Los Angeles*-class submarines. The Shipyard provides the Navy's submarine fleet with high-quality overhaul work in a safe, timely, and affordable manner. This includes a full spectrum of in-house support—from engineering services and production shops, to unique capabilities and facilities, to off-site support—all of which serve the multi-faceted assortment of fleet requirements.

The Proposed Action would occur in the Shipyard's controlled industrial area (CIA) and in the adjacent waters of the Piscataqua River (the Project area). The Project area is approximately 600 feet east of Badgers Island, an occupied island that is part of the Town of Kittery, and adjacent to the Piscataqua River federal navigation channel, which bisects the main channel of the river south of the Shipyard. A smaller channel, known as the Back Channel, is adjacent to the Project area to the north.

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to modernize and maximize dry dock capabilities for performing current and future missions efficiently and with maximum flexibility.

The need for the Proposed Action is to correct the deficiencies noted above (see Section 1.1) and ensure that the Shipyard can continue to support its primary mission to service, maintain, and overhaul submarines. By supporting the Shipyard's mission, the Proposed Action would assist in meeting the larger need for the Navy to provide capabilities for training and equipping combat-capable naval forces ready to deploy worldwide. In this regard, the Proposed Action furthers the Navy's execution of its congressionally mandated roles and responsibilities under 10 U.S. Code (U.S.C.) section 5062.

10 U.S.C. section 5062: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

1.4 Scope of Environmental Analysis

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No Action Alternative. The environmental resource areas analyzed in this EA include air quality, water resources, bathymetry, cultural resources, marine biological resources (marine vegetation, marine mammals, fish, benthic invertebrates, and marine threatened and endangered species), visual resources, airborne noise, infrastructure, transportation, and hazardous materials and waste. The study area for each resource analyzed may differ as a result of the way the Proposed Action interacts with or impacts the resource. For instance, the study area for hazardous materials and waste may only include the construction footprint of a building, whereas the noise study area would be expanded to include surrounding areas that may be impacted by airborne noise during construction.

Potential impacts on the following resource areas are considered to be negligible or non-existent, so they were not analyzed in detail in this EA: groundwater, topography, geology and soils, biological resources (terrestrial), terrestrial threatened and endangered species, land use, potable water and wastewater, airspace, public health and safety, socioeconomics, environmental justice, and Defense Environmental Restoration Program sites. See the introduction to Chapter 3 for brief discussions of potential impacts on each of these resource areas.

1.5 Relevant Laws and Regulations

The Navy has prepared this EA based upon federal and state laws, statutes, regulations, and policies that are pertinent to the implementation of the Proposed Action, including the following:

- NEPA (42 U.S.C. sections 4321-4370h), which requires an environmental analysis for major federal actions that have the potential to significantly impact the quality of the human environment
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] parts 1500-1508)
- Navy regulations for implementing NEPA (32 CFR part 775), which provides Navy policy for implementing CEQ regulations and NEPA
- Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)
- Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.)
- Rivers and Harbors Act (33 U.S.C. section 403 et seq.)

- Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)
- National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 et seq.)
- Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. section 1801 et seq.)
- Marine Mammal Protection Act (MMPA) (16 U.S.C. section 1361 et seq.)
- Executive Order (EO) 11988, Floodplain Management
- EO 12088, Federal Compliance with Pollution Control Standards
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13653, Preparing the United States for the Impacts of Climate Change
- EO 13693, Planning for Federal Sustainability in the Next Decade
- Maine Natural Resources Protection Act (38 Maine Revised Statutes [M.R.S.A] sections 480-A to 480-BB)
- Maine Site Location of Development Law (38 M.R.S. section 481)
- Maine Erosion and Sedimentation Control Law (38 M.R.S. section 420-C).

A description of the Proposed Action's consistency with these laws, policies, and regulations, as well as the names of regulatory agencies responsible for their implementation, is presented in Chapter 6 (Table 6-1).

1.6 Public Involvement, Agency Participation, and Intergovernmental Coordination

CEQ regulations (40 CFR part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. To solicit public comments on the EA, the Navy published a Notice of Intent (NOI) in the *Portsmouth Herald* on February 20, 2016 (see Appendix I). The NOI provided information on the Proposed Action and the resources to be evaluated in the EA and provided directions for submitting comments to the Shipyard. The public comment period ended March 1, 2016. No public comments were received by the Navy and, to date, there has been no public opposition to the Proposed Action.

Pursuant to its responsibilities under federal and state laws and regulations, the Navy has consulted with the following agencies and organizations:

- The U.S. Army Corps of Engineers (USACE), pursuant to its responsibilities under section 10 of the Rivers and Harbors Act and section 404 of the CWA: Consultation with the USACE will be completed before construction begins, and all construction activities will comply with the requirements of the individual USACE permit issued for the Berths 11, 12, and 13 structural repairs and the Maine General Permit issued for the Dry Dock 3 caisson replacement.
- The Maine Department of Environmental Protection (MEDEP), pursuant to its responsibilities under the CWA, the Maine Natural Resources Protection Act (NRPA), and the Maine Site

Location of Development Act: Correspondence related to these consultations is included in Appendix B.

- The Maine Department of Agriculture, Conservation, and Forestry Maine Coastal Program, pursuant to its responsibilities under the Coastal Zone Management Act (CZMA): Correspondence related to this consultation is included in Appendix B.
- The Maine SHPO, the ACHP, federally recognized tribes, and other interested parties, pursuant to its responsibilities under section 106 of the NHPA: Correspondence related to these consultations is included in Appendix D.
- Five federally recognized tribes— the Aroostook Band of Micmac Indians, the Houlton Band of Maliseet Indians of Maine, the Indian Township Reservation of the Passamaquoddy Tribe of Maine, the Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine—pursuant to its responsibilities under Executive Order 13175: Consultation with Indian Tribal Governments: Correspondence related to these consultations is included in Appendix E.
- The NOAA National Marine Fisheries Service, pursuant to its responsibilities under the MMPA, the Magnuson-Stevens Fishery Conservation Management Reauthorization Act, and section 7 of the Endangered Species Act: Correspondence related to these consultations is included in Appendices F, G, and H, respectively.

2 Proposed Action and Alternatives

2.1 Proposed Action

The Navy proposes to restore and modernize waterfront infrastructure associated with Dry Docks 1 and 3 at the Shipyard. The Proposed Action would include two waterfront improvement projects—structural repairs to Berths 11, 12, and 13 and replacement of the Dry Dock 3 caisson—which are described in detail in this chapter and in Appendix A. The waterfront improvement projects would be constructed between October 2016 and October 2022. (Note: Because of mission requirements and operational schedules at the dry docks and berths, the general construction schedules described for each alternative are subject to change.)

2.2 Screening Factors

NEPA's implementing regulations provide guidance on the consideration of alternatives to a federally proposed action and require rigorous exploration and objective evaluation of reasonable alternatives. Only those alternatives determined to be reasonable and meet the purpose and need require detailed analysis.

Potential alternatives that meet the purpose and need were evaluated against the following screening factors:

- Preventing further loss of portal crane rail load-bearing capacity at Berths 11, 12, and 13
- Providing adequate corrosion protection at Berths 11, 12, and 13
- Restoring load-bearing capacity at Berths 11, 12, and 13 sufficient to support a minimum 78,000-pound (39-ton) operational wheel-load capacity
- Restoring the condition of the Dry Dock 3 caisson so that it meets the requirements of the Naval Sea Systems Command (NAVSEA) Safety Certification Program
- Allowing for in-water and upland construction work to occur during times that would not conflict with Shipyard mission schedules
- Reducing the Navy's total cost of ownership, i.e., the frequency and cost of maintenance work on waterfront infrastructure
- Improving operational efficiencies in and around Dry Docks 1 and 3.

2.3 Alternatives Carried Forward for Analysis

Two action alternatives were identified, based on reasonable alternative screening factors and the ability to meet the purpose and need for the Proposed Action, and are analyzed within this EA. Alternative 1, the Preferred Alternative, incorporates in-water construction techniques at Berths 11, 12, and 13 and the Dry Dock 3 caisson that would require less pile driving, reducing impacts on in-water resources, including marine mammals, fish, and benthic communities, and reducing airborne noise impacts on communities near the Shipyard. Alternative 2 incorporates different in-water construction techniques at Berths 11, 12, and 13 and the Dry Dock 3 caisson and would require a larger number of piles and thus more pile driving than Alternative 1. While the alternatives described below have been developed based on general construction methodologies, the exact means and methods of construction would be determined at the discretion of the construction contractor.

2.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The infrastructure and operational deficiencies described in Chapter 1 would not be addressed, with serious consequences to the Shipyard's ability to meet mission requirements. Failure to implement the Proposed Action would prevent the Shipyard from offering competitive and timely repair, maintenance, and overhaul services to the Navy fleet. Because it would fail to support mission requirements, the No Action Alternative would not meet the purpose and need for the Proposed Action; however, as required by NEPA, the No Action Alternative is carried forward for analysis in this EA and provides a baseline for measuring the environmental consequences of the action alternatives.

2.3.2 Alternative 1 (Preferred Alternative)

Table 2-1 provides the estimated construction schedules for the Berths 11, 12, and 13 structural repairs and Dry Dock 3 caisson replacement under Alternative 1. Because of mission requirements and operational schedules at the dry docks and berths, these schedules are subject to change.

Table 2-1 Construction Timeframes for the Proposed Waterfront Improvement Projects, Alternative 1

Project	*Estimated Construction Start*	*Estimated Construction End*
Berths 11, 12, and 13 Structural Repairs	October 2016	October 2022
Phase 1	October 2016	June 2019
In-Water Work - Phase 1 (Berth 11)	January 2017	August 2018
Phase 2	October 2020	October 2022
In-Water Work - Phase 2 (Berths 12 and 13)[(1)]	To be determined based on availability of berths	To be determined based on availability of berths
Dry Dock 3 Caisson Replacement	February 2017	August 2018
In-Water Work – Outer Caisson Seat Repairs	March 2017	July 2017

Notes:
(1) In-water work at Berths 12 and 13(A and B) would be completed in phases, subject to operational schedules at these berths. The total duration of in-water work at both berths would be between 18 and 20 months.

Berths 11, 12, and 13 Structural Repairs

This proposed project would protect the pier structure at Berths 11, 12, and 13 from further deterioration and restore portal crane load-bearing capacity by enclosing these berths with bulkheads. The project would involve in-water work when installing the bulkheads and upland work when demolishing the existing timber pier deck along the berths, relocating utilities, and restoring and expanding the concrete and timber pier deck once construction is complete.

Construction of this project would be phased to avoid causing operational impacts at Dry Docks 1 and 3. Phase 1 of construction at Berth 11 would begin no earlier than October 2016 (in-water work would begin no earlier than January 2017) and would be completed by June 2019. Phase 2 of construction at Berths 12 and 13 would begin no earlier than October 2020 (in-water work to be determined based on availability of berths) and be completed by October 2022. Construction schedules are subject to change due to mission requirements.

Under Alternative 1, the Preferred Alternative, Berths 11 (A and B), 12, and 13 (A and B) would be enclosed with bulkheads constructed primarily of steel H-type king piles and concrete shutter panels

(pre-cast concrete panels that would be stacked on top of one another to form a wall). The approximate lengths of the proposed bulkheads are provided in Table 2-2. The bulkheads would be constructed within approximately 5 feet of the faces of Berths 11B (and 11C under Option 1, discussed below), 12, and 13 (see Figures 2-1 and 2-2). Berth 11A is not completely linear, and the easternmost 425 feet of Berth 11A is offset from the remainder of the berth face. To align the eastern section of Berth 11A with the rest of the berth, the new bulkhead will be offset nearly 14.5 feet from the existing berth face in this area. The bulkhead at Berth 11B will be flush with the bulkhead constructed at Berth 11A.

Table 2-2 Lengths of Bulkheads under Alternatives 1 and 2[(1)]

Alternative	*Berth*	*Length (Feet)*
1 and 2	11A and 11B	867
1 and 2, with Option 1	11C	400
1 and 2, with Option 1	11 (A, B, and C)	1,267
1 and 2	12	180
1 and 2	13 (A and B)	790

Notes:
(1) Lengths are approximate.

Before the start of in-water construction, temporary silt curtains with floating containment booms would be placed approximately 75 to 100 feet off of Berths 11 and 13 to contain debris or sediment suspended during the dredging and would remain in place during construction. Berth 12 is a relatively short berth (150 feet in length) situated at the nose of the pier. The berth juts out into the Piscataqua River and is subjected to very swift tidal currents, making it difficult to maintain an effective silt curtain; therefore, a silt curtain would not be installed at this berth.

At the beginning of the in-water work, existing timber piles would be removed from the berth faces. A total of 193 timber piles would be removed under both phases, 173 piles from Berths 11, 12, and 13 and 20 piles from two timber dolphins at the western corners of the pier (see Appendix A for more detailed information). King piles would be regularly spaced along the berths and grouted into sockets drilled into the bedrock (i.e., “rock-socketed”). The drill rig would be operated from a temporary trestle structure on piles or a jack-up barge (approximately 70 feet long) to avoid interfering with portal crane operations at the berth during construction. The concrete shutter panels then would be installed in stacks between the king piles. The depth to bedrock is greater along an approximately 16-foot section at the eastern end of Berth 11A and an additional 101 feet between Berths 11A and 11B, thus allowing a conventional sheet-pile bulkhead to be constructed (MN-FST, 2015a). The steel sheet piles would be driven to a bedrock using a vibratory hammer. Sheet piles installed with a vibratory hammer also would be used to construct “returns,” which would be shorter bulkheads connecting the new bulkheads to the existing bulkhead under the pier. Once the bulkheads are complete, the two timber dolphins at the western corners of the pier would be replaced with similar dolphins constructed of approximately 20 piles.

The Navy has determined that installing a bulkhead at Berth 11C may not be economically feasible at this time. As such, installation of a bulkhead at Berth 11C is being considered as an option under Alternative 1 that may be implemented if funding becomes available. This option is discussed in more detail below.

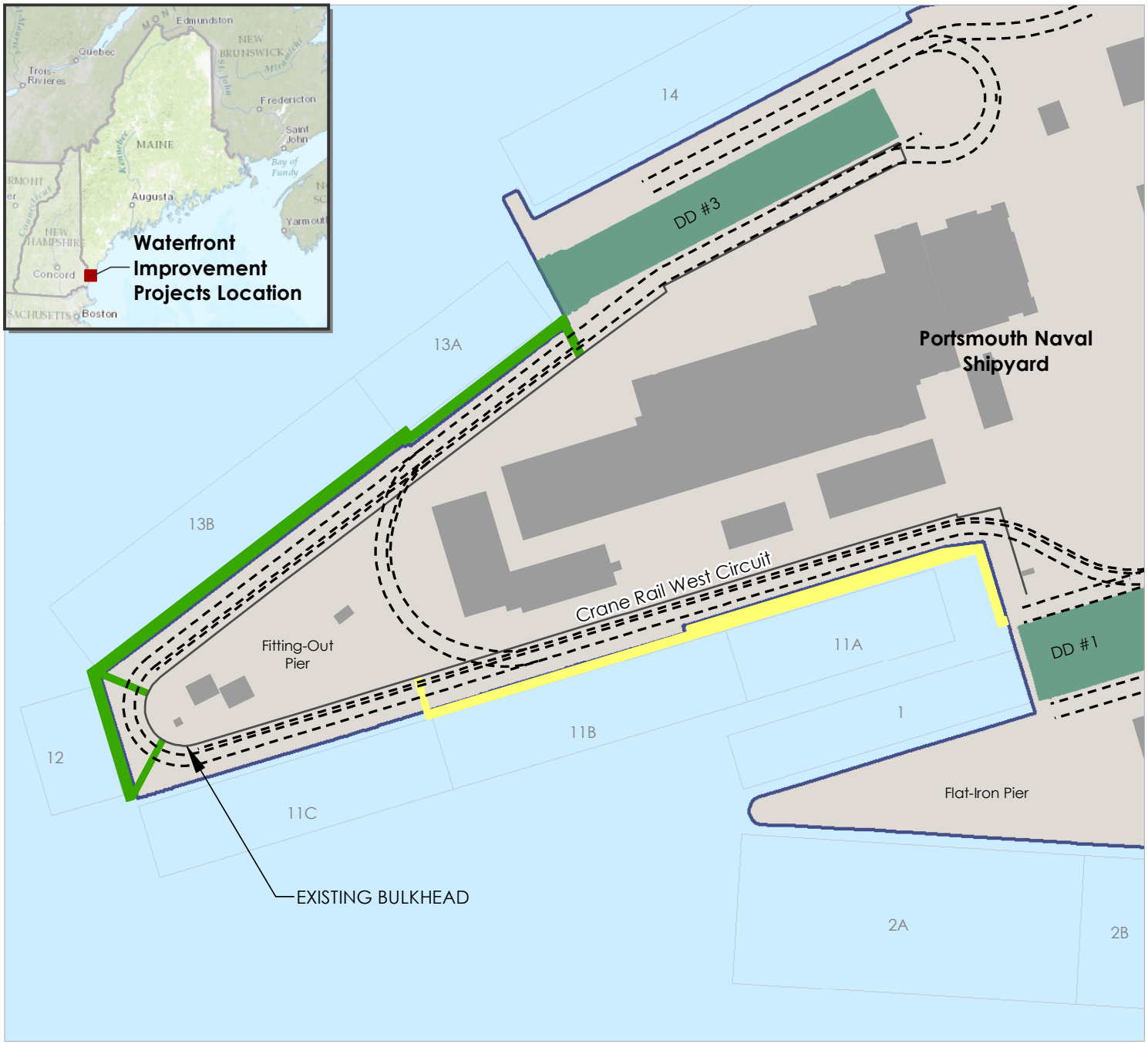

Figure 2-1
Berths 11, 12, and 13 Bulkhead, Phases 1 and 2
Portsmouth Naval Shipyard
York County, Maine

Legend

- Proposed Bulkhead Phase 1
- Proposed Bulkhead Phase 2
- Dry Dock
- Berth
- Existing Structures
- Installation Area
- Portal Crane Rail

N

0 100 200 300 400 Feet

Source: ESRI 2013; Department of Defense 2014.

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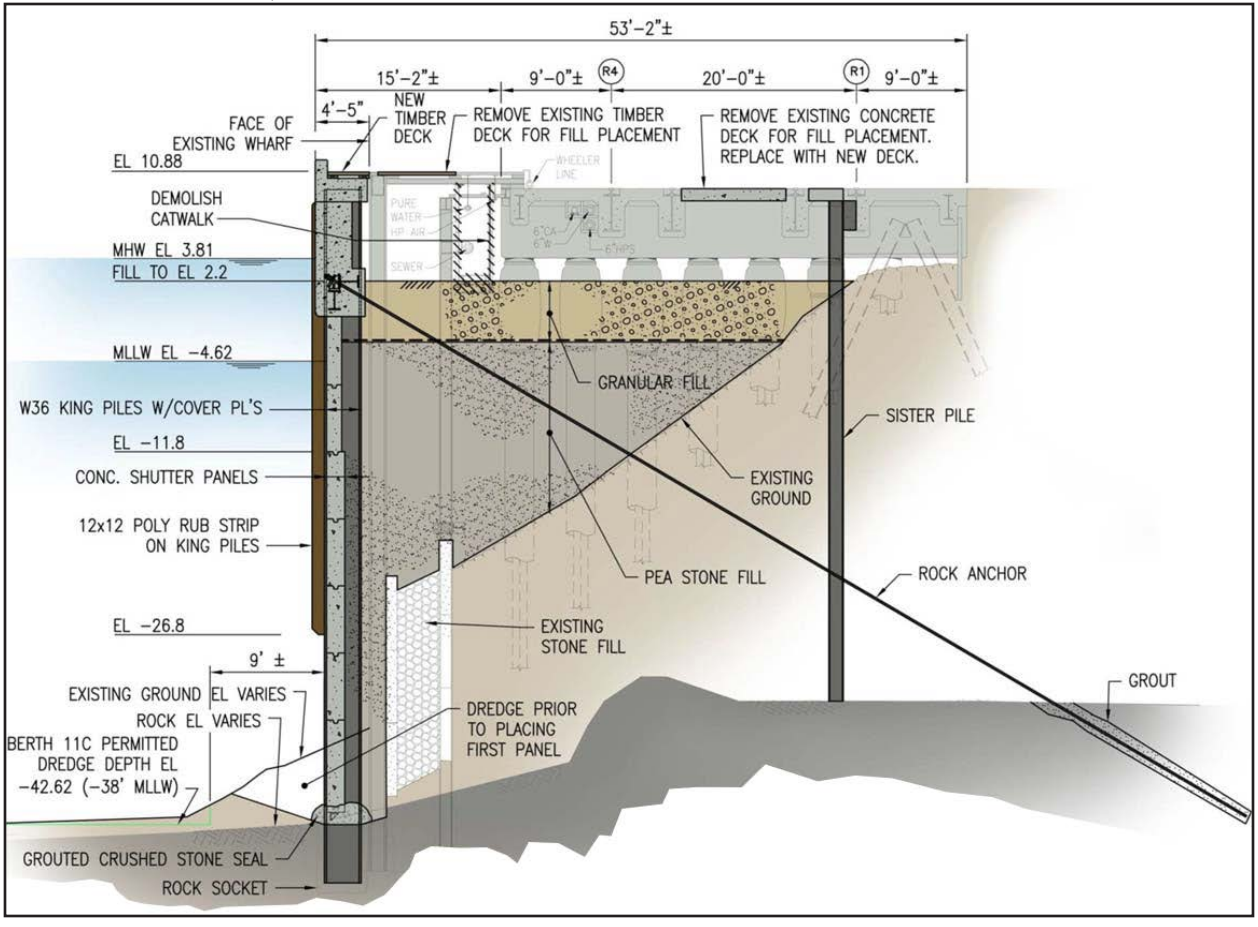

Figure 2-2
Berth 11 Bulkhead Conceptual Design
Portsmouth Naval Shipyard
York County, Maine

Additional in-water work would be required to install steel H-type sister piles at the location of the inboard portal crane rail beam at Berths 11 and 13, including Berth 11C (see Figure 2-2). The sister piles would provide additional support for the portal crane rail system and restore its load-bearing capacity. The sister piles would be driven into the bedrock below the pier, in water generally less than 10 feet deep, using an impact hammer.

Table 2-3 provides the approximate number of piles that would be installed and removed at each berth and the installation and removal methods that would be used for each type of pile.

Table 2-3 Numbers of Piles under Alternative 1, King Pile and Concrete Shutter Panel Bulkhead[1]

Berth	***Alternative 1***			***Alternative 1 (with Option 1)***		
	11	***12***	***13***	***11***	***12***	***13***
Piles Installed						
Temporary 14-inch Steel H-type Piles for Trestle System (Impact-Driven)	40	12	48	64	12	48
King Piles (Rock-socketed)	60	16	67	94	16	67
Sheet Piles (Vibratory-Driven)	69	0	0	69	0	0
Sheet Pile Returns (Vibratory-Driven)	43	86[2]	43	43	43[3]	43
Sister Piles (Impact-Driven)	50	0	37	50	0	37
Timber-pile Dolphins (Vibratory-Driven)[4]	7	0	13	7	0	13
Piles Removed						
Timber Piles (Vibratory Extraction)[5]	70	37	66	70	37	66
Timber-pile Dolphins (Vibratory Extraction)	7	0	13	7	0	13
Temporary 14-inch Steel H-type Piles for Trestle System (Vibratory Extraction)	40	12	48	64	12	48

Source: MN-FST, 2015b

Notes:
(1) Pile numbers are approximate.
(2) Up to approximately 86 sheet piles may be required for the returns at Berth 12 if construction of the bulkheads at Berths 12 and 13 does not occur simultaneously. Approximately half of this number of piles (43 piles) would be needed to construct a return at the southern end of Berth 12, where this berth meets Berth 11.
(3) Up to approximately 43 sheet piles would be needed to construct a return at the northern end of Berth 12 if construction of the bulkheads at Berths 12 and 13 does not occur simultaneously.
(4) The timber-pile dolphins are located at the corners of Berths 11 and 12 and Berths 12 and 13.
(5) Timber piles would be removed from Berths 11A, 12, and 13A only. No timber piles are located at Berths 11B, 11C, or 13B.

Once the bulkheads constructed under each phase are connected to the pier at both ends and closed off, the areas inside the bulkheads and beneath the pier would be backfilled. Backfilling the bulkheads would provide several benefits, including:

- Slowing down the rate at which the piles supporting the pier are corroded by creating a reduced-oxygen environment
- Protecting the piles from water action and the splash zone
- Laterally supporting the piles along most of their height (MN-FST, 2015a).

Approximately 1,291,410 cubic feet (47,830 cubic yards) of fill would be needed to complete Phases 1 and 2 under Alternative 1. An area of approximately 95,400 square feet would be filled. Dredged sediments that are suitable for reuse according to the Maine Department of Environmental Protection (MEDEP) Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418) would be reused as fill material at the site, which would reduce the amount of fill material that would need to be brought onto the Shipyard under Alternative 1. However, it is expected that most of the fill material will need to be brought in from a permitted outside source. Additional information on the dredging and backfill that would be required is provided in Appendix A.

The king pile and concrete shutter panel bulkheads proposed under Alternative 1, once complete, would enclose and laterally support the piles; protect the pier's utility systems; prevent additional corrosion of the piles and thereby eliminate the expensive, accelerated maintenance cycle; and restore the portal crane rail system's load-bearing capacity.

Option 1, Installation of a Bulkhead at Berth 11C

If sufficient construction funds are available, the Navy may install a king pile and concrete shutter panel bulkhead at Berth 11C as part of Phase 1 (see Figure 2-3). The bulkhead would extend from the western end of Berth 11B to the southern end of Berth 12. The total length of the bulkhead at Berths 11A, 11B, and 11C would be approximately 1,267 feet if Option 1 is implemented (see Table 2-1). The in-water construction process would be the same as the process described above and in Appendix A. Table 2-2 provides the approximate number of piles that would be installed at Berths 11, 12, and 13 under Alternative 1 with Option 1.

A total of approximately 1,554,660 cubic feet (57,580 cubic yards) of fill would be needed if Option 1 is implemented, and an area of approximately 117,200 square feet would be filled. Reuse of dredged sediments would reduce the amount of fill material that would need to be brought onto the Shipyard. However, it is expected that most of the fill material will need to be brought in from a permitted outside source. The approximate amount of fill needed at each berth is provided in Appendix A.

Dry Dock 3 Caisson Replacement

The Navy is proposing to replace the steel caisson at Dry Dock 3 to address the deterioration of the existing caisson and meet the requirements of the NAVSEA Safety Certification Program. This work would include removal and replacement of the caisson and repair of the inner and outer concrete and steel caisson seats. This project would be completed between February 2017 and August 2018; in-water work would begin no earlier than March 2017 and would be complete by July 2017. Replacement of the caisson and repair of the inner and outer concrete caisson seats would be scheduled around the operational schedule for Dry Dock 3; the construction schedule may change due to mission requirements.

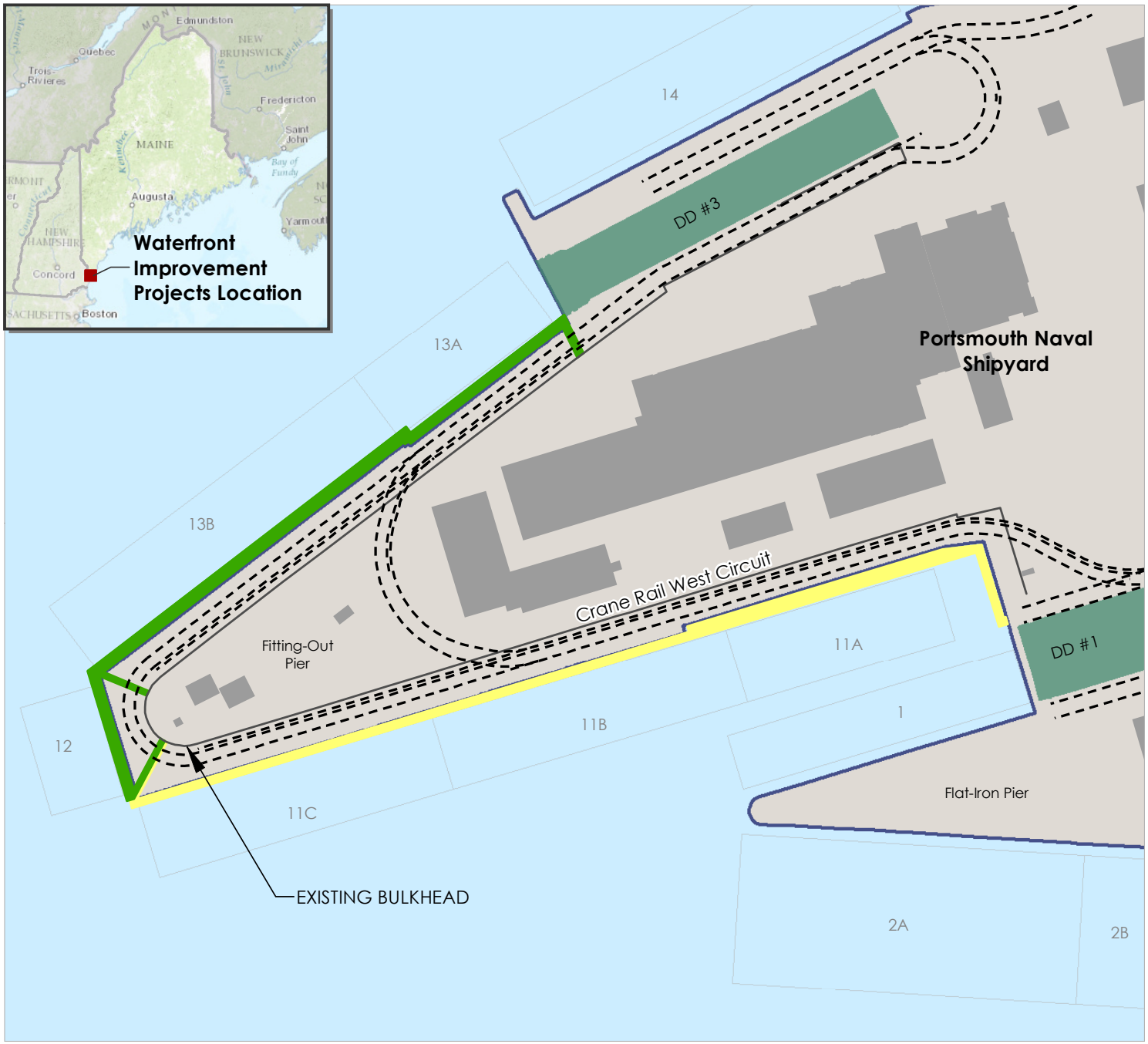

Figure 2-3
Berths 11, 12, and 13 Bulkhead with Option 1, Phases 1 and 2
Portsmouth Naval Shipyard
York County, Maine

Legend

- Proposed Bulkhead Phase 1
- Proposed Bulkhead Phase 2
- Dry Dock
- Berth
- Existing Structures
- Installation Area
- Portal Crane Rail

N

0 100 200 300 400 Feet

Source: ESRI 2013; Department of Defense 2014.

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Construction work would begin with repairs to the outer caisson seat. Site investigations have determined that the repairs needed along the outer caisson seat are less extensive than the repairs needed along the inner seat. These repairs would consist of rehabilitating areas of cracked and spalled concrete along the outer caisson seat. Full replacement of the caisson seat would not be needed so the work would be completed underwater by divers. A temporary construction caisson also would be used to complete some of the in-water work. The temporary construction caisson will be a steel structure attached to the outside of the outer caisson seat. During work on the outer caisson seat, a containment boom and siltation curtain would be installed outside the in-water work area to contain any debris. Divers would clean the surfaces of the concrete caisson seat and steel armoring with a 10,000 psi (pounds per square inch) hydroblast pressure washer to remove any marine growth. The divers would then remove any loose, deteriorated concrete to prepare the surfaces for concrete repairs. Grout would be injected into isolated cracks in the caisson seat, and new concrete would be placed in larger areas of deterioration using the tremie concrete placement method.[1]

When operational schedules permit, the caisson would be moved from the inner caisson seat to the outer caisson seat, and repairs to the inner caisson seat would be completed. The caisson would be closed and positioned in the outer caisson seat during these repairs. Damaged concrete at the inner caisson seat would be demolished using a combination of mechanical methods and hydro-demolition and removed. New reinforced concrete panels would be installed along the floor and walls of the dry dock, and steel armoring at the corners of the inner caisson seat would be repaired or replaced as needed.

Once repairs to the caisson seats are complete, the existing caisson would be removed and the new caisson would be floated into place and tested for water-tightness. The new caisson and repaired caisson seats would be 1 foot taller and 1 foot wider to take into consideration the projected sea-level rise in the lower Piscataqua River. The existing caisson, once removed, would be treated in a manner determined in consultation with the Maine State Historic Preservation Office.

2.3.3 Alternative 2

Table 2-4 provides the estimated construction schedules for Berths 11, 12, and 13 structural repairs and Dry Dock 3 caisson replacement under Alternative 1. Due to mission requirements and operational schedules at the dry docks and berths, these schedules are subject to change.

Table 2-4 Construction Timeframes for the Proposed Waterfront Improvement Projects, Alternative 2

Project	*Estimated Construction Start*	*Estimated Construction End*
Berths 11, 12, and 13 Structural Repairs	October 2016	October 2022
Phase 1	October 2016	June 2019
In-Water Work - Phase 1 (Berth 11)	January 2017	August 2018
Phase 2	October 2020	October 2022
In-Water Work - Phase 2 (Berths 12 and 13)(1)	To be determined based on availability of berths	To be determined based on availability of berths

[1] The tremie concrete placement method involves placing the end of a pipe below water and feeding concrete down the pipe. The end of the pipe is kept immersed in the fresh concrete being laid, which displaces the water from the area while preventing water from diluting the cement.

Table 2-4 Construction Timeframes for the Proposed Waterfront Improvement Projects, Alternative 2

Project	*Estimated Construction Start*	*Estimated Construction End*
Dry Dock 3 Caisson Replacement	February 2017	August 2018
In-Water Work – Cofferdam Construction	July 2017	November 2017
In-Water Work – Cofferdam Removal	March 2018	July 2018

Notes:
(1) In-water work at Berths 12 and 13(A and B) would be completed in phases, subject to operational schedules at these berths. The total duration of in-water work at both berths would be between 18 and 20 months.

Berths 11, 12, and 13 Structural Repairs

The scope of this project would be the same as described in Section 2.3.2, and construction would be completed in the same phases. The pier structure at Berths 11, 12, and 13 would be protected from further deterioration, and portal crane load-bearing capacity would be restored through construction of bulkheads around the berths. The approximate lengths of the bulkheads are provided in Table 2-1. The bulkheads would be placed within approximately 5 feet of the faces of the existing berths, except along the eastern 425 feet of Berth 11A, where the bulkhead would be offset nearly 14.5 feet from the existing berth face, as described in Section 2.3.2. The project would involve in-water work to install the bulkheads and upland work to demolish the existing timber pier deck along the berths, relocate utilities, and restore and expand the concrete and timber pier deck once construction is complete.

Alternative 2 differs from Alternative 1 in the in-water construction method proposed. The steel sheet-pile bulkheads proposed under Alternative 2 would require additional pile driving and, therefore, would have greater impacts on in-water resources, including marine mammals and fish, than Alternative 1.

Under Alternative 2, Berths 11 (A and B), 12, and 13 (A and B) would be enclosed with bulkheads constructed of steel H-type king piles and steel sheet piles (see Figure 2-2). Before the start of in-water construction, temporary silt curtains with floating containment booms would be placed 75 to 100 feet off Berths 11 and 13, as described under Alternative 1. At the beginning of in-water work, timber piles would be removed from the berth faces. The king piles would be rock-socketed as described under Alternative 1. The steel sheet piles would be driven to bedrock between the H-type king piles using a vibratory hammer. Steel sheet pile returns would be installed with a vibratory hammer between the new bulkheads and the existing bulkhead under the pier. Once the bulkheads are complete, the two timber dolphins at the western corners of the pier would be replaced with similar dolphins constructed of approximately 20 piles.

Sister piles would be installed with an impact hammer at the inboard rail beam along the full length of Berths 11 and 13 to restore the portal crane load-bearing capacity. To maximize use of construction funds, the Navy would not install a bulkhead at Berth 11C but would install sister piles at the inboard portal crane rail beam at this berth to restore the portal crane load-bearing capacity.

Table 2-5 provides the approximate number of piles that would be installed or removed at each berth under Alternative 2 and the installation and removal methods that would be used for each type of pile.

Table 2-5 Numbers of Piles under Alternative 2, King-Pile and Sheet-Pile Bulkhead [1]

Berth	*Alternative 2*			*Alternative 2 (with Option 1)*		
	11	*12*	*13*	*11*	*12*	*13*
Piles Installed						
Temporary 14-inch Steel H-type Piles for Trestle System (Impact-Driven)	40	12	48	64	12	48
King Piles (Rock-socketed)	176	35	160	240	35	160
Sheet Piles (Vibratory-Driven)	350	68	318	478	68	318
Sheet-pile Returns (Vibratory-Driven)	43	86 [2]	43	43	43 [3]	43
Sister Piles (Impact-Driven)	50	0	37	50	0	37
Timber-pile Dolphins (Vibratory- Driven)[4]	7	0	13	7	0	13
Piles Removed						
Timber Piles (Vibratory Extraction)[5]	70	37	66	70	37	66
Timber-pile Dolphins (Vibratory Extraction)	7	0	13	7	0	13
Temporary 14-inch Steel H-type Piles for Trestle System (Vibratory Extraction)	40	12	48	64	12	48

Notes:
(1) Pile numbers are approximate.
(2) Up to approximately 86 sheet piles may be required for the returns at Berth 12 if construction of the bulkheads at Berths 12 and 13 does not occur simultaneously. Approximately half this number of piles (43 piles) would be needed to construct a return at the southern end of Berth 12, where this berth meets Berth 11.
(3) Up to approximately 43 sheet piles would be needed to construct a return at the northern end of Berth 12 if construction of the bulkheads at Berths 12 and 13 does not occur simultaneously.
(4) The timber-pile dolphins are located at the corners of Berths 11 and 12 and Berths 12 and 13.
(5) Timber piles would be removed from Berths 11A, 12, and 13A only. No timber piles are located at Berths 11B, 11C, or 13B.

Once the bulkheads are connected to the pier at both ends and closed off, the areas inside the bulkheads and beneath the pier would be filled. An area of approximately 95,400 square feet would be filled, and a total of approximately 1,291,410 cubic feet (47,830 cubic yards) of fill material would be needed for Alternative 2, the same estimated amount of fill as that needed under Alternative 1. As noted under Alternative 1, dredged sediments that are suitable for reuse according to the MEDEP Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418) would be reused as fill material at the site. However, it is expected that most of the fill material will need to be brought in from a permitted outside source. Additional information on the dredging and backfill that would be required is provided in Appendix A.

Once complete, the bulkheads would enclose and laterally support the piles, protect the pier's utility systems, prevent additional corrosion of the piles, and thereby eliminate the expensive 10-year maintenance cycle and restore the portal crane rail system's load-bearing capacity.

Option 1, Installation of a Bulkhead at Berth 11C

If sufficient construction funds are available, the Navy may install a king-pile and sheet-pile bulkhead at Berth 11C as part of Phase 1 (see Figure 2-3). The bulkhead would extend from the western end of Berth 11B to the southern end of Berth 12. The total length of the bulkhead at Berths 11A, 11B, and 11C would be approximately 1,267 feet if Option 1 is implemented (see Table 2-2). The in-water construction process would be the same as the process described above and in Appendix A. Table 2-5 provides the approximate number of piles that would be installed at Berths 11, 12, and 13 under Alternative 2 with Option 1.

If Option 1 is implemented, approximately 1,554,660 cubic feet (57,580 cubic yards) of fill material would be needed, and an area of approximately 117,200 square feet would be filled. Reuse of dredged sediments would reduce the amount of fill material that would need to be brought onto the Shipyard. However, it is expected that most of the fill material will need to be brought in from a permitted outside source. The approximate amount of fill needed at each berth is provided in Appendix A.

Table 2-6 provides a comparison of the approximate total number of piles that would be installed or removed at each berth under Alternatives 1 and 2.

Table 2-6 Total Numbers of Piles under Alternatives 1 and 2[(1)]

Alternative	*1*	*1 (with Option 1)*	*2*	*2 (with Option 1)*
Piles Installed				
Temporary 14-inch Steel H-type Piles for Trestle System (Impact-Driven)	100	124	100	124
King Piles (Rock-socketed)	143	177	371	435
Sheet-Piles (Vibratory Driven)	69	69	736	864
Sheet-Pile Returns (Vibratory-Driven)	172	129	172	129
Sister Piles (Impact-Driven)	87	87	87	87
Timber-pile Dolphins (Vibratory-Driven)	20	20	20	20
Piles Removed				
Timber Piles (Vibratory Extraction)	173	173	173	173
Timber-pile Dolphins (Vibratory Extraction)	20	20	20	20
Temporary 14-inch steel H-type Piles for Trestle System (Vibratory Extraction)	100	124	100	124

Sources: MN-FST, 2015a

Notes:
(1) Pile numbers are approximate.

Dry Dock 3 Caisson Replacement

As noted in Section 2.2.1, this project would include removal and replacement of the Dry Dock 3 caisson and repair of the inner and outer caisson seats. Caisson replacement is expected to begin in February 2017 and be complete by August 2018; however, the construction schedule is subject to change based on mission requirements. Under Alternative 2, more extensive repairs of the outer caisson seat would be completed. The level of repairs proposed under this alternative would require constructing a temporary, circular cellular cofferdam around the entrance to Dry Dock 3 to create a dry work area. More extensive repair and replacement of the concrete panels making up the outer caisson seat would extend the operational life of the repairs to approximately 50 years, compared with an operational life of approximately 10 years if Alternative 1 is implemented. However, Alternative 2 is more likely to disrupt waterfront industrial operations because of the increased time required to construct and remove the cofferdam. This alternative would also have additional impacts on marine biological resources as a result of temporary habitat disruption and underwater noise and would be more expensive to implement. Therefore, the underwater construction techniques described under Alternative 1 are preferred.

The general construction method for the temporary, circular cellular cofferdam proposed under Alternative 2 is described in Appendix A. Construction of the temporary cofferdam would occur at different times during the in-water work period and is anticipated to begin in July 2017 and be complete by November 2017. In-water construction would be phased to allow vessels to dock and undock at Dry Dock 3 while work is occurring on the temporary cofferdam and caisson seats. During construction of the temporary cofferdam, a containment boom and siltation curtain would be installed outside the in-water work area.

Repair work on the inner caisson seat would progress while the temporary cofferdam is still under construction. This work would occur while the existing caisson is closed, providing a dry work environment within the dry dock. Once the temporary cofferdam is completed, the Navy would complete repair work on the outer caisson seat and remove and replace the caisson. The temporary cofferdam would be removed between March 2018 and July 2018 once the caisson is replaced and the repair work on the caisson seats is completed. The entire in-water work period is expected to last approximately 12 months, beginning in July 2017 and ending no later than July 2018. The new caisson and repaired caisson seats would be 1 foot taller and 1 foot wider to accommodate the projected sea-level rise in the lower Piscataqua River. The existing caisson, once removed, would be treated as determined in consultation with the Maine State Historic Preservation Office (SHPO).

2.4 Alternatives Considered but not Carried Forward for Detailed Analysis

The following alternatives were considered but not carried forward for detailed analysis in this EA because they did not meet the purpose and need for the Proposed Action and satisfy the reasonable alternative screening factors presented in Section 2.2.

2.4.1 Repair or Replacement of the Existing Piles and Elevated Decks at Berths 11, 12, and 13

The Navy considered two additional alternatives for Berths 11, 12, and 13 structural repairs: repairing the existing piles and elevated decks at the berths or replacing these with new piles and decks (MN-FST, 2015a). Repairing the existing timber piles at the berths would require installing concrete-encased steel H-type sister piles, which would be driven into the bedrock below the pier. Replacing the structure at each berth would require removing the existing piles, demolishing the decks, and constructing new

elevated berth structures. Both of these alternatives would leave the faces of the berths open, exposing the support piles to additional deterioration over time (MN-FST, 2015a). Both alternatives were considered unfeasible and, therefore, were eliminated from further consideration because the Navy would not be able to complete construction during the windows of availability when the berths are not being used for Shipyard operations.

2.4.2 Restoration of the Existing Dry Dock 3 Caisson

The Navy considered restoring the existing, historic Dry Dock 3 caisson. However, restoring the caisson to the degree that it would meet the requirements of the NAVSEA Safety Certification Program would require adding a large amount of steel to the caisson and would still result in an adverse effect on this historic resource. Because of this expected adverse effect and the inefficiency of restoration compared with a one-for-one replacement, this alternative was eliminated from detailed consideration.

2.4.3 Construction of a Temporary Straight Steel Sheet Pile Cofferdam at Dry Dock 3

The Navy considered constructing a temporary straight steel sheet pile cofferdam rather than a circular, cellular cofferdam in order to replace the Dry Dock 3 caisson. Construction of a straight steel sheet pile cofferdam would have involved driving king piles at regular intervals along the cofferdam footprint using an impact hammer after dredging the footprint. Temporary bracing frames would have been erected on the king piles and steel sheet piles placed around the frame between the king piles and driven using a vibratory hammer. The straight steel sheet pile cofferdam would have required that bracing frames be installed on the interior sides of the sheet piling, which would have interfered with work necessary to repair the caisson seats. In addition, cellular cofferdams are structurally stronger than straight steel sheet pile cofferdams across larger areas because each cell is self-supporting and partially filled with temporary fill material, which provides greater stability. Therefore, the alternative of a straight steel sheet pile cofferdam was considered unfeasible and was eliminated.

3 Affected Environment

This chapter presents a description of the environmental resources and baseline conditions that could be affected from implementing either of the alternatives.

All potentially relevant environmental resource areas were initially considered for analysis in this Environmental Assessment (EA). In compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), and 32 Code of Federal Regulations (CFR) part 775 guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact. This chapter discusses air quality, water resources, bathymetry, cultural resources, biological resources (marine), visual resources, noise, infrastructure, transportation, and hazardous materials and waste.

The potential impacts on the following resource areas are considered to be negligible or non-existent, so they were not analyzed in detail in this EA:

Groundwater. The Proposed Action would cause no direct impacts on groundwater resources because no ground would be disturbed in the Project area. The Proposed Action may result in indirect impacts on groundwater resources in the vicinity of the Project area as a result of temporary water quality impacts during in-water construction if contaminants inadvertently released into surface waters during construction are transported into groundwater.

Construction activities would be conducted in accordance with the Shipyard's Spill Prevention, Control, and Countermeasures (SPCC) Plan to prevent and control spills of oils. Immediate clean-up of any spills that occur during construction would prevent oils or other hazardous substances from entering groundwater. Therefore, the Proposed Action is not likely to result in groundwater impacts. No significant impacts on groundwater would result.

Topography. The topography of the region surrounding the Shipyard is characteristic of the coastal plain, which is generally flat along the shoreline and rises upward to small hills and ridges farther inland. The Shipyard is almost entirely flat, with elevations being just above sea level (Navy, 2013a). The upland Project area is flat and paved and consists of made land (fill). The Proposed Action would require filling the partially submerged area below the elevated fitting-out pier, which would not alter the topography in this location. The Proposed Action would not require additional fill or excavation in the upland Project area. Therefore, the Proposed Action would have no impacts on topography.

Geology and Soils. Surficial geology, including soils, in the upland Project area consists of man-made and natural fill materials (e.g., natural materials, dredge spoils, and construction debris), which were used in land-making activities on the Shipyard. These materials are concentrated on the west side of the Shipyard and between Jamaica and Seavey Islands (Navy, 2013a). The Proposed Action may result in temporary disturbance of fill soils in localized areas along Berths 11, 12, and 13 where the pier deck would be removed during construction. However, because these soils consist of artificial fill material, are currently covered with impervious surface, and have been previously disturbed, the Proposed Action would not result in substantial changes to the condition of these soils. Any soil disturbance would be conducted in accordance with the requirements of the Shipyard's Maine Pollutant Discharge Elimination System (MPDES) permit and Maine's Erosion and Sedimentation Control Law. Continued operation of the berths would not expose or otherwise impact soils in the Project area.

Construction contractors would be required to use clean fill material for structural repairs at Berths 11, 12, and 13. This fill would consist of dredged sediments or clean fill from a company that provides this material from an approved borrow site. No new geologic resources from undeveloped sites would be developed for the Proposed Action, and existing made land in the upland Project area would not be affected. Therefore, there would be no impacts on soils or geology.

Biological Resources (Terrestrial). The upland Project area is an entirely paved, industrial area with frequent human and vehicle traffic. The Project area does not contain any vegetation or suitable terrestrial wildlife habitat. Birds that may potentially use the Project area as a roosting or loafing area and birds using the Piscataqua River in the Project area would avoid construction sites and nearby areas affected by noise during construction. It is expected that birds would resume using the upland Project area once construction is complete. Therefore, there would be negligible short-term and no long-term impacts on terrestrial biological resources, either vegetative or wildlife.

Terrestrial Threatened and Endangered Species. A list of threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) that may occur in the Project area was developed through the use of the USFWS's Information, Planning, and Conservation System. The Information, Planning, and Conservation System provides information regarding federally designated and/or proposed candidate, threatened, and endangered species; critical habitats; and USFWS refuges that may be present within a Project area (USFWS, 2014). Using this information, it was determined that three federally listed terrestrial species could occur in the Project area (Table 3.0-1) (USFWS, 2014). Previous coordination with the USFWS Maine Field Office for other construction projects at the Shipyard indicates that because of the dense urban and industrial development on Seavey Island, no known essential or significant wildlife habitats or federally listed threatened or endangered terrestrial species occur on the Shipyard (Navy, 2014). Therefore, it was determined that no federally listed threatened or endangered terrestrial species occur in the Project area, and the Proposed Action would have no effect on federally listed terrestrial species.

Table 3.0-1 Federally Listed Threatened, Endangered, and Protected Terrestrial Species Potentially Occuring Near Portsmouth Naval Shipyard

Common Name	***Scientific Name***	***Federal Status***
Birds		
Red Knot	*Calidris canutus rufa*	Threatened
Roseate Tern	*Sterna dougallii dougallii*	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Protected under the Bald and Golden Eagle Protection Act
Mammals		
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened

While removed from the federal threatened and endangered species list, the bald eagle (*Haliaeetus leucocephalus*) still is federally protected under the Bald and Golden Eagle Protection Act. Given the dense development and human activity on Seavey Island, the occurrence of bald eagles at the Shipyard is likely to be limited to transient individuals that would be expected to avoid construction areas. Bald eagles are not expected to occur in the Project area; therefore, the Proposed Action would have no effect on the species.

A state-listed species, the peregrine falcon (*Falco peregrinus*), is also known to occur in the vicinity of the Shipyard. The peregrine falcon has been observed on the Shipyard, preying on the substantial pigeon and rodent populations on the installation (NAVFAC, 2004). In the past 10 years, a breeding pair attempting to nest at the Shipyard moved its nesting site off the Shipyard and is now nesting on the I-95 bridge (Martin, 2011; 2015). Peregrine falcons are not expected to occur in the Project area or are transient and would be expected to avoid construction areas. Therefore, the Proposed Action would have no effect on the species.

Land Use. The two projects included under the Proposed Action would not change land use in the Shipyard's controlled industrial area (CIA) and, therefore, would have no impacts on land use. The Proposed Action would take place entirely on the Shipyard or in the adjacent waters of the Piscataqua River and would cause no direct or indirect (i.e., through induced growth or changes in population) impacts on land use in neighboring communities. The Proposed Action would be consistent, to the maximum extent practicable, with the Maine Coastal Zone Management Program and applicable federal and state laws (see Chapter 6 and Appendix B). Therefore, there would be no impacts on land use.

Potable Water and Wastewater. Construction would not require changes or relocation of potable water and wastewater infrastructure at the Project sites. Shipyard operations and personnel loading would not change as a result of the Proposed Action; therefore, demand for potable water and generation of wastewater at the Shipyard would not change, and there would be no impacts on potable water or wastewater infrastructure.

Airspace. No structures more than 200 feet tall or structures meeting the requirements under 14 CFR Part 77 §77.9 that may obstruct airspace used for commercial, military, or private aviation are proposed. Therefore, the Proposed Action would have no impacts on airspace, and coordination with the Federal Aviation Administration is not required.

Public Health and Safety. Construction would be conducted in accordance with established Navy policies for ensuring the health and safety of occupational workers and the general public. The primary occupational safety requirement will be the Office of the Chief of Naval Operations Instructions (OPNAVINST) 5100.23G, Navy Safety and Occupational Health Program Manual, which is compliant with the requirements of the Occupational Safety and Health Administration as well as other U.S. Department of Defense (DoD) instructions governing occupational safety. Construction would take place entirely within the secured perimeter of the Shipyard, and construction areas would not be accessible by the public. Therefore, there would be negligible impacts on public health and safety associated with the Proposed Action.

Socioeconomics. The Proposed Action would have temporary, beneficial impacts on the local economy because of increased temporary employment and expenditures on goods and services during construction. Because the Proposed Action would not result in a change in the number of personnel at the Shipyard, the Proposed Action would not have either beneficial or negative long-term impacts on the local economy.

Environmental Justice. Consistent with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994), and EO 13045, Protection of Children from Environmental Health and Safety Risks (April 21, 1997), the Navy's policy is to identify and address any disproportionately high and adverse human or environmental effects of its actions on minority and low-income populations. The Proposed Action would occur on the Shipyard and in adjacent areas of the Piscataqua River. Construction sites would be secured to prevent

public access; therefore, construction under the Proposed Action would not present risks to public safety. Following construction, the type and nature of Shipyard operations would not substantially change. Therefore, the Proposed Action would have no disproportionately high or adverse effects on minority or low-income populations and would not disproportionately expose children to environmental health or safety risks.

Defense Environmental Restoration Program Sites. Shipbuilding and submarine work at the Shipyard have resulted in the release of hazardous substances into environmental media on and around Seavey's Island. Such areas have been studied at the Shipyard under the Defense Environmental Restoration Program (DERP) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), with the goal of protecting human health and the environment from the hazardous substances. The Environmental Response (ER) Program is the Navy's initiative to address the DERP.

Most of the ER Program sites originally identified at the Shipyard have been cleaned up. The site closest to the Project area is Operable Unit 4 (OU4), which consists of Site 5 - Former Industrial Waste Outfalls and various offshore areas of concern (AOCs) around Seavey's Island. Four of the former outfalls are located in the Project area and one of the OU4 AOCs—the Dry Docks AOC—partially overlaps some of the offshore areas included in the Proposed Action, including areas adjacent to Berths 11 and 13 and the Dry Dock 3 caisson. The CERCLA Record of Decision was signed for OU4 in August 2013, specifying remedial action (sediment removal) only in areas of OU4 that are not in or near the Project area (Resolution Consultants, 2015). Therefore, no further remedial action is required for those portions of OU4 that are in or near the Project area, and implementing the Proposed Action would have no impact on human health and the environment from hazardous substances managed under the ER Program.

3.1 Air Quality

This discussion of air quality includes criteria pollutants and greenhouse gases (GHGs) and addresses standards, sources, and permitting. Air quality in a given location is defined by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors, including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. This section also discusses GHG emissions and the effects of climate change.

Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, construction equipment) and stationary sources (e.g., factories, refineries, power plants), as well as indoor sources (e.g., some building materials and cleaning solvents). Air pollutants are also released from natural sources, such as volcanic eruptions and forest fires.

3.1.1 Regulatory Setting

3.1.1.1 Criteria Pollutants and National Ambient Air Quality Standards

The principal pollutants defining the air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), inhalable particulate matter less than or equal to 10 microns in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb) (U.S. Environmental Protection Agency [USEPA] 2015a). CO, SO_2, NO_2, Pb, and some particulates are emitted directly into the atmosphere from emissions sources. O_3 and some NO_2 and particulates are formed through atmospheric chemical reactions from other pollutant

emissions (called "precursors") that are influenced by weather, ultraviolet light, and other atmospheric processes.

Under the CAA, the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for these pollutants (Table 3.1-1). NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects such as damage to farm crops and vegetation and damage to buildings. Some pollutants have long-term and short-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

Areas that are and have historically been in compliance with the NAAQS are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas and are required to adhere to maintenance plans to ensure continued attainment.

The CAA requires states to develop a general plan to attain and maintain the NAAQS in all areas of the country and a specific plan to attain the standards for each area designated as nonattainment for a NAAQS. These plans, known as State Implementation Plans (SIPs), are developed by state and local air quality management agencies and submitted to the USEPA for approval. The General Conformity Rule is part of the CAA established by the USEPA to ensure that the actions of federal departments or agencies conform to the applicable SIP. The General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas. The MEDEP is responsible for implementing federal and state regulations in the state, including air emissions permitting.

The Shipyard is located in the Town of Kittery, in York County, Maine. This area is in attainment for all criteria pollutants (USEPA, 2015b); therefore, a General Conformity Rule evaluation of the Proposed Action is not required.

Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under section 112(b) of the 1990 CAA Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61).

HAP Mobile Sources

HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs). MSATs are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause cancer or other serious health and environmental effects. In 2001, the USEPA issued its first MSAT Rule, which identified 201 compounds as being HAPs that require regulation. A subset of six of the MSAT compounds was identified as having the greatest influence on health and included benzene, butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. In February 2007, the USEPA issued a second MSAT Rule, which generally supported the findings in the first rule and provided additional recommendations of compounds having the greatest impact on health (USEPA, 2015c). The rule also identified several engine-emission certification standards that must be implemented (40 CFR parts 59, 80, 85, and 86; *Federal Register* {FR} 72 [37]: 8427-8570, 2007). Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants for mobile sources involve reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion.

Table 3.1-1 National Ambient Air Quality Standards

Pollutant [Final Rule Citation]		*Primary/ Secondary*	*Averaging Time*	*Level*	*Form*
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	Annual	53 ppb(2)	Annual Mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm(3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA, 2015a.

Notes:

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3) as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison with the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and (2)any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is a USEPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Key:

µg/m^3 = Micrograms per cubic meter.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
ppb = Parts per billion
ppm = Parts per million.

Permitting

New Source Review (Pre-construction Permit)

New major stationary emission sources and major modifications at existing major stationary emission sources are required by the CAA to obtain an air pollution permit before commencing construction. This permitting process for major stationary sources is called "new source review" and is required whether the major source or major modification is planned for nonattainment areas or attainment and unclassifiable areas. In general, permits for emission sources in attainment areas and for other pollutants regulated under the major source program are referred to as prevention of significant deterioration (PSD) permits, while permits for major sources emitting nonattainment pollutants and located in nonattainment areas are referred to as nonattainment new source review permits. In addition, a proposed project may have to meet the requirements of nonattainment new source review for the pollutants for which the area is designated as nonattainment and PSD permitting requirements for the pollutants for which the area is designated as attainment. Additional PSD permitting thresholds apply to increases in stationary source GHG emissions. PSD permitting can also apply to a new major stationary source (or any net emissions increase associated with a modification to an existing major stationary source) that is constructed within 6.2 miles of a Class I area and that would increase the 24-hour average concentration of any regulated pollutant in the Class I area by 1 microgram per cubic meter ($\mu g/m^3$) or more. Navy installations comply with applicable permit requirements under the PSD program per 40 CFR section 51.166.

Title V (Operating Permit)

The Title V Operating Permit Program consolidates all CAA requirements applicable to the operation of a source, including requirements from the SIP, pre-construction permits, and the air toxics program. It applies to stationary sources of air pollution that exceed the major stationary source emission thresholds as well as other non-major sources specified in a particular regulation. The program includes a requirement for payment of permit fees to finance the operating permit program whether implemented by the USEPA or a state or local regulator. Navy installations subject to Title V permitting shall comply with the requirements of the Title V Operating Permit Program, which are detailed in 40 CFR Part 70 and all specific requirements contained in their individual permits.

3.1.1.2 Greenhouse Gases and Climate Change

GHGs are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences around the globe.

In the Northeast, communities must prepare for increases in precipitation, sea-level rise, and heat waves. Regionally, sea levels have already risen by approximately 1 foot since 1900, resulting in more frequent flooding of coastal areas. Sea-level rise and coastal flooding are projected to increase an additional 1 to 4 feet globally by 2100, with greater increases possible in the Northeast because of "the combined effects of warming waters and local land subsidence (sinking)" (USEPA, 2015d). Regional sea-level rise is likely to cause increased risk of damage to coastal infrastructure (USEPA, 2015d).

The CEQ issued final guidance on consideration of GHG emissions and the effects of climate change in NEPA reviews on August 1, 2016. The final guidance clarifies that the National Environmental Policy Act

requires federal agencies to consider both the potential effects of a Proposed Action on climate change, as indicated by its estimated GHG emissions, and the implications of climate change for the environmental effects of a Proposed Action (CEQ 2016). The guidance also emphasizes that agency analyses should be commensurate with projected GHG emissions and climate impacts and should employ appropriate quantitative or qualitative analytical methods to ensure useful information is available to inform the public and the decision-making process in distinguishing between alternatives and mitigations.

The USEPA issued the Final Mandatory Reporting of Greenhouse Gases Rule on September 22, 2009. GHGs covered under the Final Mandatory Reporting of Greenhouse Gases Rule are CO_2, methane, nitrogen oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Each GHG is assigned a global warming potential. The global warming potential is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. The equivalent CO_2 rate is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emissions rate representing all GHGs. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of mobile sources and engines, and facilities that emit 25,000 metric tons of carbon dioxide ($MTCO_2e$) or more per year of GHG emissions are required to submit annual reports to the USEPA.

GHG emissions are also regulated under PSD and Title V permitting programs, which were initiated by a USEPA rule issued on June 3, 2010, known as the GHG Tailoring Rule (FR 75 [106]:31514, 2010). The GHG emission thresholds for permitting of stationary sources are an increase of 75,000 tons per year (tpy) of CO_2e at existing major sources and facility-wide emissions of 100,000 tpy of CO_2e for a new source or a modification of an existing minor source. Only sources otherwise subject to Title V permitting are subject to CO_2e requirements.

Federal agencies are required to address GHG emissions with emission-reduction planning. On March 19, 2015, President Obama issued EO 13693, Planning for Federal Sustainability in the Next Decade, which requires federal agencies to meet emission-reduction goals associated with energy use, water use, building design and utilization, fleet vehicles, and procurement and acquisition decisions. The CEQ provided federal agencies with implementation guidance to meet these new goals (CEQ, 2015).

In an effort to reduce energy consumption, GHGs, and dependence on petroleum, and increase the use of renewable energy resources, the Navy has implemented a number of renewable energy projects. The Navy has established fiscal year 2020 GHG emission-reduction targets of 34 percent from a fiscal year 2008 baseline for direct GHG emissions and 13.5 percent for indirect emissions (DoD, 2014). Examples of Navy-wide GHG-reductions include energy-efficient construction, thermal and photovoltaic solar systems, geothermal power plants, and the generation of electricity with wind energy. The Navy continues to promote and install new renewable energy projects.

3.1.2 Affected Environment

The Shipyard is in York County, Maine, which is within the Metropolitan Portland Intrastate Air Quality Control Region 110, which also includes Androscoggin, Cumberland, and Sagadahoc counties. York County is designated as in attainment/unclassifiable for all criteria pollutants (USEPA, 2015b). The entire state of Maine is located within the Northeast Ozone Transport Region. The Northeast Ozone Transport Region was established by the 1990 amendments to the CAA and comprises Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island,

and Vermont, as well as the District of Columbia and portions of the Northern Virginia suburbs. The most recent emissions inventory for the Metropolitan Portland Intrastate Air Quality Control Region is shown in Table 3.1-2. Volatile organic compound (VOC) and nitrogen oxide (NO_x) emissions are used to represent ozone generation because they are precursors of ozone.

Table 3.1-2 Metropolitan Portland Intrastate Air Quality Control Region (MPIAQR) 110 Air Emissions Inventory (2011)

Location	*NO_x (tpy)*	*VOCs (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
York County	6,968	6,440	34,587	1,188	6,240	2,246
Androscoggin County	3,032	3,075	17,190	764	2,826	1,063
Cumberland County	11,705	9,476	49,274	3,429	6,652	2,807
Sagadahoc County	1,509	2,569	9,377	265	1,104	445
Total MPIAQR	23,214	21,560	110,428	5,646	16,822	6,561

Source: USEPA, 2015e

Key:
CO = Carbon monoxide.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
NO_x = Nitrogen oxide.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOCs = Volatile organic compounds.

The Shipyard is classified as a major source of emissions and operates under an Air Pollution Control Title V Permit (No. A-452-70-C-R). A variety of sources on the Shipyard emit criteria pollutants, including generators, boilers, hot water heaters, air compressors, fuel storage tanks, surface coatings/paints, and various items of heavy machinery. Recent annual criteria pollutant emissions reported for the Shipyard are shown in Table 3.1-3.

Table 3.1-3 Reported Criteria Pollutant Air Emissions Inventory for Portsmouth Naval Shipyard

Year	*NO_x (tpy)*	*VOCs (tpy)*	*CO (tpy)*	*SO_2 (tpy)*	*PM_{10} (tpy)*	*$PM_{2.5}$ (tpy)*
2011	29.11	21.73	7.62	0.21	3.31	2.84
2012	27.57	18.85	7.19	0.21	3.26	2.74
2013	32.12	25.78	9.02	0.24	3.32	2.78

Source: MEDEP, 2015

Key:
CO = Carbon monoxide.
PM_{10} = Particulate matter less than 10 microns in diameter.
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter.
NO_x = Nitrogen oxide.
SO_2 = Sulfur dioxide.
tpy = Tons per year.
VOCs = Volatile organic compounds.

3.2 Water Resources

This discussion of water resources includes surface water, marine sediments, wetlands, and floodplains. This section discusses the physical characteristics of surface waters and wetlands; estuarine wildlife and vegetation are addressed in Section 3.5, Biological Resources.

Surface water resources generally consist of wetlands, lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. A total maximum daily load (TMDL) is the maximum amount of a substance that can be assimilated by a water body without causing impairment. A water body can be deemed impaired if water quality analyses conclude that exceedances of water quality standards have occurred.

Wetlands are jointly defined by the USEPA and the USACE as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include "swamps, marshes, bogs and similar areas" (40 CFR section 230.3[t] and 33 CFR section 328.3[b]).

Floodplains are areas of low, level ground present along rivers, stream channels, large wetlands, or coastal waters. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow of water reaches the main water body. Floodplain boundaries are most often defined in terms of frequency of inundation—i.e., the 100-year and 500-year flood. Floodplain delineation maps are produced by the Federal Emergency Management Agency (FEMA) and provide a basis for comparing the locale of the Proposed Action to the floodplains.

Sediments are the solid fragments of organic and inorganic matter created from weathering rock transported by water, wind, and ice (glaciers) and deposited at the bottom of bodies of water. Components of sediment range in size from boulders, cobble, and gravel to sand (particles 0.05 to 2.0 millimeters [mm] in diameter), silt (0.002 to 0.05 mm), and clay (less than or equal to 0.002 mm). Sediment may also be produced locally as non-living particulate organic material ("detritus") that falls to the bottom of a waterbody (Navy, 2013a). Through the downward movement of organic and inorganic particles in the water column, substances that are otherwise scarce in the water column (e.g., metals) are concentrated in bottom sediment (Navy, 2013a).

3.2.1 Regulatory Setting

Groundwater quality and quantity are regulated under several statutes and regulations, including the Safe Drinking Water Act.

To restore and maintain the chemical, physical, and biological integrity of water, the CWA establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) program, on the amounts of specific pollutants that can be discharged into surface waters. The NPDES program regulates the discharge of point (e.g., end of pipe) and non-point (e.g., stormwater) sources of water pollution. Permitting requirements under the NPDES are delegated to individual states.

Waters of the United States are defined as (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically three months), and (4) wetlands that directly abut such tributaries under section 404 of the CWA, as amended, and are regulated by the USEPA and the USACE. The CWA requires that Maine establish a section 303(d) list to identify impaired waters and establish TMDLs for the sources causing the impairment.

Section 438 of the Energy Independence and Security Act (42 U.S.C. section 17094) establishes stormwater design requirements for development and redevelopment projects. Under these requirements, federal facility projects larger than 5,000 square feet must "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow."

The Maine NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES Construction General Permit for stormwater discharges. Construction or demolition that necessitates an individual permit also requires preparation of a Notice of Intent to discharge stormwater and a Stormwater Pollution Prevention Plan that is implemented during construction. As part of the 2010 Final Rule for the CWA, titled *Effluent Limitations Guidelines and Standards for the Construction and Development Point Source Category*, activities covered by this permit must implement non-numeric erosion and sediment controls and pollution prevention measures.

Wetlands are currently regulated by the USACE under section 404 of the CWA as a subset of all "waters of the United States." The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats, including wetlands. Jurisdictional waters of the United States regulated under the CWA include coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, and "other" waters that, if degraded or destroyed, could affect interstate commerce. The full regulatory definition of waters of the United States is provided in the CWA.

EO 11990, Protection of Wetlands, requires that federal agencies adopt a policy to avoid, to the extent possible, long- and short-term adverse impacts associated with destruction and modification of wetlands and to avoid the direct and indirect support of new construction in wetlands whenever there is a practicable alternative.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other Waters of the United States. Any discharge of dredge or fill into waters of the United States requires a permit from the USACE. Section 401 of the CWA requires states to review federal permit applications and certify that the permitted activities will meet state water quality standards.

Maine administers section 401 certification under the Maine NRPA. The NRPA was established to protect the state's significant natural resources. Under the NRPA, a permit is required for any activity that takes place in, on, or over protected natural resources, including coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, and streams or brooks. A permit also is required for any activity located "adjacent to and within 75 feet, measured horizontally" of a coastal wetland, great pond, river, stream or brook, or significant wildlife habitat contained within a freshwater wetland, or certain freshwater wetlands (MEDEP, 2013b).

Section 10 of the Rivers and Harbors Act provides for USACE permit requirements for any in-water construction. USACE and some states require a permit for any in-water construction. Permits are required for construction of piers, wharfs, bulkheads, pilings, marinas, docks, ramps, floats, moorings, and like structures; construction of wires and cables over the water, and pipes, cables, or tunnels under the water; dredging and excavation; any obstruction or alteration of navigable waters; depositing fill and dredged material; filling of wetlands adjacent or contiguous to waters of the United States; construction of riprap, revetments, groins, breakwaters, and levees; and transportation of dredged material for dumping into ocean waters.

EO 11988, Floodplain Management, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development unless it is the only practicable alternative. Flood potential of a site is usually determined by the 100-year floodplain, which is defined as the area that has a 1-percent chance of inundation by a flood event in a given year.

3.2.2 Affected Environment

The following discussions provide a description of the existing conditions for water resources at the Shipyard.

3.2.2.1 Surface Water

The Shipyard is located on Seavey's Island in the lower Piscataqua River. The Piscataqua River drainage basin encompasses approximately 1,495 square miles in New Hampshire and Maine and is part of an extensive estuarine system, the Great Bay estuary, which supports diverse aquatic life ranging from commercial and recreationally important fisheries to aquatic vegetation (eelgrass) (Maine Department of Marine Resources [MEDMR], 2010). The intertidal waters around the Shipyard are characterized by lowland marshes, tidal mudflats, and channels of the tidal harbor located between Portsmouth and the Atlantic Ocean (U.S. Department of Health and Human Services, 2007). The Shipyard is separated from the Town of Kittery by the Back Channel of the Piscataqua River, a popular fishing spot (U.S. Department of Health and Human Services, 2007).

Surface water bodies on the Shipyard include two manmade freshwater ponds (Upper Meade Pond and Lower Meade Pond), which are each approximately 5 acres in size. These ponds are located in the southern portion of the Shipyard. Surface waters on and near the Shipyard are shown on Figure 3.2-1.

The Dry Dock 3 caisson and Berths 11, 12, and 13 are in-water facilities and are submerged to varying degrees between low and high tides. The Proposed Action would involve construction work along Berths 11, 12, and 13 and at the entrance to Dry Dock 3. These areas are in and adjacent to the Piscataqua River.

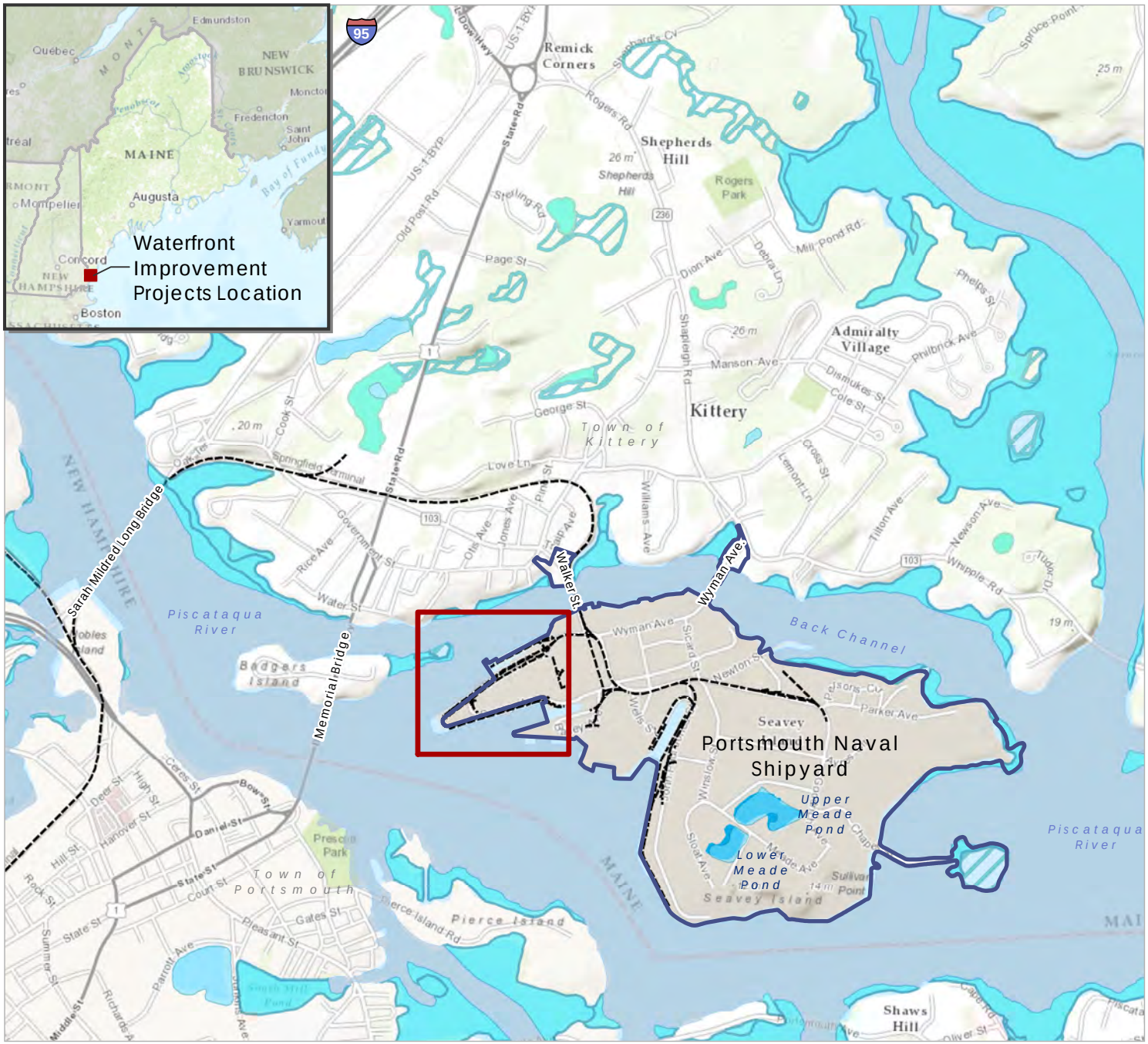

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Figure 3.2-1
Water Resources
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Railroad
- Lake / Pond

National Wetlands Inventory Wetland Type

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

N

0 500 1,000 1,500 2,000 Feet

Source: ESRI 2013; Department of Defense 2014; Maine Department of Transportation 2011; Maine NHD 2013; NWI 2013.

State Water Quality Standards

Maine has established three state surface water classifications for estuarine and marine waters, including the waters of the Great Bay estuary: SA, SB, and SC[2], as indicated in section 465-B of the Marine Revised Statutes Annotated (M.R.S.A.). Class SC represents the third-highest classification of waters. The Piscataqua River surrounding the Shipyard is classified as SC for water-contact recreation and fishing (U.S. Department of Health and Human Services, 2007). New Hampshire designates two classes of surface waters: Class A and Class B[3], as indicated in section 485-A:8 of the New Hampshire Water Management and Protection Regulations. The lower Piscataqua River near Portsmouth, New Hampshire, is classified as Class B water.

Table 3.2-1 provides the established designated uses for Class SC surface waters in Maine and Class B waters in New Hampshire.

Table 3.2-1 Maine and New Hampshire Designated Uses for the Piscataqua River near Portsmouth Naval Shipyard

Designated Uses	
Maine (Class SC Waters Only)	***New Hampshire (Class B Waters Only)***
Recreation	Fish Consumption
Fishing	Shellfish Consumption
Aquaculture	Drinking Water Supply after Adequate Treatment
Propagation and Harvesting of Shellfish	Primary Contact Recreation
Navigation	Secondary Contact Recreation
Habitat for Fish and Other Estuarine and Marine Life	

According to the Maine *2012 Integrated Water Quality Monitoring and Assessment Report*, the Piscataqua River estuary is listed as impaired under section 303(d) for the designated use of marine life. The cause of the impairment has been identified as nutrients/eutrophication (i.e., the river is receiving excess nutrients that stimulate plant and, specifically, algal growth) with an unknown source (MEDEP, 2012). Additionally, the Piscataqua River in the vicinity of Kittery is listed as impaired due to elevated fecal levels.

The state of New Hampshire has listed the lower Piscataqua River on the 2012 Impaired Waters List (303[d]) for impairment of three designated uses: aquatic life, fish consumption, and shellfishing. Aquatic life is listed as impaired based on estuarine bioassessments taking into account the density and area of eelgrass habitat, fish consumption is listed as impaired due to mercury and polychlorinated

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[2] The "Class SA" designation is applied to waters that are outstanding natural resources and should be preserved for their ecological, social, scenic, economic, or recreational importance. "Class SB" waters are suitable for recreation in and on the water, fishing, aquaculture, shellfish propagation and harvesting, industrial water use, hydroelectric power generation, and navigation, and as habitat for wildlife. The habitat must be characterized as unimpaired. "Class SC" waters are suitable for recreation in and on the water, fishing, aquaculture, restricted harvesting of shellfish, industrial water use, hydroelectric power generation, navigation, and as habitat for wildlife (M.R.S.A. Section 465-B).

[3] Class A waters are the highest quality waters and are considered as being potentially acceptable for water supply uses after adequate treatment. Class B waters are of the second-highest quality and are considered acceptable for fishing, swimming, and other recreational purposes and, after adequate treatment, for use as water supplies. The majority of the state's waters are Class B.

biphenyls (PCBs), and shellfishing is listed as impaired due to dioxins, mercury, and PCBs (New Hampshire Department of Environmental Services, 2014).

3.2.2.2 Wetlands

The main channel and Back Channel of the Piscataqua River are considered an estuarine and marine deepwater wetland (E1UBL), defined as a deepwater tidal habitat with an unconsolidated bottom that is continuously submerged (USFWS, 2016). According to National Wetlands Inventory data, estuarine intertidal and marine intertidal wetlands also are located in the vicinity of the Project area along the eastern shoreline of Badgers Island, approximately 400 feet west-northwest of Dry Dock 3 and the northern shoreline of the Back Channel of the Piscataqua River, approximately 600 feet north of the northern side of Dry Dock 3 (USFWS, 2015). Palustrine forested and/or palustrine shrub wetlands occur along the northeastern shoreline of Badgers Island (USFWS, 2015).

3.2.2.3 Floodplains

Portions of the northern, eastern, and southwestern shores of the Shipyard are within the 100- and 500-year floodplains (see Figure 3.2-2). According to the most recent effective flood insurance rate map produced by FEMA for the Shipyard, in effect since 1986, the upland Project area is outside of the 100-year and 500-year floodplains and has a minimal chance of flooding (FEMA, 1986). The waters of the Piscataqua River and the interiors of Dry Docks 1 and 3 are included in the 100-year floodplain (FEMA, 1986).

In 2013, FEMA released preliminary updated flood insurance rate maps for York County. According to the preliminary flood insurance rate mapping, FEMA has delineated 100-year floodplains (now called special flood hazard areas, or areas subject to inundation by the 1-percent annual-chance flood) on and around the Shipyard as Zones AE and VE (FEMA, 2013). Zone AE signifies a special flood hazard area where base flood elevations have been determined. Zone VE signifies a coastal flood zone with velocity hazards from wave action where base flood elevations have been determined. The upland Project area, including the fitting-out pier between Berths 11 and 13 and areas around Dry Dock 3, is designated Zone AE with a base flood elevation of 10 feet (see Figure 3.2-2) (FEMA, 2013). The waters of the Piscataqua River in the Project area, including the interior of Dry Dock 1, have been designated Zone VE with a base flood elevation of 14 feet. The river and the interior of Dry Dock 1 also are mapped as floodway areas, or areas that “must be kept free of encroachment so the 1% annual chance flood can be carried without substantial increases in flood heights” (FEMA, 2013). The 2013 mapped flood zones are not yet effective but are shown on Figure 3.2-2 as the most recent information available from FEMA.

3.2.2.4 Marine Sediments

The lower Piscataqua River bottom near the Project area consists primarily of sand, gravel, and shell under a layer of silt, with boulders layered in silt observed in steeply sloped areas. Little sedimentation occurs due to the high tidal currents in the lower estuary (Normandeau Associates, Inc., 2014).

During a 2014 benthic survey of in-water parts of the Project area, underwater video data were collected to characterize the bottom substrate and help select the best locations for benthic grab surveys. Bottom substrates identified included soft mud, sand, pebble/cobble, small boulder, and shell. Larger substrate grain sizes were found toward the end of the piers where the velocity of bottom currents increased in a westerly direction (CR Environmental, Inc., 2014).

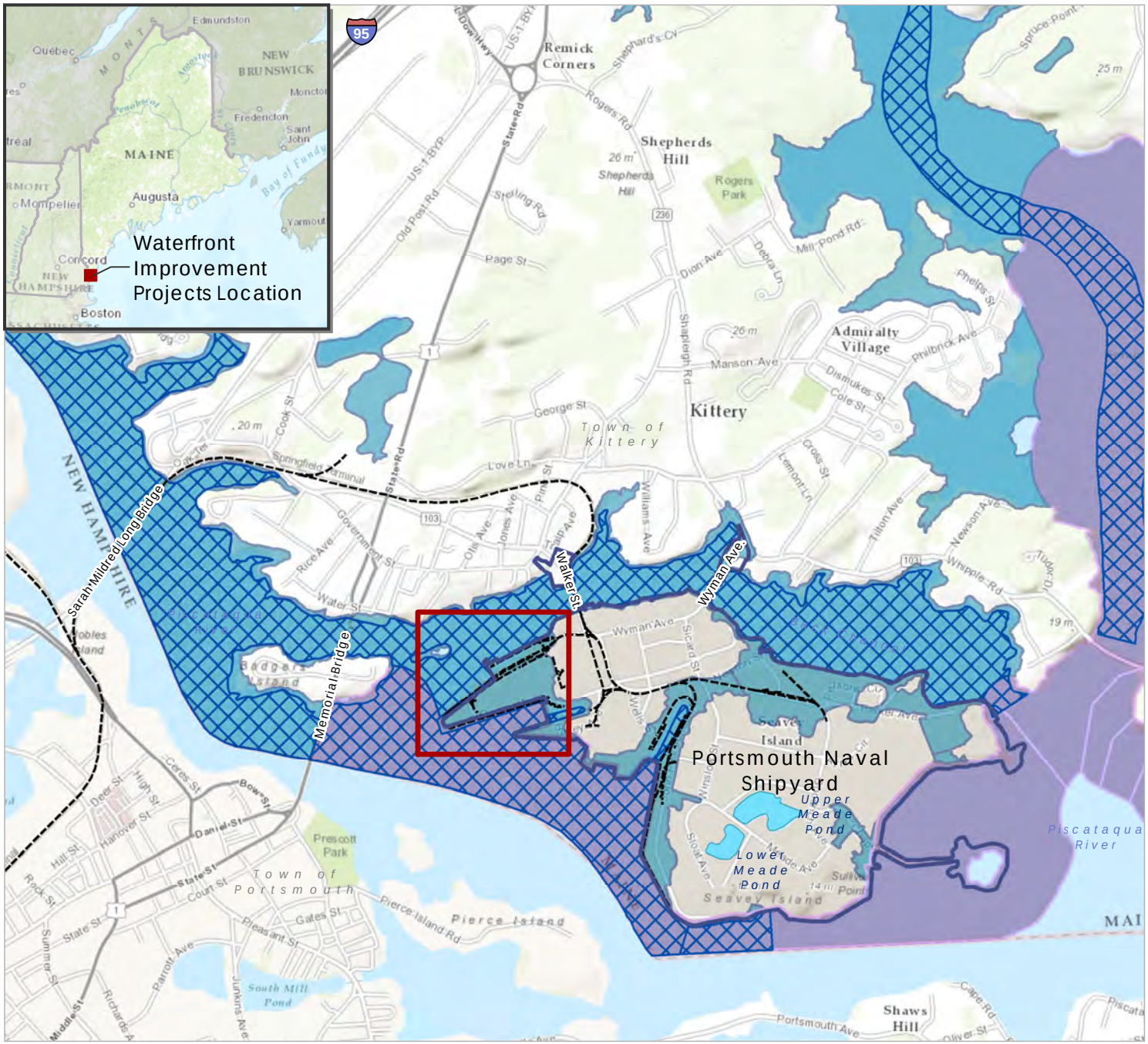

Figure 3.2-2
FEMA Flood Zones
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Railroad
- Lake / Pond

FEMA Flood Zone

- Zone AE (Special flood hazard area where base flood elevations have been determined)
- Zone VE (Coastal flood zone with velocity hazards from wave action where base flood elevations have been determined)
- Floodway

N

0 500 1,000 1,500 2,000 Feet

Source: ESRI 2013; FEM 2015; Department of Defense 2014; Maine Department of Transportation 2011.

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Industrial operations, sewage treatment plant discharge, and other upstream sources in the vicinity of the Shipyard have contaminated river sediments in the Project area. Contamination also has resulted from shipbuilding and submarine work at the Shipyard that has caused the release of hazardous substances. As noted in the introduction to Chapter 3, the Navy has investigated areas of contamination in OU4, which partially overlaps some of the offshore areas included in the Proposed Action, including areas adjacent to Berths 11 and 13 and the Dry Dock 3 caisson, under the ER Program. The CERCLA Record of Decision was signed for OU4 in August 2013, specifying remedial action (sediment removal) only in areas of OU4 that are not in or near the Project area (Resolution Consultants, 2015). No further remedial action is required to address sediment contamination in those portions of OU4 that are in or near the Project area.

3.3 Bathymetry

Bathymetry is described in terms of the topography of the sea floor or river bottom where the Proposed Action would occur.

3.3.1 Regulatory Setting

The Rivers and Harbors Act of 1988 gives the USACE authority over navigation. Section 10 of the act awards the USACE with the authority to approve construction of smaller structures, such as wharves, booms, and bulkheads, as well as approve dredging and filling operations. Alterations of any navigable Water of the U.S. must be approved prior to construction or demolition.

3.3.2 Affected Environment

The lower Piscataqua River that makes up the channel to the south of the Shipyard is characterized by swift tides and deep channels. Southwest of the Project area, the river ranges in depth from approximately 40 to 70 feet. The waters to the west, between Badgers Island and the Project area, are much shallower, ranging from 3 feet in marshy areas to 27 feet deep. The Back Channel north of Dry Dock 3 ranges in depth from approximately 10 to 24 feet (NOAA, 2013). Water depths in the Project area recorded during the 2014 benthic survey ranged from approximately 17 feet where Berth 11 meets Dry Dock 1 to approximately 40 feet at the western end of Berth 11. Most of the locations surveyed were at depths of 25 feet to 35 feet (CR Environmental, Inc., 2014). Berths 11, 12, and 13 and the entrances to Dry Docks 1 and 3 are regularly dredged to their permitted depths, which range from 30 to 38 feet (plus 2 feet of overdredge).

3.4 Cultural Resources

This discussion of cultural resources includes prehistoric and historic archaeological sites; historic buildings, structures, objects, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, objects, landscapes, and other built-environment resources of historic or aesthetic significance.

- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.4.1 Regulatory Setting

Cultural resources are governed by federal laws and regulations, including the National Historic Preservation Act (NHPA) of 1966, as amended, the Archeological and Historic Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Federal agencies' responsibility for protecting historic properties is defined primarily by sections 106 and 110 of the NHPA. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Section 110 of the NHPA requires federal agencies to establish—in conjunction with the Secretary of the Interior—historic preservation programs for the identification, evaluation, and protection of historic properties. Cultural resources also may be covered by state, local, and territorial laws.

3.4.2 Affected Environment

Cultural resources that are listed in the National Register of Historic Places (NRHP) or eligible for listing in the NRHP are "historic properties" as defined by the NHPA. The list was established under the NHPA and is administered by the National Park Service on behalf of the Secretary of the Interior. The NRHP includes properties on public and private land. Properties can be determined eligible for listing in the NRHP by the Secretary of the Interior or by a federal agency official with concurrence from the applicable SHPO. A NRHP-eligible property has the same protections as a property listed in the NRHP. Historic properties include archaeological and architectural resources, as well as historic districts. The Navy has conducted inventories of cultural resources at the Shipyard to identify historic properties that are listed or potentially eligible for listing in the NRHP (Hardlines Design Company, 2012).

The area of potential effects (APE) of a project, activity, program, or practice on cultural resources is the geographic area or areas within which an undertaking may cause changes in the character or use of any historic properties present. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking. For this Proposed Action, the Navy defined separate APEs for each of the proposed projects. The APEs and the historic resources within the APEs that may be directly or indirectly impacted by the Proposed Action are described below and are shown on Figure 3.4-1.

- Berths 11, 12, and 13 Structural Repairs: the APE is limited to the area displayed in Figure 3.4-1 and includes direct effects on Berths 11 (A, B, and C), 12, and 13 (A and B). The APE also includes indirect effects on the following historic resources within the viewshed of the proposed project: Dry Docks 1 and 3, Berth 1 (Flat-Iron Pier), Building 175, and Welding House (WH) 3. Portions of Buildings 2, 92, and 155 (planned for demolition as part of Military Construction (MILCON) P-266) are also included.
- Dry Dock 3 Caisson Replacement: the APE is limited to the area displayed in Figure 3.4-1 and includes direct effects on Dry Dock 3 and indirect effects on the following historic resources within the viewshed of the proposed project: Building 175, WH 3, and Berths 12 and 13 (A and B).

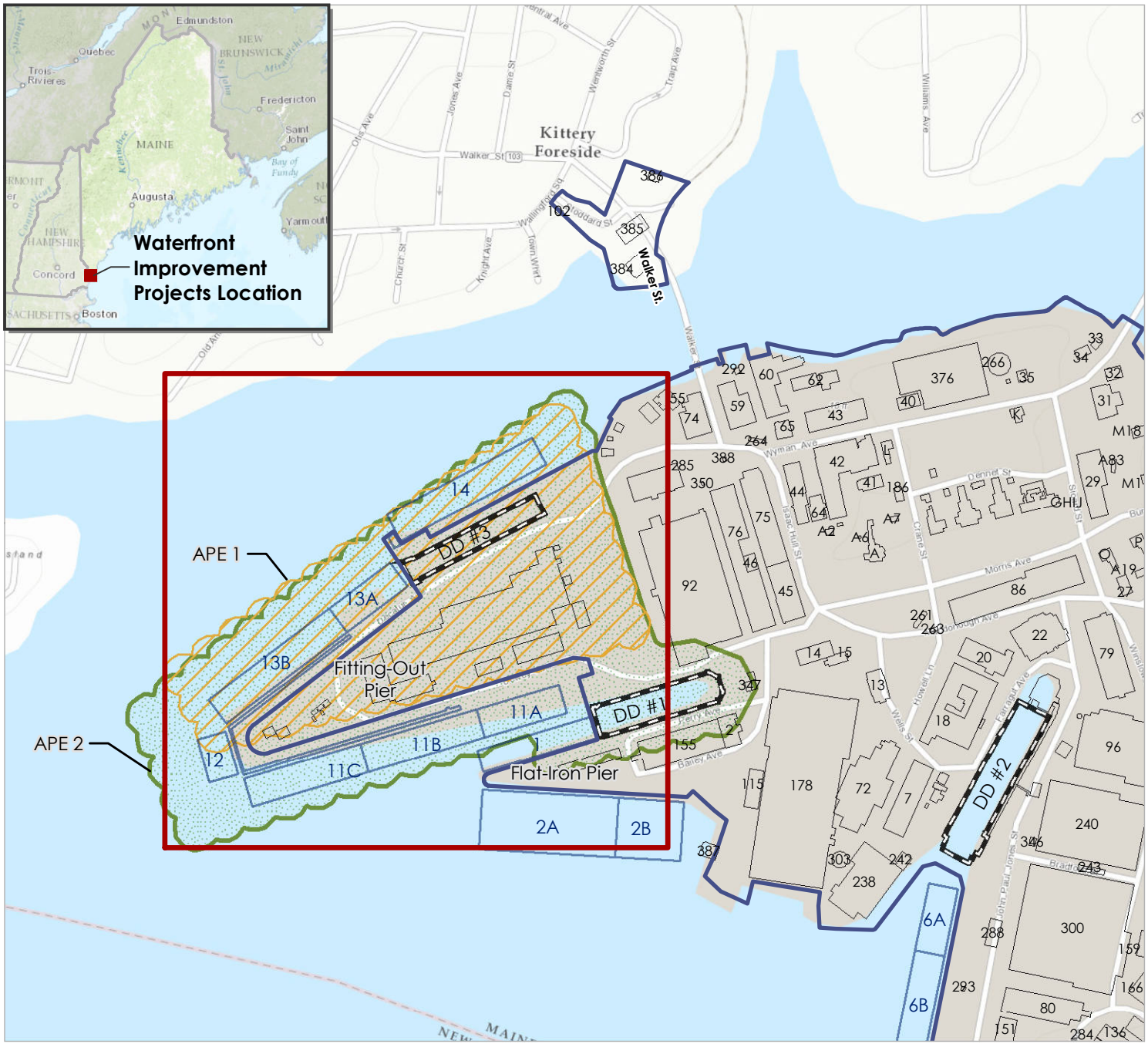

Figure 3.4-1
Cultural Resources Areas of Potential Effect
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Berth
- Dry Dock
- Existing Structures
- APE 1: Dry Dock 3 Caisson Replacement
- APE 2: Berths 11, 12, and 13 Structural Repairs

N

0 250 500 750 1,000 Feet

Source: ESRI 2013; Department of Defense 2014; Maine Department of Transportation 2011; Maine NHD 2013; NWI 2013.

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3.4.2.1 Archaeological Resources

The two APEs are in areas that are a combination of original land associated with both Dennett's Island and Pumpkin Island and made land (i.e., fill). The results of a 2006 archaeological sensitivity assessment indicate that the APEs considered for direct effects do not contain any previously recorded prehistoric archaeological sites and are not in areas that are considered sensitive for the presence of previously unidentified prehistoric archaeological resources (Navy, 2006a).

Archaeological monitoring conducted as part of numerous projects within the Shipyard has revealed the potential for archaeological resources, including locations of buried quay walls and potential remnants of demolished buildings. For instance, Building 155, located in the APE for the Berths 11, 12, and 13 structural repairs and scheduled for demolition, covers the area that once contained an office (in 1826) and the Building 1 offices and store house (Cofelice and Wheeler, 2013). As noted in the 2012 Integrated Cultural Resources Management Plan (ICRMP), the entirety of both APEs has not been subject to archaeological investigations (Hardlines Design Company, 2012).

In addition, while no formal underwater archaeological survey has been performed at the Shipyard, a preliminary assessment of underwater archaeological sensitivity was prepared in 2002. This assessment noted that the construction of quay walls and berths and dredging activities along the western shore of the Shipyard throughout its history would have periodically removed bottom sediments down to the bedrock, thereby limiting the potential for intact archaeological resources in Piscataqua River sediments adjacent to the Shipyard (Hardlines Design Company, 2012).

The potential for unidentified historic archaeological resources to occur in each of the APEs is discussed below.

Berths 11, 12, and 13 Structural Repairs

The Shipyard has been subject to regular maintenance dredging activities since 1925. This, along with the construction of quay walls, berths, and the swiftly moving Piscataqua current, suggests that the likelihood for submerged intact historic archaeological resources within the APE is low. In addition, shipwrecks containing significant information are unlikely to be present in the waters around Portsmouth, and, if extant, natural decay would have removed much, if not all, of the detectable remains (Hardlines Design Company, 2012). Much of the APE evaluated for direct effects is considered to lack archaeological sensitivity because the area has been affected by land filling and cutting, as well as grading associated with building construction and demolition. Thus, the APE for the Berths 11, 12, and 13 structural repairs is not in an area considered sensitive for historic archaeological resources (Weinstein, 2012; Hardlines Design Company, 2012).

Dry Dock 3 Caisson Replacement

For the same reasons as those discussed above for the APE for the Berths 11, 12, and 13 structural repairs, the APE for this proposed project is not in an area considered sensitive for historic archaeological resources (Weinstein, 2012; Hardlines Design Company, 2012).

3.4.2.2 Architectural Resources

The Portsmouth Naval Shipyard Historic District (PNSY Historic District) was listed in the NRHP in 1977, and its boundaries and period of significance were later expanded in 1996 and 2007. The Shipyard is significant in American engineering, military, architecture, and industry. Historical significance of the PNSY Historic District is based on its association with events and architectural/engineering qualities. The

period of significance is from its establishment in 1800 through the end of the PNSY's direct involvement in the Cold War in 1987.

Most of the buildings within the PNSY Historic District were built between the early 1800s and the 1950s and are constructed of brick, stone, or a combination of the two materials (Navy, 2011). Today, the PNSY Historic District contains 114 contributing resources and 11 contributing landscape features and covers most of the Shipyard property. These features were identified in the 2014 *Survey of Landscape Features at Portsmouth Naval Shipyard* (see Figure 3.4-1) (Hardlines Design Company, 2014).

Culturally significant architectural resources in the APEs are discussed below.

Berths 11, 12, and 13 Structural Repairs

Historic properties in the APE for this project include Berths 11 (A, B, and C), 12, and 13 (A and B); Dry Docks 1 and 3; Berth 1 (Flat-Iron Pier); and Building 175; and WH 3 . Portions of Buildings 2, 92, and 155 (scheduled for demolition) also are included.

- **Berth 11 (A, B, and C),** located to the south of Dry Dock 3, was constructed circa 1942 to form part of the new fitting-out pier. It is integral to the structure of the fitting-out pier, functioning as a retaining wall for the fill that makes up the pier (Navy, 2006b). This structure is made of poured concrete that is now covered by a wood deck (Hardlines Design Company, 2012). While the berth was altered in the 1960s, it retains integrity with respect to design, workmanship, and materials (Louis Berger Group, Inc., 2005a). This berth is a contributing resource within the PNSY Historic District under Criterion C (Hardlines Design Company, 2012; Louis Berger Group, Inc. 2005a; Navy 2007).
- **Berth 12**, located to the southwest of Dry Dock 3, was constructed circa 1942 to form part of the new fitting-out pier. A portion of this berth is located within the APE. It is integral to the structure of the fitting-out pier, functioning as a retaining wall for the fill that makes up the pier (Navy, 2006b). Berth 12 is a poured-concrete structure that is now covered by a wood deck (Hardlines Design Company, 2012). While this berth was altered in the 1960s, it retains integrity with respect to design, workmanship, and materials (Louis Berger Group, Inc., 2005b). Berth 12 is a contributing resource within the PNSY Historic District under Criterion C (Navy, 2007a).
- **Berth 13 (A and B)**, located west of and directly adjacent to Dry Dock 3, also was constructed circa 1942 to form part of the new fitting-out pier. It is integral to the structure of the fitting-out pier, functioning as a retaining wall for the fill that makes up the pier (Navy, 2006b). Berth 13 is a poured-concrete structure that is now covered by a wood deck (Hardlines Design Company, 2012). Similar to Berths 11 and 12, this berth was altered in the 1960s but retains integrity with respect to design, workmanship, and materials (Louis Berger Group, Inc., 2005c). Berth 13 is a contributing resource within the PNSY Historic District under Criterion C (Navy, 2007a).

The three berths in combination form the faces of the fitting-out pier. The fitting-out pier with its associated buildings and berths was constructed to support construction of new submarines in the early 1940s during World War II (Navy, 2004). It was constructed as an expansion of the already-filled timber basin on Dennett's Island and the small, uninhabitable Pumpkin Island to the west (Navy, 2004; Navy, 2006b; Louis Berger Group, Inc. 2005a). The timber basin area previously served as a stone timber dock for more than 100 years, beginning shortly after the establishment of the Shipyard in 1800. The timber basin was slowly filled beginning around 1914, creating newly made land, which then was further expanded to encapsulate Pumpkin Island and form the fitting-out pier (Fulk, 2011).

The fitting-out pier consists of an earth-filled area enclosed along the perimeter with a pile-supported open wharf structure to form Berths 11, 12, and 13. Steel pipe bollards are embedded in the top of each berth for mooring (Hardlines Design Company, 2014). Originally constructed in 1943, the pier has been expanded, strengthened, and rehabilitated at various times up to the present. Concrete pile platforms and timber fender systems were subsequently added to each of the berths during the 1960s (Louis Berger Group, Inc., 2005a, 2005b, 2005c). In the 1970s, the berths were modified to accommodate the current, larger-gauge portal crane rails. The face of the wharf at Berth 11 (B and C) and Berth 13B has been extended through the installation of a master pile fender system and timber deck. Repairs have generally consisted of installing concrete pile jackets, repairing concrete encasements on steel beams and pile caps, and strengthening all rail beams. As discussed in the 2006 *Architectural Resources Survey*, "this V-shaped mass, totaling about 12 acres in extent, is edged by a concrete quay wall on steel girders that provides over 2,000 linear feet of berthing space" (Navy, 2006b). Berths 11, 12, and 13 are integral to the structure of the pier, functioning as retaining walls for the fill that made up the pier (Navy, 2006b). The expansion of the Shipyard, including the fitting-out pier, during World War II was essential to the Shipyard's mission (Louis Berger Group, Inc., 2005a). The fitting-out pier is heavily used and is fully paved with roadways and work spaces.

- **Dry Dock 1** is located at the southeast end of the fitting-out pier, south of Dry Dock 3. Dry Dock 1 was built on the site of the Shipyard's first dry dock, the 1850s floating dry dock that was removed in 1907, when Dry Dock 2 was constructed to the east. Originally used for submarine repairs and construction, the dry dock was constructed by Aberthaw Co. of Boston in 1943 from standard yard and dock designs developed by the U.S. Navy Bureau of Yards and Docks. Like Dry Dock 3, it was constructed in response to the demand for submarine repair and construction facilities during World War II (Navy, 2006b). Dry Dock 1 is closed at the lower end by a steel caisson maneuvered in and out of place by a barge-mounted crane. Three service galleries extend the length of each side of the dry dock (Louis Berger Group, Inc., 2005d). Dry Dock 1 has retained the earlier structure's numerical designation; it retains integrity of design, workmanship, and materials. Dry Dock 1 is considered a contributing resource within the PNSY Historic District under NRHP Criterion C (Navy, 2007a; Louis Berger Group, Inc., 2005d).
- **Dry Dock 3** is located at the northeast end of the fitting-out pier. Originally used for submarine repairs and construction, the dry dock was constructed by Aberthaw Co. of Boston in 1943 from standard yard and dock designs developed by the U.S. Navy Bureau of Yards and Docks. It was constructed in response to the demand for submarine repair and construction facilities during World War II. The dry dock is still used for submarine repairs and is capable of overhauling both *Virginia* and *Los Angeles* class submarines (Navy, 2006b). Dry Dock 3 contains six service galleries to provide working accommodations for yard workers. The dry dock walls are constructed of a massive concrete facing cast against stay-in-place steel sheet pile cells. The floor is reinforced concrete supported on bedrock. The appearance of the dry dock is industrial and is representative of the construction that took place at the Shipyard in response to the United States' involvement in World War II. In 1958, Dry Dock 3 was lengthened to accommodate the Navy's larger, modern submarines, and a concrete platform on the north side was widened to provide more working and crane-track space; these alterations were integral for the Shipyard to meet its mission requirements during the Cold War. At the seaward end of Dry Dock 3, a large steel caisson and its concrete caisson seats form an air-tight seal, allowing submarine repair work to be performed at the dry dock. The existing *circa* 1960 caisson is a character-defining feature of the dry dock. Additional repair projects that have been completed

on the dry dock over the past 55 years include upgrades to pumping and utilities systems and replacement of the stairs and concrete spall repairs throughout the dry dock. Dry Dock 3 retains integrity of design, workmanship, and materials. It is considered a contributing resource within the PNSY Historic District under NRHP Criterion C (Appledore Marine Engineering, LLC, 2015; Louis Berger Group, Inc., 2005e; Navy, 2006b, 2007a).

- **Berth 1** is located along the north side of the flat-iron pier (Fulk, 2011). It was originally constructed in 1904 to form part of the flat-iron pier and was rebuilt in 1943. Approximately 400 feet long, the Berth 1 quay wall is a gravity retaining wall built entirely of cut granite block. The Berth 1 quay wall was capped with concrete coping, installed sometime after 1923 (Navy, 2004). As noted in the 2012 ICRMP, this berth is not directly involved in ship or marine construction, repair, and overhaul, although is important to the overall function of the Shipyard as a marine facility (Hardlines Design Company, 2012).

  Berth 1 retains integrity of design and materials and survives as an excellent example of a gravity retaining wall, reflecting the high degree of engineering skill, workmanship, and use of quality materials practiced by the Navy. Although the westernmost section of the pier has recently undergone structural repairs, a these repairs did not adversely affect the historic integrity of the structure and the integrity of this structure is not considered diminished (Navy, 2004; Navy, 2006b). Berth 1 was recorded in August 2003 under terms of a Memorandum of Agreement (MOA) among the United States Navy, Portsmouth Naval Shipyard, and the Maine Historic Preservation Officer, in association with the recent work (Navy, 2004). Berth 1 has been determined a contributing resource within the PNSY Historic District (Hardlines Design Company, 2012; Navy, 2007a).

- **Building 175,** located to the east of Dry Dock 3, was one of two nearly identical concrete substations constructed in 1941; it is considered a contributing resource within the PNSY Historic District under NRHP Criterion C. It was designed by the U.S. Navy Bureau of Yards and Docks and constructed by Aberthaw Co. of Boston (Louis Berger Group, Inc., 2005f). This windowless building's massive reinforced concrete walls and vaulted ceiling were intended to protect its contents from bomb splinters in the event of an air attack. Building 175 has elements of the Streamline Moderne Style of the 1930s and 1940s, expressed in the grooves below the parapets, the rounded corners of the roofs over the doors, and the shaped covers over the ventilation openings. Steel rings, which were used to support camouflage netting, circumscribe the building at the parapet level. Building 175 is essentially unaltered (Navy, 2006b; Louis Berger Group, Inc., 2005f).
- **WH 3,** located east of and directly adjacent to Dry Dock 3, was constructed in 1943 to serve as the welding house for Dry Dock 3. WH 3 is a contributing resource within the PNSY Historic District (Navy, 2007a).

Portions of the following resources are in the APE:

- **Building 2** is identified as a Production Shop (Insulators)/Electric Substation 1 (1864, 1941, mid-20th century) that was originally constructed as a storehouse adjacent to Building 1 (originally located in a portion of the Building 155 footprint). Building 2 is a Classical Revival-style building with a cross gable, dentilated wood cornices, lunette windows, and several significant wood six-over-six windows. Throughout the years, several non-significant additions have been made and

many windows in-filled with brick (Weinstein, 2013). Building 2 is a contributing resource within the PNSY Historic District under Criterion C (Louis Berger Group, 2005g).

- **Building 92**, located just east of the fitting-out pier, was constructed in 1905 as a steam engine and steel plant and is now used as a structural shop. Subsequent additions were made in 1939 and 1941. The original brick building is representative of industrial buildings during the Shipyard's major expansion at the turn of the 20th century. Building 92 is a contributing resource within the PNSY Historic District under Criterion C (Navy, 2007a; Louis Berger Group, 2005h).
- **Building 155**, located southeast of the fitting-out pier, was constructed in 1939 as a pipe shop, with an addition occurring in 1941. Building 155 was functionally designed with flat roofs, a large, full-length monitor for increased interior illumination, and long expanses of windows (currently a late 20th-century fiber glass) on each long elevation. Building 155 is a contributing resource within the PNSY Historic District under Criterion C (Navy, 2007a; Louis Berger Group, Inc. 2005i). Building 155 is scheduled to be demolished as part of MILCON P-266.

Dry Dock 3 Caisson Replacement

Historic properties in the APE for the Dry Dock 3 caisson replacement project include Dry Dock 3, Building 175, WH3, and Berths 12 and 13 (A and B). As the APE for the Dry Dock 3 caisson replacement project largely overlaps the APE for Berths 11, 12, and 13 structural repairs, a description of each of these resources has been included as part of the preceding discussion.

Traditional Cultural Properties

There are no known traditional properties with spiritual and/or cultural importance to an Indian tribe, ethnic group, or subculture on the installation. The Navy has consulted with five federally recognized Native American tribes of Maine: the Aroostook Band of Micmac Indians, the Houlton Band of Maliseet Indians of Maine, the Indian Township Reservation of the Passamaquoddy Tribe of Maine, the Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine (Hardlines Design Company, 2012) (Appendix E).[4]

The Navy consults with federally recognized Indian tribes on actions with the potential to significantly affect protected tribal resources, tribal treaty rights, or Indian lands.

3.5 Biological Resources

Biological resources include living, native, or naturalized plant and animal species, and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife. Habitat can be defined as the resources and conditions present in an area that support a plant or animal. The analysis in this EA focuses on marine vegetation and wildlife in the in-water Project area.

The lower Piscataqua River is part of the busy Port of New Hampshire, and estuarine resources in this area are affected by higher ambient noise levels influenced by commercial, military, and recreational

[4] The Indian Township Reservation of the Passamaquoddy Tribe of Maine and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine are served by a single Tribal Historic Preservation Officer (THPO). The Navy consulted with the THPO for the Passamaquoddy Tribes of Maine, and the THPO responded on behalf of both tribes. Copies of all correspondence with federally recognized Indian tribes are included in Appendix E.

vessel traffic. Ambient noise by definition is background noise, and it has no single source or point. Ambient noise varies with location, season, time of day, and frequency. Ambient noise is continuous but with much variability on time scales, ranging from less than 1 second to 1 year (Richardson et al., 1995). Ambient underwater noise in and near the Project area is widely variable over time due to a number of natural and anthropogenic sources. Sources of naturally occurring underwater noise include wind, waves, precipitation, and biological sources (such as shrimp, fish, and cetaceans). There is also human-generated noise from ship or boat traffic and other mechanical means (Hildebrand, 2009). Anthropogenic sources of underwater noise at industrial waterfronts could come from cranes, generators, and other types of mechanized equipment on wharves or the adjacent shoreline.

Underwater noise generated by the level of vessel traffic and industrial activity present in the lower Piscataqua River may be noteworthy. Typical underwater ambient noise levels for bay systems with heavy recreational, commercial, and industrial vessel traffic are expected to range from 113 dB to 155dB (ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009). A recent ambient noise study conducted by ESS Group took in-water ambient sound measurements over a one-day duration at Berths 11, 12, and 13 (ESS Group, Inc., 2015). Average broadband ambient underwater noise levels ranged from 52.8 to 80.5 L_{sel} dB re 1µPa with peak readings from passing boats and industrial noise ranging from 79.9 to 103.9 L_{peak} dB re 1µPa (ESS Group, Inc., 2015). While these sound measurements are below what would be expected in areas with heavy vessel traffic, boat traffic was limited on the day of the in-water ambient sound measurements at the berths (three boats passed at a distance greater than 66 yards from the site), and the measurements were taken over a short duration. Therefore, typical underwater ambient noise levels in the vicinity of the Shipyard are expected to be higher than these measurements during periods of greater vessel traffic. By virtue of their continued use of this area, aquatic wildlife are considered tolerant of existing anthropogenic activities and ambient underwater noise.

3.5.1 Regulatory Setting

Special-status marine species are those species listed as threatened or endangered under the Endangered Species Act (ESA) and species afforded federal protection under the Marine Mammal Protection Act (MMPA).

The purpose of the ESA is to conserve the ecosystems upon which threatened and endangered species depend and to conserve and recover listed species. Section 7 of the ESA requires action proponents to consult with the USFWS or NOAA Fisheries to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of designated critical habitat. Critical habitat cannot be designated on any areas owned, controlled, or designated for use by the DoD where an Integrated Natural Resources Management Plan has been developed that, as determined by the Department of Interior or Department of Commerce Secretary, provides a benefit to the species subject to critical habitat designation.

All marine mammals are protected under the provisions of the MMPA, which prohibits any person or vessel from “taking” marine mammals in the United States or the high seas without authorization.

The Magnuson-Stevens Fishery Conservation and Management Act provides for the conservation and management of fisheries. Under the Magnuson-Stevens Fishery Conservation and Management Act, essential fish habitat (EFH) consists of the waters and substrate needed by fish to spawn, breed, feed, or grow to maturity.

The Maine NRPA contains rules pertaining to the protection of significant natural resources. Under the NRPA, a permit is required for any activity that takes place in, on, or over a significant wildlife habitat, or adjacent to or within 75 feet of a significant wildlife habitat contained within a freshwater wetland.

3.5.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories under biological resources.

3.5.2.1 Marine Vegetation

Marine vegetation comprises plants occurring in marine or estuarine waters and may include mangroves, algae, and various grasses. The Piscataqua River serves as important habitat for aquatic vegetation, including eel grass (*Zostera marina*), which is a submerged, marine flowering plant that is vital to the health and productivity of the estuary. Based on information from the MEDMR, eel grass beds have been noted around the Shipyard—specifically, along the northeastern shoreline and in the vicinity of the shoreline along Building 178 (see Figure 3.5-1) (MEDMR, 2010).

In 2014, video and benthic grab surveys were conducted in the Project area along Berths 11, 12, and 13 to characterize bottom substrate, identify epifaunal macroinvertebrate communities, and determine the presence of submerged aquatic vegetation. Figure 3.5-2 shows benthic survey locations in the Project area. The surveys found that the benthic environment alongside the berths was dominated by communities of small opportunistic species indicative of stressed environments, not unlike communities in other regions of the Piscataqua River estuary that exhibit similar stressed conditions. The marine algal species identified included sea lettuce (*Ulva lactuca*), kelp (*Laminaria stenopylla*), rock weed (*Ascophylum nodosum*), and branching red algae (*Rhodophyta* spp.). The surveys found no presence of eel grass within or near the Project area. No other marine plant species were identified (CR Environmental, Inc., 2014). The 2014 benthic survey report is included with the EFH assessment for the Proposed Action in Appendix G.

3.5.2.2 Marine Mammals

Jurisdiction over marine mammals is maintained by NOAA Fisheries and the USFWS. NOAA Fisheries maintains jurisdiction over whales, dolphins, porpoises, seals, and sea lions. The USFWS maintains jurisdiction for certain other marine mammal species, including walruses, polar bears, dugongs, sea otters, and manatees. The MMPA of 1972 prohibits the “take” of marine mammals in U.S. waters. A take is defined under the MMPA as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal” and includes “any negligent or intentional act which results in disturbing or molesting a marine mammal.”

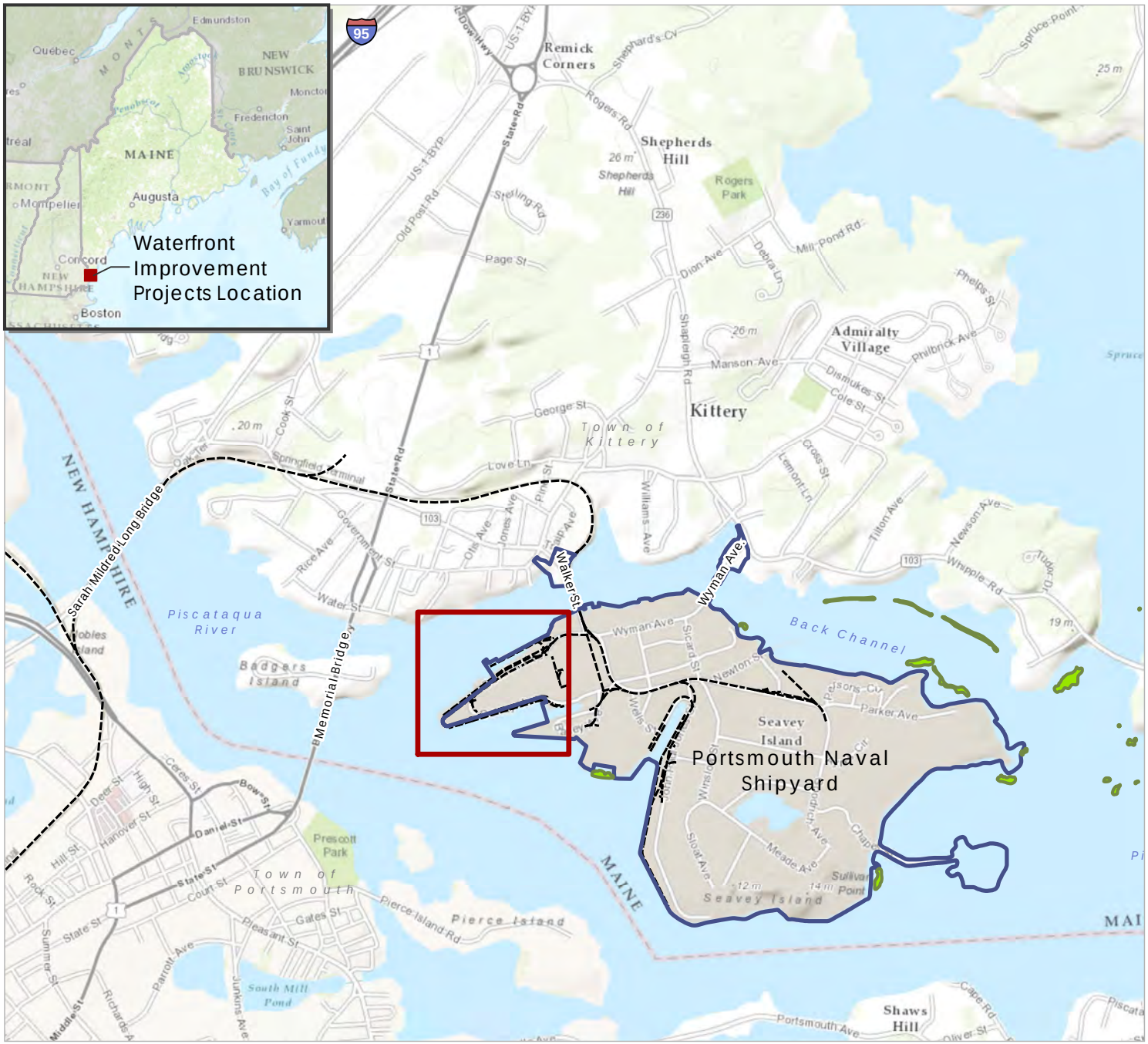

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Figure 3.5-1
Eelgrass Beds
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Eelgrass Beds
- Railroad

Source: ESRI 2013; Department of Defense 2014; Maine Department of Marine Resources 2010; Maine Department of Transportation 2011.

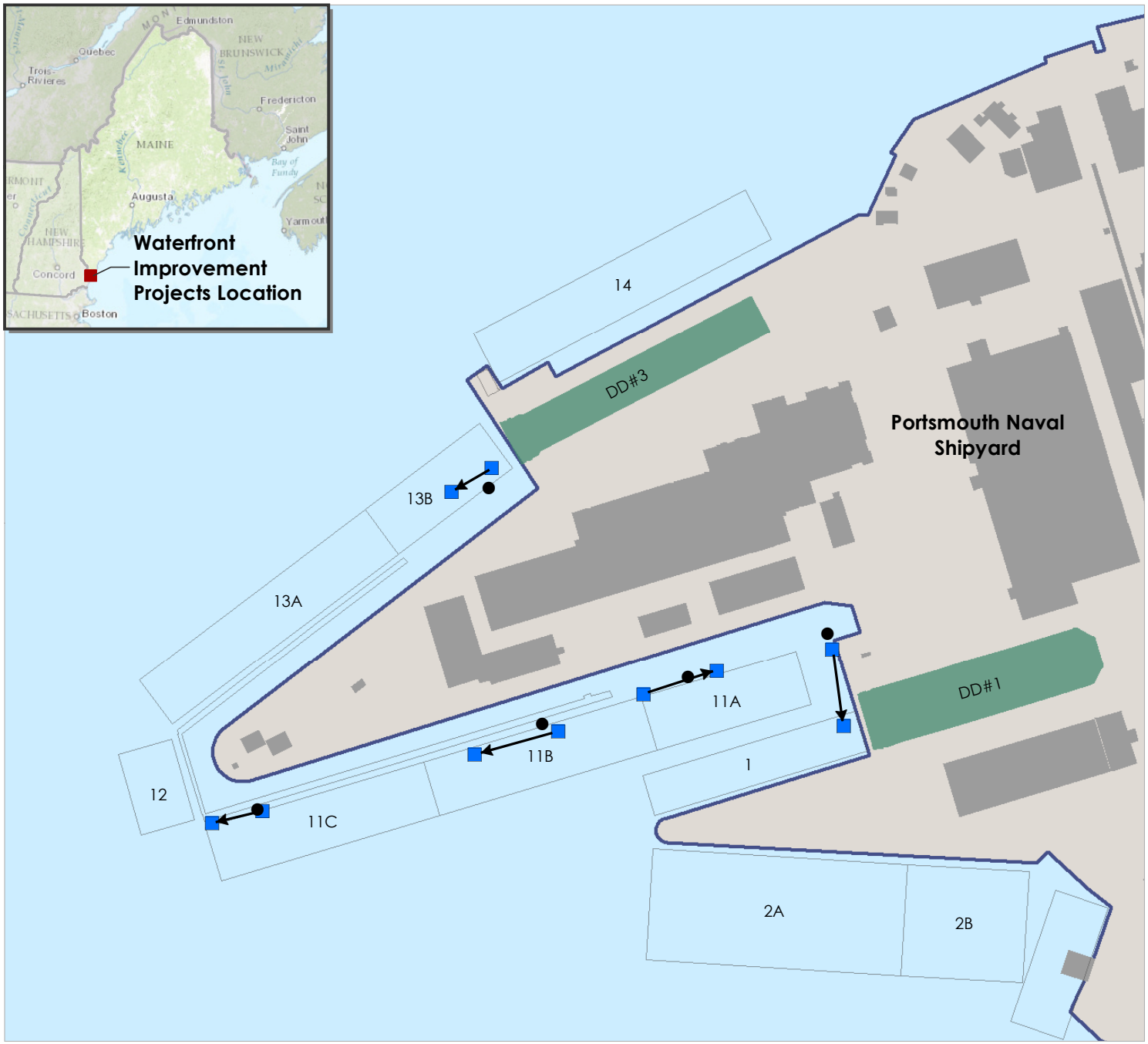

Figure 3.5-2
Benthic Survey Locations
Portsmouth Naval Shipyard
York County, Maine

Legend

- PNSY sediment grab stations 5/13/2014
- PNSY video transects 5/13/2014
- Dry Dock
- Berth
- Existing Structures
- Installation Area

N

0 100 200 300 400 Feet

Source: CR Environmental 2014; ESRI 2013; Department of Defense 2014.

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Table 3.5-1 Marine Mammal Species Potentially Occurring in the Piscataqua River Near Portsmouth Naval Shipyard

Species	*Stock Abundance*[1]	*Relative Occurrence in Lower Piscataqua River*	*Season(s) of Occurrence*	*Approximate Density in the Vicinity of the Project Area (individuals per km²)* [3]			
				Winter	*Spring*	*Summer*	*Fall*
Harbor Porpoise (*Phocoena phocoena*) Gulf of Maine/Bay of Fundy stock	79,883 (CV= 0.32)	Occasional	Spring to Fall (April – December)	1.2122[4]	1.1705	0.7903	0.9125
Grey Seal (*Halichoerus grypus*) Western North Atlantic stock	331,000 [2]	Common	Year-round	0.2202	0.2202	0.2202	0.2202
Harbor Seal (*Phoca vitulina*) Western North Atlantic stock	70,142 (CV= 0.29)	Common	Year-round	0.1998	0.1998	0.1998	0.1998
Hooded Seal (*Crystphora cristata*) Western North Atlantic stock	592,900 [2]	Rare	Winter to Spring (January – May)	N/A	N/A	N/A	N/A
Harp Seal (*Pagophilus groenlandicus*) Western North Atlantic stock	71,000,000	Rare	Winter to Spring (January – May)	0.0125	0.0125	0.0125	0.0125

Source: Waring et al. 2014, except where noted.

Notes:

(1) No population estimate is available for the U.S. Western North Atlantic stock; therefore, the best population estimates are those for the Canadian populations, as reported in Waring et al., 2014.

(2) Source: Waring et al., 2007. The population estimate for the Western North Atlantic hooded seal population was not updated in Waring et al., 2014.

(3) Density data are taken from the Navy Marine Species Density Database (Crain, 2015; Krause, 2015). It should be noted that these data overestimate the potential species density in the Piscataqua River. The Navy Marine Species Density Database data presented in the table are based on a relative environmental suitability study and represent data with low confidence. These data are generally used for broad-scale offshore activities; however, due to a lack of any other data within the general Project area, these data are presented as the best available data for the Piscataqua River.

(4) The species is not expected to be present in the river during this season. As noted above, density data are taken from the Navy Marine Species Density Database and overestimate the potential species density in the Piscataqua River.

Key:
CV = Coefficient of variation
km^2 = Square kilometer

In general, the occurrence of marine mammals in the lower Piscataqua River is rare, and they are more prevalent off the coasts of Maine and New Hampshire; however, seals and cetaceans occasionally occur in the lower Piscataqua while foraging (Smith, n.d.). Table 3.5-1 lists the marine mammals potentially occurring in the Project area. Seal species that could occur include the harbor seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*), hooded seal (*Cystophora cristata*), and harp seal (*Pagophilus groenlandicus*). There is one known seal haul-out site located approximately 1.5 miles downstream of the Project area. Of the seal species, the harbor seal is the most likely to occur in the Project area. Cetacean species that could occur in the Project area include the harbor porpoise (*Phocoena phocoena*), which occurs occasionally in the lower Piscataqua River (Smith, n.d.). Descriptions of each of these species, including their habitat and geographic ranges and expected abundance near the Project area, are provided in Appendix F. Additionally, there are some reports of offshore marine mammals occurring within the river, though these occurrences are extremely rare (Smith, n.d.). There are no known significant populations of marine mammals and no federally listed threatened or endangered marine mammals with the potential to occur within the Piscataqua River or Back Channel.

3.5.2.3 Fish

Fish are a vital component of the marine ecosystem and have great ecological and economic values. To protect this resource, NOAA Fisheries works with regional fishery management councils to identify the essential habitat for every life stage of each federally managed species using the best available scientific information. EFH has been described for approximately 1,000 managed species to date. EFH includes all types of aquatic habitat including wetlands, coral reefs, seagrasses, and rivers—all locations where fish spawn, breed, feed, or grow to maturity.

The Piscataqua River, Back Channel, and Portsmouth Harbor support diverse, abundant populations of fish. Nine species of anadromous fish migrate through the Piscataqua River, including the federally listed as endangered shortnose sturgeon (*Acipenser brevirostrum*) and federally listed as threatened Gulf of Maine distinct population segment (DPS) of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). American shad (*Alosa sapidissima*) and striped bass (*Morone saxatilis*) are seasonal inhabitants of nearshore waters surrounding the Project area. Alewife (*Alosa pseudoharengus*), Atlantic silverside (*Menidia menidia*), Atlantic menhaden (*Brevoortia tyrannus*), blueback herring (*Alosa aestivalis*), and rainbow smelt (*Osmerus mordax*) are some of the most abundant finfish species found in the Piscataqua River system. These species represent important components of the forage base for larger predatory fish.

Significant numbers of finfish are year-round residents of the Piscataqua River and Back Channel, including Atlantic tomcod (*Microgadus tomcod*), cunner (*Tautogolabrus adspersus*), grubby (*Myoxocephalus aenaeus*), lumpfish (*Cyclopterus lumpus*), mummichog (*Fundulus heteroclitus*), northern searobin (*Prionotus carolinus*), northern pipefish (*Syngnathus fuscus*), rock gunnel (*Pholis gunnellus*), smooth flounder (*Pleuronectes putnami*), stickleback (*Gasterosteidae* spp.), and winter flounder (*Pseudopleuronectes americanus*). Major predators in the area include striped bass, bluefish (*Pomatomus saltatrix*), Atlantic tomcod, migrating juvenile Atlantic salmon (*Salmo salar*), and American eel (*Anguilla rostrata*). Recreational fishing in Portsmouth Harbor and the Piscataqua River is primarily directed toward bluefish, pollock (*Pollachius* spp., striped bass, winter flounder, and various species of baitfish (Richardson, 2011).

Table 3.5-2 lists fish species known to occur in the Project area for which the New England Fishery Management Council, the Mid-Atlantic Fishery Management Council, South Atlantic Fishery

Management Council, and the NOAA Fisheries' Northeast Regional Office (now the Greater Atlantic Regional Fisheries Office) have designated EFH. NOAA Fisheries' EFH Mapper was cross-referenced with the species list of fish occurring in the Great Bay National Wildlife Refuge, which is located approximately 10 miles upriver from the Project area, to develop a list of species in the vicinity of the Project area with designated EFH (see Table 3.5-2).

Table 3.5-2 Species with Designated Essential Fish Habitat near Portsmouth Naval Shipyard

Species		*Eggs*	*Larvae*	*Juveniles*	*Adult*	*Spawning Adults*
Common Name	***Scientific Name***					
Atlantic salmon[1]	*Salmo salar*			X	X	
Atlantic cod	*Gadus morhua*	X*	X*	X	X	
Haddock	*Melanogrammus aeglefinus*	X*	X*			
Pollock	*Pollachius virens*	X*	X*	X*	X	
Whiting	*Merluccius bilinearis*			X	X	
Red hake	*Urophycis chuss*	X	X	X*	X*	
White hake	*Urophycis tenuis*	X*	X	X*	X*	
Winter flounder	*Pseudopleuronectes americanus*	X*	X*	X*	X*	X*
Yellowtail flounder	*Limanda ferruginea*	X*	X*		X	
Windowpane flounder	*Scophthalmus aquosus*	X*	X*	X*	X*	X*
American plaice	*Hippoglossoides platessoides*				X	
Atlantic halibut	*Hippoglossus hippoglossus*	X*	X*	X*	X*	X*
Atlantic sea scallop	*Placopecten magellanicus*	X	X	X*	X*	
Atlantic sea herring	*Clupea harengus*		X*	X*	X	
Bluefish	*Pomatomus saltarix*			X*	X*	
Atlantic mackerel	*Scomber scombrus*	X*	X*	X*		
Atlantic bluefin tuna	*Thunnus thynnus*				X	

Source: NOAA Fisheries, Greater Atlantic Regional Fisheries (GARFO) n.d.[a],n.d.[b]

Notes:
X = EFH is present in the Project area for this life stage.
* Indicates that EFH is designated for those species/life stages in the seawater zone portion of the Great Bay estuary.
[1] The Atlantic salmon's current range is limited to 11 rivers, not including the Piscataqua, and the species is not expected to occur in the Project area or its vicinity.

3.5.2.4 Benthic Invertebrates

Benthic invertebrates inhabit the seafloor and include a variety of diverse groups, from sessile species (i.e., animals permanently attached to the seafloor or a structure) such as sponges, corals, and bivalves to motile crustaceans such as crabs, shrimp, and lobsters. American lobster (*Homarus americanus*), eastern oyster (*Crassostrea virginica*), blue mussel (*Mytilus edulis*), green crab (*Carcinus maenas*), rock crab (*Cancer irroratus*), and soft-shell clam (*Mya arenaria*) abound in the estuary. Recreational fishing in Portsmouth Harbor and the Piscataqua River is primarily directed toward lobster, oyster, and soft-shell clam (Richardson, 2011).

Common invertebrates found during the 2014 benthic grab and video surveys included sand shrimp (*Crangon crangon*) in areas sheltered from strong currents, sea stars (*Asteria vulgaris*) and blue mussels (*Mytilus edulis*) in areas exposed to stronger currents, and other species common to Maine waters such as the branched hydroid (*Hydroza* spp.), orange sheath tunicate (*Botrylloides violaceaus*), sea anemone

(*Metridum senle*), Jonah crab (*Cancer borealis*) and rock crab. No rare, threatened, endangered, or otherwise distinctive species were observed (CR Environmental, Inc., 2014).

3.5.2.5 Threatened and Endangered Species

The purpose of the ESA is to protect and recover any listed threatened and/or endangered species and their habitats. Like the MMPA, the ESA prohibits the take (without a permit) of any listed species. Section 7 of the ESA requires consultation with the USFWS and/or NOAA Fisheries for any action that "may affect" a federally listed threatened or endangered species. The protection of non-federally listed species that are listed at the state level as threatened or endangered is not legally mandated; however, the Navy cooperates with state agencies to protect such species whenever possible (Office of the Chief of Naval Operations Instruction 5090.1D).

The 125 endangered and threatened marine species over which NOAA Fisheries has jurisdiction were reviewed to determine their potential occurrence in the Project area. Two species, the Atlantic sturgeon and shortnose sturgeon, could occur in the Project area.

Four sea turtle species could potentially occur in Maine estuarine waters—the leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), and hawksbill (*Eretmochelyd imbricate*) turtles. While each species varies slightly in its nesting locations, they share a common pattern wherein they migrate south to warmer waters to nest and north into cooler waters to feed. During their northern migrations, sea turtles are largely carried by ocean currents with the Gulf of Maine beyond the northernmost extent of their typical migratory patterns. In addition, with the exception of the leatherback, sea turtles are very sensitive to cold waters and prefer habitats consisting of pelagic waters, sandy beaches, or benthic environments abundant in sea grasses and algae (NOAA Fisheries, 2015). The distance of the lower Piscataqua River from suitable habitats, the lack of abundant food sources, and cold water temperatures make occurrences of sea turtles in Maine waters extremely rare. Therefore, the Navy has determined the Proposed Action would have no effect on these species, and they are not discussed further in this EA.

1. Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

Status and Management

NOAA Fisheries was petitioned to list the Atlantic sturgeon under the ESA in 2009. In 2010, NOAA Fisheries found that the petition presented substantial scientific or commercial information indicating that listing may be warranted (FR 75 [3]: 838-841, January 6, 2010). After completing an ESA status review of the Atlantic sturgeon, NOAA Fisheries issued two Final Rules on February 6, 2012—one for the Southeast Region, listing the Carolina and South Atlantic DPSs as endangered (FR 77 [24]: 5914-5982, February 6, 2012), and the other for the Northeast Region, listing the Gulf of Maine DPS as threatened and the Chesapeake and New York Bight DPSs as endangered (FR 77 [24]: 5880-5912, February 6, 2012).

On June 2, 2016, NOAA Fisheries proposed critical habitat under section 7 of the ESA for the Gulf of Maine and two other DPS of Atlantic sturgeon. NOAA Fisheries' proposed rule is open for public comment with a revised Final Rule designating critical habitat for the Atlantic sturgeon to be issued in response to public comments. Critical habitat is defined as geographical areas that are occupied by an ESA-listed species and contain features essential to the conservation of the species. Proposed critical habitat for the Gulf of Maine DPS includes portions of the Penobscot, Kennebec, Androscoggin, Piscataqua, and Merrimack rivers. Within the Piscataqua River, proposed critical habitat boundaries

extend from the river's confluence with the Salmon Falls and Cocheco rivers downstream to where the main river discharges at the Atlantic Ocean (NOAA Fisheries 2016).

The Atlantic sturgeon is also managed under a fishery management plan implemented by the Atlantic States Marine Fisheries Commission, but a coast-wide moratorium on its harvest is in effect (Navy, 2013a). NOAA Fisheries augmented the Atlantic States Marine Fisheries Commission moratorium with a similar moratorium for federal waters. Amendment 1 to the Atlantic States Marine Fisheries Commission's Atlantic Sturgeon Fishery Management Plan also includes measures for preservation of existing habitat, habitat restoration and improvement, monitoring of bycatch and stock recovery, and breeding and stocking protocols (FR 75 [3]: 838-841, January 6, 2010).

Habitat and Geographic Range

As an anadromous fish, mature Atlantic sturgeon undergo seasonal migrations between freshwater habitats, where they spawn, and marine waters, where they forage and grow. During non-spawning years, adults remain in marine waters either year-round or seasonally (Bain, 1997). Spawning adults migrate upriver in spring, beginning in February in the south, April in the mid-Atlantic, and May in Canadian waters (Dadswell, 2006). Beginning in mid-May, after water temperatures have reached 14.8° to 19.0° Celsius (°C), Atlantic sturgeon will travel up large New England rivers (Collette and Klein-MacPhee, 2002). After spawning in freshwater in the spring and early summer, adults migrate back into estuarine and marine waters. Spawning populations of the Gulf of Maine DPS are found in the Kennebec River and, potentially, in the Penobscot River; the Piscataqua River is not a spawning river. After spawning, females return to the sea within four to six weeks, while males may remain in the river or lower estuary until fall (Murdy et al., 1997; NOAA Fisheries, 2010). Tagging data indicate that immature Atlantic sturgeon disperse widely once they move into coastal waters (Secor et al., 2000). Dispersal is extensive: north and south along the Atlantic coast and seaward to the edge of the Continental Shelf (Bain, 1997). Atlantic sturgeon juveniles in the Northeast U.S. Continental Shelf and Scotian Shelf Large Marine Ecosystems may occur in salinities ranging from 5 to 25 parts per thousand in estuaries, usually over a mud-sand bottom (Dadswell, 2006). Juveniles move between estuaries and the ocean (NOAA Fisheries Office of Protected Resources, February 22, 2016a), while sub-adults and adults live in coastal waters and estuaries when not spawning, generally in shallow (35 to 165 feet deep) inshore areas of the continental shelf, where they feed (FR 75 [3]: 838-841, January 6, 2010). In a 2004 study using fisheries bycatch data, Atlantic sturgeon were found to be strongly associated with specific coastal areas, such as the mouths of Narragansett Bay and Chesapeake Bay and the inlets of the North Carolina Outer Banks; most fish were caught within a narrow depth range of 30 to 160 feet over gravel and sand and, to lesser extent, silt and clay (Stein et al. 2004).

Population and Abundance

Between seven and ten genetically distinct populations along the U.S. Atlantic coast can be statistically differentiated (Stein et al. 2004). Abundance estimates are available for only two of these populations—the Hudson River (New York) population (9,500 juveniles) and the Altamaha River (Georgia) population (2,000 sub-adults)—although these data are from 1995 (Navy, 2013a). The mean annual spawning stock size has been estimated at 870 individuals, although about half of the Hudson River population may be of hatchery origin (Navy 2013a). The Altamaha River supports one of the healthiest Atlantic sturgeon populations in the southeast, which appears to be stable (Navy, 2013a). The status of the other Atlantic sturgeon populations varies widely, from the large but possibly declining Hudson River population, to small groups of survivors of a once robust population that has undergone considerable decline

(Delaware River), to apparently locally extinct populations (Maryland tributaries of Chesapeake Bay and St. Johns River, Florida) (Navy 2013a).

The two extant populations of the Gulf of Maine DPS are the Penobscot and Kennebec River populations. Analysis of these two populations has determined that there is a moderate risk of the DPS becoming endangered over a 20-year planning horizon (NOAA Fisheries 2010). The Penobscot subpopulation is thought to have fewer than 300 spawning adults. The Kennebec River population historically supported approximately 15,000 spawning adults, and limited data suggest that the population may be increasing (NOAA Fisheries, 2010).

Predator and Prey Interactions

Like all sturgeon, the Atlantic sturgeon feeds along the bottom on invertebrates such as isopods, crustaceans, worms, and molluscs (NOAA Fisheries, 2010). It has also been documented to feed on fish (Bain, 1997). Evidence of predation on sturgeon is scarce, but some researchers believe they are taken by the American alligator (*Alligator mississippiensis*), alligator gar (*Atractosteus spatula*), and striped bass (*Morone saxatilis*) (Dadswell, 2006). Sharks likely prey on all species of sturgeon in the marine environment (Atlantic Sturgeon Status Review Team, 2007).

Species-specific Threats

Historical overfishing resulted in declines in Atlantic sturgeon abundance. Atlantic sturgeon bycatch is the most substantial threat in the ocean environment (NOAA Fisheries, 2010). Other threats include the marine parasitic copepod (*Dichelesthium oblongum*), which has been observed on up to 93 percent of the sturgeon sampled in the New York Bight during 2007 and 2008. Substantially higher parasite burdens, stress, and reduced physiological condition associated with Atlantic sturgeon in areas of sewage contamination may have negative impacts on juvenile Atlantic sturgeon (Navy 2013a). Vessel strikes and degraded water quality (Collins et al., 2000) have also been noted as threats to this species.

Presence in the Project Area

Historically, Atlantic sturgeon were common in the Great Bay estuary, including the Piscataqua River (Odell et al., 2006). Adults overwinter in pelagic areas and would not be found in the Project area during winter months; however, subadults may overwinter in estuarine and marine waters. Therefore, Atlantic sturgeon could occur within the Project area year-round (Tritt, 2014). Currently, there is no evidence to suggest that the Piscataqua River is used as spawning ground by Atlantic sturgeon, but subadults use the Great Bay estuary system (including the lower portions of the Piscataqua River) as nursery habitat (Atlantic Sturgeon Status Review Team, 2007). One tagged Atlantic sturgeon was detected by the University of New Hampshire in Great Bay in 2012 (Trefry, 2016).

The Navy has been partnering with the USGS since February 2014 to capture, tag and monitor sturgeon populations in the Piscataqua River estuary. Tagged Atlantic sturgeon near the Shipyard have not been detected since the start of this effort, probably because of the lack of suitable habitat around the Shipyard. Further, the Navy is actively monitoring for the presence of tagged sturgeon at the Shipyard and will continue efforts for at least the next 10 years.

2. Shortnose Sturgeon (*Acipenser brevirostrum*)

Status and Management

In 1967, the shortnose sturgeon was listed as endangered under the Endangered Species Preservation Act of 1966, which predated the ESA; this species remains on the list as endangered throughout its

range along the Atlantic coast (NOAA Fisheries, 1998a). No critical habitat has been designated for this species.

NOAA Fisheries manages 19 DPSs of the anadromous shortnose sturgeon (NOAA Fisheries, 1998); those occurring in rivers and estuaries along the Atlantic coast are listed below:

- Kennebec River System (including the Sheepscot, Kennebec, and Androscoggin Rivers), Maine
- Hudson River, New York
- Delaware River, Delaware, New Jersey, New York, and Pennsylvania
- Chesapeake Bay and Potomac River, Maryland and Virginia
- St. Marys River, Georgia
- St. Johns River, Florida

Habitat and Geographic Range

After hatching in upstream reaches of rivers, shortnose sturgeon larvae orient into the river current and away from light sources, generally staying near the bottom and seeking cover. By two weeks of age, the larvae emerge from cover and swim in the water column, moving downstream from the spawning site. By two months, juvenile behavior becomes similar to that of adults, with active swimming in a wide range of thermal conditions and foraging at night along the bottom (Navy, 2013a).

The shortnose sturgeon primarily occurs in freshwater rivers and coastal estuaries of the Northeast and Southeast U.S. Continental Shelf large marine ecosystems, occasionally moving short distances to the mouths of estuaries and into nearshore coastal waters (Dadswell, 2006; NOAA Fisheries, 1998a). Shortnose sturgeon are known to occur as far north as Saint John River, New Brunswick, Canada, and as far south as Indian River, Florida (NOAA Fisheries, 1998a). Shortnose sturgeon are a migratory species influenced by temperature and salinity, tending to prefer warmer temperatures and lower salinity; they tend to migrate between freshwater and mesohaline river reaches (NOAA Fisheries, 1998a). In estuarine systems, juveniles and adults occupy areas with little or no current over a bottom composed primarily of mud and sand (Secor et al., 2000). Adults are found in deep water (35 to 100 feet) in winter and in shallow water (7 to 35 feet) during summer (Navy, 2013a). Individual shortnose sturgeon do not disperse far along the coastline beyond their home river estuaries (NOAA Fisheries, 1998a). Based on this information, the species' potential occurrence is concentrated within the bays and estuaries associated with each distinct population segment. The breeding season from April to June is when the shortnose sturgeon will migrate from its overwintering locations upstream to spawning grounds; migrations occur in the early spring in the species' northernmost ranges and in the late winter/early spring in the southernmost ranges. The spawning period will vary from a few days up to 30 days, determined by a "spawning suitability window" that includes day length, water temperature, and river discharge rates (NOAA Fisheries, 1998a).

Population and Abundance

No estimate of the historical shortnose sturgeon population size is available (NOAA Fisheries Office of Protected Resources, February 22, 2016b). The lack of shortnose sturgeon catches in the 1950s led the USFWS to conclude that the species had been eliminated from rivers in its historical range (except the Hudson River) (NOAA Fisheries Office of Protected Resources, February 22, 2016b]). Historical trends for abundance have not been conclusive, but there is evidence to suggest a population decline (NOAA Fisheries Office of Protected Resources, February 22, 2016b). Certain subpopulations of the shortnose

sturgeon have increased substantially in recent years, particularly in the Hudson River (Bain, 1997; Stein et al., 2004). Several strong cohorts had higher-than-expected survival during the 1980s and 1990s, then recovery slowed during the late 1990s (Woodland and Secor, 2007). Abundances in the Hudson River population exceed recovery criteria (Bain et al., 2007; Woodland and Secor, 2007). The Delaware River supports a well-documented population (8,445 individuals) (Navy 2013a), but the abundance of the Chesapeake Bay and Potomac River population is not known.

Populations of shortnose sturgeon are currently found in the Saint John River, Kennebec system, and Merrimac River. There may also be a population in the Penobscot River (Collette and Klein-MacPhee, 2002). The shortnose sturgeon may occur in the lower Piscataqua River and the Project area during the spring as it migrates to spawning sites and again during fall migration when it heads back out to its overwintering sites (NOAA Fisheries, 2014). There are no records of shortnose sturgeon spawning in the Piscataqua River (NOAA Fisheries, 2010).

Predator and Prey Interactions

Feeding patterns of the shortnose sturgeon vary seasonally between northern and southern river systems. In northern rivers, some sturgeon feed in freshwater during summer and over sand-mud bottoms in the lower estuary during fall, winter, and spring (NOAA Fisheries, 1998a). By contrast, in southern rivers, feeding has been observed during winter at or just downstream of where saltwater and freshwater meet (Kynard, 1997). The shortnose sturgeon feeds by suctioning polychaetes (marine worms), crustaceans, molluscs, and small fish from the bottom (NOAA Fisheries, 1998a; Stein et al., 2004).

Young-of-the-year sturgeon (individuals less than one year old) have been found in the stomachs of yellow perch (NOAA Fisheries, 1998). Predation on older sturgeon is not well documented, although sharks likely prey on them in the marine environment (NOAA Fisheries, 1998a).

Species-Specific Threats

Principal causes of the shortnose sturgeon's decline include pollution, overharvesting in commercial fisheries (including bycatch in the shad fishery), and its resemblance to the formerly commercially valuable Atlantic sturgeon (Bain et al., 2007; NOAA Fisheries, 1998a). Other risk factors include poaching (northern rivers); accidental introduction of exotic species into habitat; very low productivity; freshwater spawning and nursery areas destroyed or degraded because of human-caused dissolved oxygen reductions; contaminants (e.g., heavy metals, pesticides, and organochlorine compounds); siltation from dredging, bridge construction, and demolition; impingement on power plant cooling water intake screens; impoundment operations; and hydraulic dredging operations (Collins et al., 2000; NOAA Fisheries, 1998a).

Presence in the Project Area

Shortnose sturgeon are found within the Piscataqua River, but their suitable habitat typically includes estuarine areas with lower salinities than the waters present in the Project area. Therefore, while shortnose sturgeon may occur in the Project area during spring and fall migrations between overwintering and spawning sites, they are expected to be transient in the lower Piscataqua River (Tritt, 2014). The Navy has been partnering with the USGS since February 2014 to capture, tag, and monitor sturgeon populations in the Piscataqua River Estuary. Tagged shortnose sturgeon have not been detected at the Shipyard, probably because of the lack of suitable habitat; however, one was detected several miles upstream of the Shipyard near the confluence of the Cocheco and Salmon Falls rivers in

October 2014 (Trefry, 2016). The Navy is actively monitoring for the presence of tagged sturgeon at the Shipyard and will continue efforts for at least the next 10 years.

3.6 Visual Resources

This discussion of visual resources includes the natural and built features of the landscape visible from public views that contribute to an area's visual quality. Visual perception is an important component of environmental quality that can be impacted through changes created by various projects. Visual impacts occur as a result of the relationship between people and the physical environment. Public concern over adverse visual impacts can be a major source of Project opposition.

Visual resources within the immediate vicinity of the Shipyard were considered; in general, this included only those resources within the viewshed of the Shipyard (i.e., that have a view of the installation).

3.6.1 Regulatory Setting

NEPA requires that the Navy account for environmental resources that may be affected by the Proposed Action. Visual resources are included among those to be considered. Visual resources, including scenic areas, sites, landscapes, or other visual features, can be important at the national, state, or local level.

3.6.2 Affected Environment

The affected environment consists of a number of visually sensitive resources that are located both at and near the Shipyard.

The Shipyard is situated in the lower Piscataqua River, adjacent to Portsmouth Harbor, part of the Great Bay estuary in Maine and New Hampshire, and the Town of Kittery. The Piscataqua River separates the Shipyard from the City of Portsmouth, New Hampshire, while the Back Channel of the Piscataqua River separates the Shipyard from the Town of Kittery. Portsmouth Harbor and the Piscataqua River accommodate heavy recreational, commercial, and military vessel traffic. The Back Channel is used primarily by recreational and commercial fishing boats (see Figure 3.6-1).

As noted in Section 3.4, Cultural Resources, the Shipyard is an active industrial complex associated with military vessel repair and maintenance. The overall setting of the Shipyard is a result of operational functions and architectural design from more than 200 years of physical growth and change. The built environment consists of dense industrial areas interspersed with residential and administrative structures; buildings are irregularly placed and contrast with one another in age, design, scale, and materials.

The majority of the Shipyard is included within the PNSY Historic District, which was established in 1977 and expanded in 1996 and 2006. Since the establishment of the historic district, the built environment of the Shipyard has been modified, consistent with the evolving nature of the Shipyard's mission and its significance as a continually operating Navy shipyard. While these modifications have sometimes altered the setting, the PNSY Historic District is still capable of conveying its sense of time, place, and historical development associated with its periods of significance (Navy, 2006b).

At a local level, the Town of Kittery places value on the visual and scenic quality created by the "interface of the land with the community's waterbodies" due to its coastal position (Kittery Comprehensive Plan Update Committee, 2002). As a result, the town's entire shoreline has been designated as a scenic area. In addition, the Town of Kittery has assigned scenic views and vistas, as well as scenic roads, to one of several different categories of importance (Category 1 being the highest and

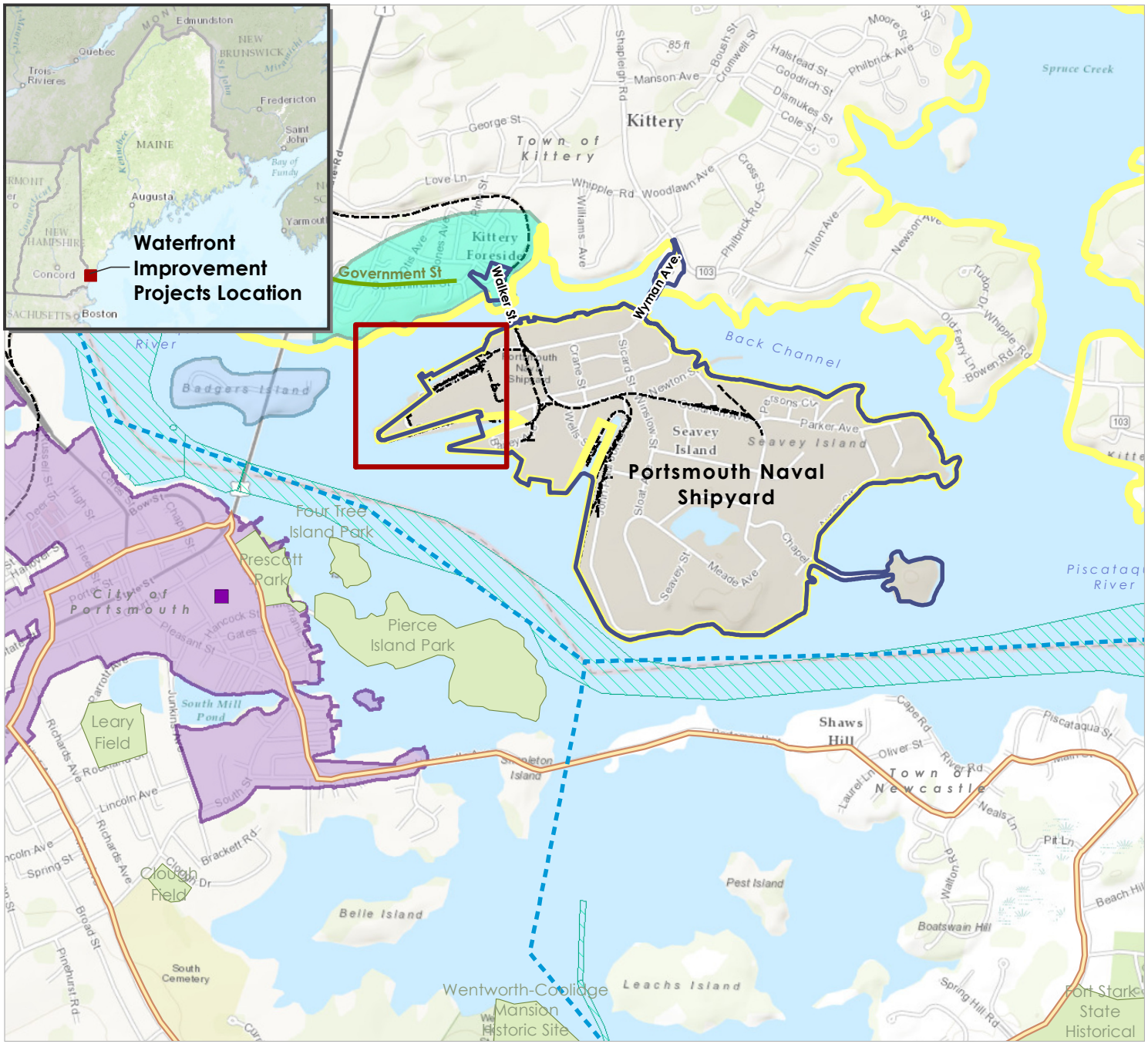

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Figure 3.6-1
Visually Sensitive and Scenic Areas
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Navigation Channel
- Navigation Lanes
- Railroad
- Kittery's Shoreline Scenic Area
- Government Street
- Coastal Byway
- Strawbery Banke Museum
- Portsmouth Historic District
- Badgers Island
- Wallingford Square Scenic Area
- Parks

N

0 500 1,000 1,500 2,000 Feet

Source: ESRI 2013; Department of Defense 2014; Maine Department of Transportation 2011.

Category 3 being the lowest) based on their scenic value. For instance, a Category 1 designation means that the Town of Kittery has identified the scenic views/vistas/roads as having one of the highest scenic values to the community. These resources then are considered during any planning process that may affect these values (Kittery Comprehensive Plan Update Committee, 2002).

The following scenic resources in the Town of Kittery may contain views of the Shipyard due to their locations:

- **The Back Channel of the Piscataqua River** between the Shipyard and the Town of Kittery is used primarily by recreational and commercial fishers.
- **The Piscataqua River** and federal navigation channel (between the Shipyard and the Town of Portsmouth) accommodate heavy recreational, commercial, and military vessel traffic.
- **The Town of Kittery Shoreline Scenic Area** includes the entire shoreline of the town and the Shipyard (Kittery Comprehensive Plan Update Committee, 2002).
- **The Wallingford Square Scenic Area** is on the north side of the Back Channel, across from and to the north of the Shipyard at the fitting-out pier, and is a formally designated scenic resource in the Town of Kittery (Kittery Comprehensive Plan Update Committee, 2002).
- **Badgers Island**, located to the east of the Shipyard, is a designated Scenic Area in the Town of Kittery and also contains a Category 1 Scenic View/Vista (View 1-9, the view of the Back Channel and Kittery Foreside from Badgers Island [180-degree view]) (Kittery Comprehensive Plan Update Committee, 2002).
- **Government Street**, a designated scenic resource in the Town of Kittery, is a Category 1 Scenic Road (Road 1-5) (Kittery Comprehensive Plan Update Committee, 2002).
- The **Kittery Foreside District** is located northwest of the Shipyard. The neighborhood is characterized by a mixture of historic and modern development. One historic architectural resource listed on the NRHP, the Robert and Louisa Traip House, is located in the district on Wentworth Street, just north of the Shipyard, and is visible from the Shipyard. The Greek Revival-style house was erected by Robert Traip, a direct descendent of Kittery's original seventeenth-century settlers, in the 1820s (National Register of Historic Places, n.d.).

The City of Portsmouth, New Hampshire, also considers preservation of scenic landscapes in its planning process, with one of its objectives in its master plan being to preserve scenic views to the waterfront. The city also considers the scenic value of roads, and the city's historic districts also are considerations in its planning and permitting processes (City of Portsmouth, 2005).

- The following scenic resources in the City of Portsmouth may contain views of the Shipyard: **Prescott Park** is a waterfront park in the City of Portsmouth, located southwest of the Shipyard. The park is part of the locally-designated Portsmouth Historic District. The park includes flower gardens, walkways, seating, docking for boats, and grass areas—all designated for public use and recreation (City of Portsmouth, 2011).
- The **Coastal Byway** is a formally designated visually sensitive resource. It is designated a Scenic and Cultural Byway by the State of New Hampshire and is located south of the Shipyard on the mainland in New Hampshire and extends from the City of Portsmouth approximately 18.5 miles south along the New Hampshire coast to Seabrook. U.S. Route 1B is an optional route that can be added to the route of this visually sensitive resource in New Hampshire. U.S. Route 1B loops east from Portsmouth to New Castle, passing close by the Shipyard, before continuing

southwest to reconnect with Route 1A in the Town of Rye (Portsmouth Planning Department, 2015; National Wild and Scenic Rivers, 2015a, 2015b; New Hampshire DOT, 2011; New Hampshire DOT n.d.).

- The **Portsmouth Historic District**, which is regulated by the Portsmouth Historic District Commission, encompasses the majority of the Portsmouth waterfront along Marcy Street, including Prescott Park, Northern Pier, and Southern Pier (Portsmouth Planning Department, 2015). The NRHP-listed Strawbery Banke Historic District is situated in the local Portsmouth Historic District and is bound by Court Street to the north, Hancock Street to the south, Marcy Street to the east, and Washington Street to the west (Garvin, 1974). A direct view of the Shipyard across the Piscataqua River is available from within the locally designated Portsmouth Historic District at Prescott Park and the two piers on the east side of Marcy Street and east of the NRHP-listed Strawberry Banke Historic District.

While the Marcy Avenue waterfront in the Portsmouth Historic District is characterized by a mixture of open space and historic development, the NRHP-listed Strawbery Banke Historic District is emblematic of a historic residential waterfront community. The district includes seventeenth, eighteenth, and early nineteenth-century buildings, which represent a wide variety of styles common in northern New England. This district is significant as the focal point of early commercial development and is the focus of numerous events of social, cultural, and political importance in the history of the region. In particular, the Strawbery Banke Museum and its 10-acre property preserve remnants and artifacts of the early seventeenth century history of the Portsmouth area (National Park Service, 1975).

Views from locations such as these are considered sensitive because they have high scenic quality and are experienced by relatively large numbers of people (i.e., views from publicly accessible areas). The overall scenic quality is a measure of the impression or appeal of an area or resource created by the physical features of the natural and built landscape that comprise it or surround it. These sensitive visual resources are shown on Figure 3.6-1.

3.7 Noise

This discussion of noise includes types or sources of airborne noise and noise-sensitive receptors in the human environment. Noise in relation to biological resources and wildlife species, specifically, existing ambient underwater noise, is discussed in the introduction to Section 3.5.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity: the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency: the number of cycles per second the air vibrates, in hertz
- Duration: the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although continuous and extended exposure to high noise levels (e.g., through occupational exposure) can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While vessels and construction vehicles and equipment are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this EA.

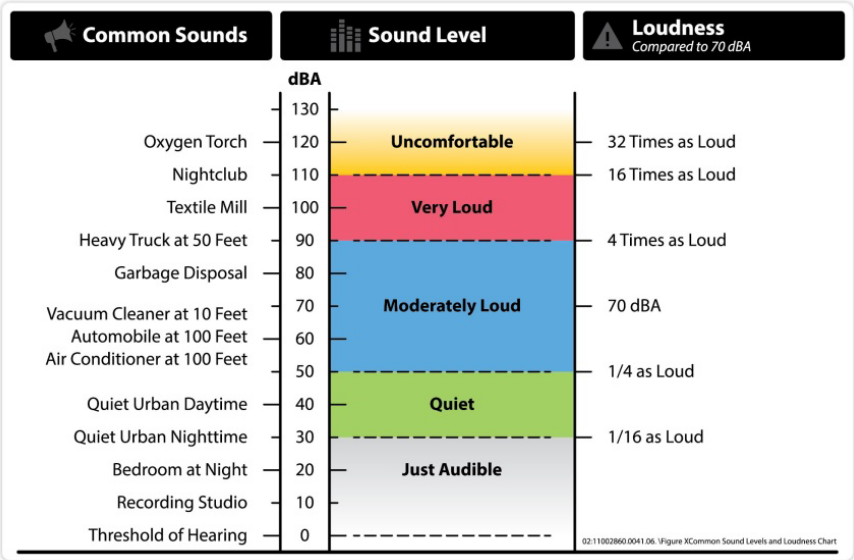
3.7.1 Basics of Sound and A-weighted Sound Level

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. This vast range means that using a linear scale to represent sound intensity is not feasible. The dB is a logarithmic unit used to represent the intensity of a sound, also referred to as the sound level. All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" to the measurement unit in order to identify that the measurement has been made with this filtering process (dBA). In this document, the dB unit refers to A-weighted sound levels. Table 3.7-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table 3.7-1 Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic; twice or half as loud
20 dB	Striking; a four-fold change

Figure 3.7-1 provides a chart of A-weighted sound levels from typical noise sources. Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources (e.g., automobile, heavy truck) are the maximum sound produced during an event like a vehicle pass-by. Other sounds (e.g., urban daytime, urban nighttime) are averages taken over extended periods of time. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.



Sources: Derived from Harris (1979) and the Federal Interagency Committee on Aviation Noise (December 1997).

Figure 3.7-1 A-Weighted Sound Levels from Typical Sources

3.7.1.1 Noise Metrics

A metric is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EA are described in summary format below. While the day-night average sound level (DNL) noise metric is the most commonly used tool for analyzing noise generated at Navy installations, the DoD has been developing additional metrics (and analysis techniques). These supplemental noise metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure. This EA evaluates supplemental noise metrics relevant to a discussion of noise produced during temporary, intermittent construction operations, as described below.

3.7.1.2 Day-night Average Sound Level

The DNL metric is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. (acoustic night). DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. DNL is the standard noise metric used by the U.S. Department of Housing and Urban Development, the Federal Aviation Administration, the USEPA, and the DoD. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments: there is a consistent relationship between the DNL and the level of annoyance. Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Aviation Noise, 1997.

3.7.1.3 Equivalent Sound Level

A cumulative noise metric useful in describing noise is the equivalent sound level (L_{eq}). L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out so as to contain the same total sound energy. The same calculation for a daily average time period such as DNL but without the penalties is a 24-hour equivalent sound level, abbreviated $L_{eq(24)}$. Other typical time periods for L_{eq} are 1 hour and 8 hours.

3.7.1.4 Sound Exposure Level

The sound exposure level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., a vessel or vehicle passing) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. SEL captures the total sound energy from the beginning of the acoustic event to the point when the receiver no longer hears the sound. It then condenses that energy into a 1-second period of time, and the metric represents the total sound exposure received.

3.7.1.5 Noise Effects

An extensive amount of research has been conducted regarding noise effects including annoyance, speech interference, sleep disturbance, noise-induced hearing impairment, non-auditory health effects, performance effects, noise effects on children, and effects on domestic animals and wildlife, property values, structures, terrain, and archaeological sites. Annoyance, the primary effect of high noise levels on sensitive receptors, is discussed below. The other noise effects noted above tend to result from long-term high noise levels and are not discussed further in this EA.

3.7.1.6 Annoyance

As previously noted, the primary effect of recurring high-noise events on exposed communities is long-term annoyance, defined by the USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response, and there is a consistent relationship between DNL and the level of community annoyance (Federal Interagency Committee on Aviation Noise, 1997).

3.7.1.7 Potential Hearing Loss

DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to DNL greater than or equal to 80 dB (DoD Noise Working Group, 2009). Noise levels generated by Shipyard industrial activities do not reach 80 dB DNL or more outside the installation boundary. There is no risk of potential hearing loss due to Navy operations for individuals working or residing outside the Shipyard. Therefore, this EA does not evaluate potential hearing loss.

3.7.1.8 Sleep Disturbance

The disturbance of sleep is generally a concern for communities exposed to nighttime industrial noise. This EA evaluates noise produced during temporary, intermittent construction activities, which will not be occurring at night; therefore, this EA does not analyze sleep disturbance effects.

3.7.1.9 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended noise exposure limit of 85 dBA as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss. Following the reevaluation using a new risk-assessment technique, NIOSH published another criteria document in 1998, which reaffirmed the 85 dB recommended exposure limit (NIOSH, 1998). Construction contractors will be required to comply with NIOSH noise exposure limits. Temporary, intermittent construction noise is not expected to increase the risk of hearing loss for workers outside of the Shipyard; therefore, NIOSH standards are not addressed further in this EA.

3.7.2 Affected Environment

Many components of the Proposed Action may generate noise and warrant analysis as contributors to the total noise impact. The Shipyard is a dynamic industrial facility situated on an island with a narrow separation of waterways between the installation and residential and commercial areas in Kittery and Portsmouth. The predominant noise sources from Shipyard industrial operations consist of the use of dry dock cranes, passing vessels, and industrial equipment (e.g., forklifts, loaders, rigs, vacuums, fans, dust collectors, blower belts, HVAC units, water pumps, and exhaust tubes and lids). Other components such as construction, vessel ground support equipment for maintenance purposes, vessel traffic across the Piscataqua River, and vehicle traffic on the Shipyard's bridges and on local roads in Kittery and Portsmouth produce noise, but such noise generally represents a transitory contribution to the average noise level environment (Blue Ridge Research and Consulting, Inc. [BRRC], 2015; ESS Group, 2015).

The federal government supports conditions free from noise that threatens human health and welfare and the environment. Response to noise varies, depending on the type and characteristics of the noise, the distance between the noise source and whoever hears it (the receptor), receptor sensitivity, and time of day. A noise-sensitive receptor is defined as a land use where people involved in indoor or outdoor activities may be subject to stress or considerable interference from noise. Such locations or facilities often include residential dwellings, hospitals, nursing homes, educational facilities, and libraries. Sensitive receptors may also include noise-sensitive cultural practices, some domestic animals, or certain wildlife species (BRRC, 2015). The nearest sensitive receptors to the Project sites are residences located in the Town of Kittery and City of Portsmouth, and on Badgers Island. The distances to these sensitive receptors are identified in Table 3.7-2. Potentially noise-sensitive wildlife species are discussed in Section 3.5.

Table 3.7-2 Portsmouth Naval Shipyard Nearest Noise-sensitive Receptors

Project Component	*Nearest Sensitive Receptor and Relative Location*	*Approximate Distance*
Dry Dock 3	Residence north of Dry Dock 3 on Knight Avenue, Kittery	690 feet
	School northeast of Dry Dock 3, on Williams Ave, Kittery (R.W. Traip Academy)	1,600 feet
Berths 11A, 11B, and 11C	Residence building southwest of Berths 11A, 11B, and 11C adjacent to Prescott Park, Portsmouth (near Marcy Street)	1,730 feet from Berth 11C
Berth 12	Residence northwest of Berth 12, on Island Avenue, Badgers Island	740 feet
Berth 13A	Residence northwest of Berth 13A, on Old Armory Way, Kittery	950 feet
Berth 13B	Residence west of Berth 13B, on Island Avenue, Badgers Island	700 feet

Table 3.7-2 Portsmouth Naval Shipyard Nearest Noise-sensitive Receptors

Project Component	*Nearest Sensitive Receptor and Relative Location*	*Approximate Distance*
Gate 1 (vehicle access)	Residence northwest of Gate 1, adjacent to Gate 1 parking lot.	200 feet
	Residence northwest of Gate 1, on intersection of Wentworth St and Walker St, Kittery	280 feet
	Rice Public Library (8 Wentworth St, Kittery). North of Gate 1.	430 feet
Gate 2 (vehicle access)	Residence adjacent to Gate 2 access (east side on Whipple Rd and Wyman Avenue, Kittery).	120 feet
	Residence adjacent to Gate 2 access (east side on Whipple Rd and Wyman Avenue, Kittery).	160 feet
	Residence in front of Gate 2 access on Whipple Rd and Wyman Avenue, Kittery.	180 feet

Source: Google Earth, 2015

3.7.2.1 On-shore Noise

Existing noise levels in the vicinity of the Shipyard are typical of those normally associated with urban environments. Noise from Shipyard industrial activities is audible off the Shipyard in waterfront areas of Kittery and Portsmouth. In addition, other noise sources in the surrounding communities include vehicle traffic to and from the Shipyard.

Ambient sound levels recorded at the Shipyard are considered typical of a large outdoor industrial facility and vary widely in space and time (ESS Group, 2015). Table 3.7-3 summarizes the sound exposure and the average ambient sound levels recorded at Berths 11, 12, and 13 in 2014 during normal operations (morning and afternoon hours), as well as the predominant operational and natural sound sources identified.

Table 3.7-3 Ambient Sound Levels Recorded at Berths 11, 12, and 13

Measurement Location	*Sound Exposure Level (SEL dBA)*		*Equivalent Sound Level (L_{eq} dBA)*		*Predominant sources*
	Morning	*Afternoon*	*Morning*	*Afternoon*	
Berth 11	100.4	94.0	69.6	63.2	Operational sources: trucks and forklifts passing, drilling rig, circular saw noise, passing boats, front-end loaders passing Natural sources: wind noise and seagulls
Berth 12	101.1	86.5	70.3	55.7	Operational sources: crane noise and beeping, traffic on bridges and across the river, generators and personnel on barges, air compressors, idling trucks, foghorn, and passing boats Natural sources: wind noise

Table 3.7-3 Ambient Sound Levels Recorded at Berths 11, 12, and 13

Measurement Location	*Sound Exposure Level (SEL dBA)*		*Equivalent Sound Level (L_{eq} dBA)*		*Predominant sources*
	Morning	*Afternoon*	*Morning*	*Afternoon*	
Berth 13	92.3	93.8	61.4	62.9	Operational sources: frequent passing and idling trucks, traffic along Route 1, intermittent public and radio announcements, front-end loader use, drilling near Berth 11, and passing boats Natural sources: Seagulls

Source: ESS Group, 2015; BRRC, 2015.

Key:
dBA = A-weighted decibel.
L_{eq} = Equivalent sound level. It is the continuous sound level that would be present if all of the variations in sound occurring over a specified time period had the same total sound energy. It correlates reasonably well with the effects of noise on people, even for wide variations in environmental sound levels and time patterns.
SEL = Sound exposure level. It provides a measure of total sound energy of an acoustic event. It is commonly used for describing sound from passing vehicles.

3.8 Infrastructure

This section discusses infrastructure, including utilities (such as water distribution, wastewater collection, stormwater collection, solid waste management, energy, and communications) and facilities. Transportation systems and traffic are addressed separately in Section 3.9.

3.8.1 Regulatory Setting

The regulatory settings related to stormwater and energy are discussed below.

The CWA (33 U.S.C. 1251) establishes the basic structure for regulating discharges of pollutants into Waters of the United States. Pursuant to section 402 of the CWA, the USEPA or its designated state authority regulates point-source discharges of pollutants, including discharges of stormwater, through the National Pollutant Discharge Elimination System (NPDES).

The MEDEP is the Maine state permitting authority for the NPDES. In accordance with Phase II stormwater regulations under the NPDES, the MEDEP has issued a General Permit for the Discharge of Stormwater from State or Federally Owned Municipal Separate Storm Sewer Systems. The Shipyard's separate storm sewer system is covered under the General Permit; the Shipyard's current coverage is effective from July 1, 2013, to June 30, 2018. To comply with the requirements of the General Permit, the Shipyard has prepared and implemented a five-year Stormwater Program Management Plan that addresses detection and elimination of illicit discharges, stormwater runoff control from construction sites, post-construction stormwater management, and pollution prevention. The Shipyard's stormwater program is designed to reduce pollutants that are discharged to the receiving waters of the Piscataqua River through best management practices, structural controls, training, inspections, and stormwater sampling (Environmental Division, Portsmouth Naval Shipyard, 2013).

Point-source discharges from the Shipyard's dry docks are authorized under a separate Maine Pollutant Discharge Elimination System permit and Maine Waste Discharge License issued by MEDEP (Permit No.

ME0000868). Under this five-year permit issued in 2011, the Navy can discharge wastewater generated by normal dry dock operations from three outfalls and dry dock dewatering water from three dry docks (Hinkel, 2011).

Maine's General Permit for Construction Activities regulates direct discharges of stormwater from construction projects disturbing a total land area of one acre or more (MEDEP, Bureau of Land and Water Quality, 2006). As a condition of the general permit, developers must prepare and implement an erosion and sediment control plan to protect water quality in receiving waters of the state.

New construction and major renovation projects on the Shipyard are required to meet specific standards for stormwater management under Maine's Site Location of Development Law (38 M.R.S.A. sections 481–490), the technical guidance on implementing section 438 of the Energy Independence and Security Act (EISA), and the Navy's low-impact development (LID) policy. The stormwater management standards put into place by these laws and policies are described briefly below.

- Under the Shipyard's planning permit, issued pursuant to Maine's site law, new construction on the Shipyard is required to meet both basic and general standards for stormwater management. Basic standards apply during construction and address erosion and sedimentation control, inspection and maintenance, and pollution prevention. General standards address the design of a new facility's stormwater management system and include standards for controlling and treating runoff and standards for inspection and maintenance (MEDEP, n.d.).
- Section 438 of the EISA stipulates that federal development exceeding 5,000 square feet must maintain or restore pre-development hydrology with respect to temperature, rate, volume, and duration of flow, to the maximum extent technically feasible. Technical guidance for implementing section 438, released by the USEPA in December 2009, provides two options for meeting the objective of preserving or restoring the hydrology of a site: a performance-based approach or a site-specific approach (USEPA, 2009).
- The Navy's LID policy focuses on implementing LID measures in lieu of conventional stormwater collection and conveyance systems in order to replicate natural systems and minimize adverse water quality impacts on receiving waters. Stormwater management requirements under the Navy's LID policy are defined in Unified Facilities Criteria 3-210-10, *Low Impact Development* (which also addresses the requirements under section 438 of the EISA). The Navy's LID policy sets a goal of no net increase in stormwater volume and sediment or nutrient loading from major renovation and construction projects. The policy also requires that LID be considered in the design of all projects that have a stormwater management component (Navy, 2007b).

EO 13693, Planning for Federal Sustainability in the Next Decade, requires federal departments and agencies to enact specific actions and operations outlined within the EO to reduce agency direct GHG emissions by at least 40 percent over the next decade. Improved environmental performance and federal sustainability will be achieved by reducing energy use and cost. Pursuing clean sources of energy will improve energy and water security.

Chief of Naval Operations Instruction 4100.5E outlines the Secretary of the Navy's vision for shore energy management. The focus of this instruction is establishing the energy goals and implementing strategy to achieve energy efficiency.

3.8.2 Affected Environment

The following discussions provide a description of the existing conditions for each of the categories of infrastructure at the Shipyard.

3.8.2.1 Utilities

Utilities refer to the systems that support the functions of a community or region. Utility systems are human-made structures that allow regions to develop and grow. The capacity of utility systems is a primary factor in the ability of a region to support physical and economic growth (Navy, 2014). The utilities that are discussed in relation to the Proposed Action include stormwater, solid waste management, and energy.

Stormwater

Stormwater runoff at the Shipyard is controlled by an extensive stormwater collection system that directs runoff through outfalls to the lower Piscataqua River. The lower Piscataqua River downstream of the Great Bay estuary is heavily industrialized and receives stormwater runoff from multiple industrial outfalls, including those of the Shipyard. The river also receives point- and non-point-source pollution from a variety of other sources (U.S. Department of Health and Human Services, 2007).

Stormwater runoff in the Project area is collected in a network of storm drains and discharged via drainage outfalls to the Piscataqua River. In addition, the concrete deck at Berths 11, 12, and 13 contains drainage openings that discharge stormwater directly to the river (MN-FST, 2015b). The Project area within the Shipyard's CIA is entirely developed with impervious surfaces.

Solid Waste Management

Solid wastes, including municipal solid waste and non-contaminated construction and demolition debris, generated at the Shipyard are recycled to the extent practicable in accordance with installation and Navy contracting procedures. The Shipyard's recycling procedures support the DoD-mandated goals to divert 50 percent of non-hazardous waste and 60 percent of construction and demolition debris from the waste stream as part of the DoD Strategic Sustainability Performance Plan (Navy, 2012a). The Shipyard uses a private contractor for solid-waste management and disposal. Solid waste generated at the Shipyard that is unsuitable for reuse is disposed of off-site at various licensed recycling and disposal facilities in Maine and New Hampshire (Navy, 2011).

Periodic maintenance dredging of the Shipyard's berths and dry dock entrances results in dredged sediments, or spoils. The Navy authorizes dredging contractors to reuse dredged spoils for construction purposes or dispose of them. Dredge spoils exceeding MEDEP Solid Waste Management Rules (Chapter 418) criteria for toxicity are transported to authorized landfills for disposal in accordance with the requirements of the solid waste management rules and regulations (38 M.R.S.A. section 1301) (MN-FST, 2015b).

Energy

The Shipyard is located in the Northeast Power Coordinating Council New England eGRID subregion (Northeast Power Coordinating Council, Inc., n.d.; USEPA, 2010). The U.S. Energy Information Administration reports that electricity generated totaled 14,030,038 megawatt-hours (MWH), and 11,855,047 MWH of electricity was sold in Maine in 2013. The state's primary source of energy is natural gas (U.S. Energy Information Administration, 2015).

The Shipyard produces a large quantity of electricity for its own use through a combined heat and power plant consisting of two 5-megawatt (MW) co-generation turbines. When there is a need for additional power, the Shipyard purchases electricity from the Defense Energy Support Center. Central Maine Power, a subsidiary of Iberdrola USA, provides the transmission infrastructure that carries electricity purchased from the Defense Energy Support Center (Navy, 2011). Central Maine Power serves more than 600,000 customers in central and southern Maine (Central Maine Power, n.d.). Overhead lines owned by Central Maine Power carry electricity to the Franklin Substation on the Shipyard, where it is distributed to Shipyard facilities through Navy-owned buried and overhead distribution lines (Navy, 2014).

Electricity is used on the Shipyard to provide direct power, heat buildings, produce steam, and provide high-pressure air service. The amount of energy consumed by the Shipyard fluctuates based on the number of submarines berthed or in dry dock and the type and tempo of submarine overhaul and repair operations under way at any given time. In 2014, the Shipyard used approximately 84,900 MWH of electricity, an average of approximately 7,000 MWH per month (Simpson, 2015). Of the annual amount of electricity used, an average of approximately 5,000 MWH (70 percent) was generated on base and 2,000 MWH (30 percent) was purchased (Simpson, 2015). The Shipyard's electrical distribution system consists of electrical substations and mechanical distribution systems, including buried and overhead distribution and feeder lines. Electrical distribution and feeder lines in the CIA typically are buried to protect them from damage and to maximize the use of space in operational areas.

3.9 Transportation

This discussion of transportation includes all of the land and sea routes with the means of moving passengers and goods in the vicinity of the Project area. A transportation system can consist of any or all of the following: roadways, bus routes, railways, subways, bikeways, trails, airports, and taxis. These systems can be analyzed on a local or regional scale.

3.9.1 Regulatory Setting

State and local weight and size restrictions for vehicles traveling on roads and bridges are applicable to construction vehicles used to transport materials and equipment to and from the Project sites. Permits must be obtained for any overweight or oversize loads, and such permits may stipulate safety measures such as the use of flaggers, pilot vehicles, and warning signs. Such measures are not anticipated to be necessary for the transport of most equipment and materials, such as fill material, to and from the Project sites via trucks. The use of barges for delivery of materials and large equipment, such as cranes used for in-water construction activities, is subject to standard rules and regulations for navigation within the federal navigation channel and to the Project sites.

3.9.2 Affected Environment

The Shipyard is located near three major roadways that run north-south between Maine and New Hampshire: Interstate 95 (I-95), U.S. Route 1, and the U.S. Route 1 Bypass. Access to the Shipyard is provided by State Route (S.R.) 103 (Government Street/Wentworth Street/Whipple Road) and Walker Street (see Figure 3.9-1). The most recent documented average annual daily traffic counts for these roads are provided in Table 3.9-1. As shown in Table 3.9-1, I-95 carries the highest volume of traffic between Maine and New Hampshire.

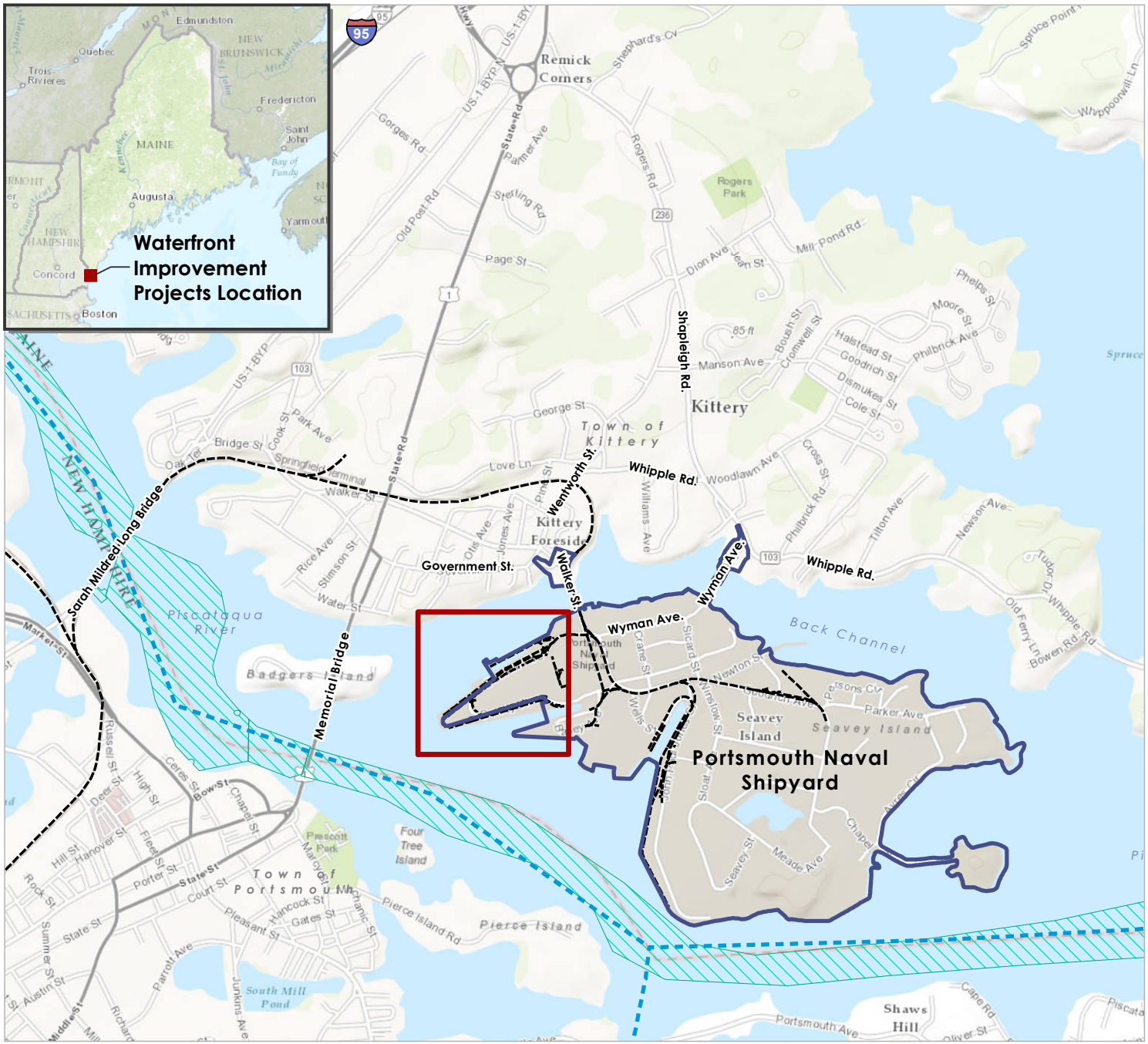


Figure 3.9-1
Transportation
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Navigation Channel
- Navigation Lanes
- Railroad

N

0 500 1,000 1,500 2,000 Feet

Source: ESRI 2013; Department of Defense 2014; Maine Department of Transportation 2011.

Path: L:\Buffalo\Portsmouth_Railway\Maps\MXD\Reports\EA\Figure_3_9_1_Transportation_Near_ProjectArea.mxd

Table 3.9-1 Average Annual Daily Traffic in the Vicinity of Portsmouth Naval Shipyard

Road	*Section*	*AADT (Year)*
Interstate 95	Northbound at the New Hampshire state line	36,320 (2014)
	Southbound at the New Hampshire state line	37,500 (2014)
U.S. Route 1	At the New Hampshire state line (Memorial Bridge) (Northbound and Southbound)	8,650 (2010)
	Northbound north of State Route (S.R.) 103 (Walker Street)	4,110 (2013)
	Southbound south of S.R. 103 (Walker Street)	4,420 (2010)
U.S. Route 1 Bypass	At the New Hampshire state line (Sarah Mildred Long Bridge) (Northbound and Southbound)	15,670 (2011)
	Northbound southwest of U.S. Route 1	4,110 (2010)
	Southbound southwest of U.S. Route 1	2,640 (2010)
S.R. 236 (Shapleigh Road)	Southeast of Rogers Road (Northbound and Southbound)	12,070 (2013)
S.R. 103 (Walker Street)	East of U.S. Route 1 (Eastbound and Westbound)	8,460 (2013)

Source: Maine Department of Transportation, 2015

Where both directions are indicated, AADT indicates total number of vehicles traveling in both directions.

Key:
AADT = average annual daily traffic

The Sarah Mildred Long Bridge on the U.S. Route 1 Bypass will be replaced with a new bridge being constructed next to the existing bridge. Construction began in January 2015, and the project is scheduled to be completed in June 2018. The existing bridge is scheduled to be closed from November 2016 through August 2017, with the new bridge opening to traffic in September 2017 (Maine Department of Transportation, n.d.). Further discussion of this project is provided in Chapter 5.

Railroad access for material and equipment shipments is provided to the Shipyard via a dedicated rail line that runs to the Shipyard from a junction with the Montreal, Maine, and Atlantic Railway, Ltd., line in Portsmouth, New Hampshire, near the Sarah Mildred Long Bridge. The Proposed Action would have no effect on railroad transportation or rail traffic; therefore, the railroad is not further discussed in this EA.

The deep-water shipping channel of the Piscataqua River allows larger vessels to access the Shipyard and marine terminals and fishing piers along the river. The shipping channel, also known as the Port of New Hampshire, is used by military vessels, cargo ships, commercial fishing ships, and recreational vessels. In 2012, the port handled more than 2 million metric tons of cargo (USACE 2014a). Approximately 55 fishing vessels operate from the Commercial Fish Pier on Peirce Island (Pease Development Authority, n.d.). There are approximately 20 boating facilities for local or transient boats in the area of the port (USACE New England District n.d. [b]).

3.10 Hazardous Materials and Wastes

This section discusses hazardous materials, hazardous waste, toxic substances, and contaminated sites.

3.10.1 Regulatory Setting

Hazardous materials are defined by 49 CFR section 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table, and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR part 273. Four types of waste are currently covered under the universal wastes regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps. The MEDEP regulates hazardous waste under Chapters 850 to 857 of the Hazardous Waste Management Rules.

Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances. Special hazards include asbestos-containing material (ACM), PCBs, and lead-based paint (LBP). The USEPA is given authority to regulate special hazard substances by the Toxic Substances Control Act. Asbestos is also regulated by the USEPA under the Clean Air Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). MEDEP regulates asbestos under Maine Solid Waste Management Rules (Chapter 425), Asbestos Management Regulations, and regulates PCBs largely under the Maine Hazardous Waste Management Rules. Maine LBP regulations apply to residential dwellings and child-occupied facilities and are not applicable to the Shipyard.

3.10.2 Affected Environment

The Navy has implemented a strict hazardous material control and management program and a hazardous waste minimization program for all activities. These programs are governed Navy-wide by applicable OPNAVINST and at the installation by specific instructions issued by the base commander as discussed in the following sections. The Navy continuously monitors its operations to find ways to minimize the use of hazardous materials and to reduce the generation of hazardous wastes.

3.10.2.1 Hazardous Materials

To support its mission and daily activities, the Shipyard uses a wide variety of hazardous materials, including paints, cleaners, solvents, chemicals, acids, oils, and fuel. Such materials have been used in the Project area associated with the Proposed Action.

A few aboveground storage tanks (ASTs) exist in and near the Project area. An AST is present at the western end of Dry Dock 3 and two ASTs are located north of the western end of Dry Dock 1, in a partial construction area for work at Berth 11A. These ASTs are used for the storage of diesel fuel or oily water. The Shipyard's Spill Prevention, Control, and Countermeasure Plan contains procedures to prevent the discharge of oil from onshore facilities such as ASTs into navigable waters of the U.S. in accordance with 40 CFR part 112, Oil Pollution Prevention (Navy, 2013b).

A hazardous material survey performed for constituents in soil in areas adjacent to Berths 11, 12, and 13, in support of the Proposed Action, reported some elevated levels of chemical constituents, which are further discussed in Section 3.10.2.2.

3.10.2.2 Hazardous Waste

Shipbuilding and submarine repair activities at the Shipyard have resulted in the generation and disposal of hazardous wastes. These wastes are primarily from mechanical, structural, electrical/electronic, and public works activities and include waste fuel/oil, solvents, chemicals, pesticides, plating wastes, and paint (Navy, 2013c). With the exception of plating wastes, similar hazardous wastes are occasionally generated in the Project areas from daily operational activities.

Hazardous wastes are containerized, stored, managed, and disposed of in accordance with Shipyard Instruction 5090.30A, Hazardous Waste Generator Standards (Navy, 2012c), which complies with RCRA and MEDEP hazardous waste requirements.

The hazardous material survey of constituents in soil in areas adjacent to Berths 11, 12, and 13, performed in support of the Proposed Action, reported total petroleum hydrocarbons and arsenic in one or more soil samples at concentrations exceeding Maine remedial action guideline standards. Sediment in certain areas near Berth 11 contains lead and arsenic at levels above MEDEP Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418). Sediment in the locations sampled near Berth 13 does not contain such constituents, and sediment near Berth 12 was not sampled during that study (MN-FST, 2015b).

A hazardous building materials survey conducted at Dry Dock 3 in 2015 in support of the Proposed Action reported the presence of mercury-containing light bulbs in some fluorescent light fixtures at the dry dock, typically in the control room (Appledore Marine Engineering, 2015). If removed and handled, such equipment would become hazardous waste.

3.10.2.3 Special Hazards (Asbestos-containing Material, Lead-based Paint, Polychlorinated Biphenyls)

A hazardous material survey for ACM and LBP at Berths 11, 12, and 13, performed in support of the Proposed Action, did not find ACM but reported the presence of LBP on the berths. Sediment in certain areas near Berth 13 contains PCBs at levels above MEDEP Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418). Sediment in the locations sampled near Berth 11 does not contain PCBs, and sediment near Berth 12 was not sampled during that study (MN-FST, 2015b).

A hazardous building materials survey conducted at Dry Dock 3 in 2015 in support of the Proposed Action did not indicate the presence of asbestos or PCBs in suspect materials but did report the presence of gray LBP on certain exterior portions of the caisson (Appledore Marine Engineering, 2015).

Information on special hazards in other Project areas was not available. Based on the age of the Shipyard, it can be assumed that ACM and LBP could be present in older structural components in the Project area. The USEPA banned the use of most asbestos-containing products by 1989, and the

manufacture of many LBPs was curtailed beginning in 1978. Structures and components in the Project areas that pre-date those dates could contain some of those materials, most notably LBP on berths, dry docks, and piers. Any low-level PCBs at the Shipyard would be associated with transformer oil, certain equipment fluids, and certain fluorescent light ballasts, which would not tend to be encountered under the Proposed Action.

4 Environmental Consequences

This chapter presents an analysis of the potential direct and indirect effects of each alternative on the affected environment. The following discussion elaborates on the nature of the characteristics of each alternative that might relate to specific resources. "Significantly," as used in the National Environmental Policy Act (NEPA), requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts, such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a Proposed Action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 Code of Federal Regulations [CFR] part 1508.27). Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, the more intense a potential impact would need to be to be considered significant.

4.1 Air Quality

Effects on air quality are based on the estimated direct and indirect emissions associated with construction of each of the waterfront improvement projects under each alternative and the impact of the projected changes in emissions on local and regional air quality, regional greenhouse gas (GHG) levels, and climate change. Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations.

The region of influence (ROI) for assessing air quality impacts is York County, within the Metropolitan Portland Intrastate Air Quality Control Region (MPIAQCR). The General Conformity Rule does not apply to this action because the region is in attainment for all National Ambient Air Quality Standards (NAAQS). The MPIAQCR had previously been designated a nonattainment area for the 1997 ozone standard and has been subject to a maintenance plan under that standard; however, on March 6, 2015, the USEPA revoked the 1997 8-hour ozone NAAQS (FR 80 [44]: 12264, 2015).

Air Quality Potential Impacts:

- No Action: No change in emissions. No change in the vulnerability of Shipyard waterfront infrastructure to the impacts of climate change.
- Alternative 1: Annual direct emissions of criteria pollutants during construction and after implementation would not result in significant impacts on air quality. The temporary increase in GHG emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region. The vulnerability of Shipyard waterfront infrastructure to the impacts of climate change would be reduced.
- Alternative 2: the emissions would be similar to those under Alternative 1.

4.1.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to baseline air quality. Therefore, no significant impacts on air quality would occur with implementation of the No Action Alternative.

Greenhouse Gases and Climate Change

The No Action Alternative would not result in increased GHG emissions. As a result of climate change, regional sea-level rise and coastal flooding are projected to increase in the future, causing increased risk of damage to coastal infrastructure (USEPA, 2015d). The No Action Alternative would not provide protection against these risks, leaving waterfront infrastructure in the Project area at greater risk from climate change impacts.

4.1.2 Alternative 1 (Preferred Alternative)

The study area encompasses the proposed construction and ground disturbance areas and vehicle operations related to Alternative 1. Alternative 1 incorporates in-water construction techniques for the proposed bulkheads at Berths 11A and 11B (Phase 1) and Berths 12 and 13 (Phase 2) that require dredging, pile driving, and fill placement. Construction of the king pile and concrete shutter panel bulkheads at Berths 11, 12, and 13 would minimize the amount of pile driving required. Option 1 would include the repair of Berth 11C under Phase 1. Alternative 1 also includes replacement of the Dry Dock 3 caisson, repair of the inner caisson seat, and limited in-water repair of the caisson seat at Dry Dock 3. A full description of the construction activities can be found in Section 2.3.2.

4.1.2.1 Potential Impacts

The Proposed Action would result in direct emissions of criteria air pollutants during construction, i.e. temporary and minor increases in air emissions from the combustion of fossil fuels in equipment and vehicles during demolition, dredging, pile and fill delivery and placement, and construction, as well as emissions of fugitive dust and dirt. It is conservatively assumed that all construction under Phase 1 of the berth structural repairs at Berth 11 and at the Dry Dock 3 caisson would occur within one year. It is also assumed that all construction under Phase 2 of the berths structural repairs project at Berths 12 and 13 would occur within a single year. Since the construction periods for the projects may take two or three years, these assumptions are conservative. Table 4.1-1 shows estimated criteria pollutant emissions from construction activities of Phase 1 and 2 for Alternative 1. Appendix C includes the assumptions and calculations used to develop these estimates. These total emissions would be minor, temporary, and dispersed over time and location; therefore, implementation of Alternative 1 would not result in significant impacts on air quality.

Since vehicle emissions associated with the Proposed Action would be minimal and no sensitive receptors are nearby, it is assumed that hazardous air pollutant (HAP) emissions would be minimal and would cause no impacts on air quality.

The Proposed Action under either Alternative 1 or 2 would not result in any increases in operating emissions, construction of any new major stationary emission sources or major modifications of any existing major stationary emission sources at the Shipyard. Therefore, a prevention of significant deterioration (PSD) permit and Title V Operating Permit are not required for the Proposed Action.

Greenhouse Gases and Climate Change

Implementation of Alternative 1 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Carbon dioxide emissions from demolition and construction are shown in Table 4.1-1. This temporary increase in GHG emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region.

Table 4.1-1 Estimated Construction Emissions, Alternative 1 (Preferred Alternative)

Projects and Phases	*Emission Totals (Tons)*							*Metric Tons*
	VOCs	*NOx*	*CO*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*CO_2*	*$MTCO_2$*
Phase 1								
Berths 11A and B	2.81	34.77	17.33	2.06	2.12	0.85	3,868	3,508
Option 1: Berth 11C	1.41	17.38	8.66	1.03	1.06	0.42	1,934	1,754
Dry Dock 3 Caisson	0.50	5.00	4.14	0.30	0.31	0.11	541	491
On-road Vehicle Operations, Phase 1	0.31	1.46	2.66	0.16	1.25	0.03	324	294
Option 1: On-road Vehicle Operations, Phase 1	0.20	0.65	1.82	0.09	0.73	0.012	162	147
Phase 1 Total	3.62	41.23	24.13	2.52	3.68	0.99	4,733	4,293
Phase 1 with Option 1 Total	5.24	59.27	34.61	3.64	5.47	1.42	6,829	6,194
Phase 2								
Berths 12 and 13	2.81	34.77	17.33	2.06	2.12	0.85	3,868	3,508
On-road Vehicle Operations	0.24	1.64	1.96	0.15	1.13	0.03	334	303
Phase 2 Total	3.05	36.41	19.28	2.21	3.25	0.88	4,202	3,811

Key:
CO = Carbon monoxide
CO_2 = Carbon dioxide
$MTCO_2$ = Metric tons of carbon dioxide
NO_x = Nitrogen oxide
PM_{10} = Particulate matter equal to or smaller than 10 microns in diameter
$PM_{2.5}$ = Particulate matter equal to or smaller than 2.5 microns in diameter
SO_2 = Sulfur dioxide
VOCs = Volatile organic compounds

Sea-level rise and coastal flooding are projected to increase in the future, causing increased risk of damage to coastal infrastructure (USEPA, 2015d). The Navy's Climate Change Roadmap (Navy, 2010) outlines the Navy's approach to observing, predicting, and adapting to climate change. The document states that climate change is a national security challenge, with strategic implications for the Navy, and that climate change is affecting, and will continue to affect, U.S. military installations and access to natural resources worldwide (Navy, 2010). Pursuant to the Climate Change Roadmap and EO 13653, *Preparing the United States for the Impacts of Climate Change*, which directs federal government agencies to begin preparedness planning, the Shipyard is proposing to make the caisson 1 foot taller in order to accommodate the projected slightly more than 1 foot of sea-level rise in the Piscataqua River. Alternative 1 would repair and strengthen waterfront infrastructure at the Shipyard, potentially reducing the vulnerability of the installation to the impacts of climate change. In response to the projected increased risk of sea-level rise and coastal flooding, the design for the new Dry Dock 3 caisson increases the height of the caisson by 1 foot to minimize risks to dry dock operations. Therefore, implementation of Alternative 1 would not result in significant impacts on air quality.

4.1.3 Alternative 2

Alternative 2 differs from Alternative 1 in the in-water construction method proposed at Berths 11, 12, and 13, and the extent of Dry Dock 3 caisson seat repair. The steel sheet-pile bulkheads at Berths 11A and 11B (Phase 1), and Berths 12 and 13 (Phase 2) proposed under Alternative 2 would require additional pile driving and less dredging. Option 1 would include the repair of Berth 11C under Phase 1.

Under Alternative 2, more extensive repairs would be completed to the outer caisson seat at Dry Dock 3. The level of repairs proposed under this alternative would require construction of a temporary, circular cellular cofferdam around the entrance to Dry Dock 3 to create a dry work area.

4.1.3.1 Potential Impacts

Under Alternative 2, the Proposed Action would result in direct emissions of criteria air pollutants during construction. Under Alternative 2, more equipment would be used for pile driving and less for dredging compared with Alternative 1. Total emissions would be only slightly different between the alternatives.

As discussed in Section 1.1.2.1, construction emissions are estimated as they were for Alternative 1, and Table 4.1-2 shows estimated criteria pollutant emissions from construction activities of Phase 1 and 2 for Alternative 2. As noted under Alternative 1, under each phase, all of the construction was conservatively assumed to occur in a single year. All construction for the Dry Dock 3 caisson replacement has been included under Phase 1. Total emissions under Alternative 2 would be minor, temporary, and dispersed over time and location; therefore, implementation of Alternative 2 would not result in significant impacts on air quality.

Table 4.1-2 Estimated Construction Emissions, Alternative 2

Projects and Phases	*Emission Totals (Tons)*							*Metric Tons*
	VOCs	*NOx*	*CO*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*CO_2*	*$MTCO_2$*
Phase 1								
Berths 11A and B	2.93	35.64	17.75	2.14	2.20	0.86	3,948	3,581
Option 1: Berth 11C	1.46	17.82	8.88	1.07	1.10	0.43	1,974	1,791
Dry Dock 3 Caisson	0.78	8.85	5.03	0.47	0.49	0.21	970	880
On-road Vehicle Operations, Phase 1	0.38	1.51	3.31	0.18	1.44	0.03	350	318
Option 1: On-road Vehicle Operations, Phase 1	0.21	0.66	1.90	0.09	0.75	0.01	166	150
Phase 1 Total	4.09	46.00	26.10	2.79	4.13	1.10	5,269	4,779
Phase 1 with Option 1 Total	5.76	64.48	36.87	3.96	5.98	1.54	7,409	6,720
Phase 2								
Berths 12 and 13	2.53	30.67	16.33	1.88	1.93	0.76	3,437	3,118
On-road Vehicle Operations	0.24	1.55	1.95	0.15	1.10	0.03	319	289
Phase 2 Total	2.77	32.22	18.28	2.02	3.03	0.79	3,756	3,407

Key:
CO = Carbon monoxide
CO_2 = Carbon dioxide
$MTCO_2$ = Metric tons of carbon dioxide
NO_x = Nitrogen oxide
PM_{10} = Particulate matter equal to or smaller than 10 microns in diameter
$PM_{2.5}$ = Particulate matter equal to or smaller than 2.5 microns in diameter
SO_2 = Sulfur dioxide
VOCs = Volatile organic compounds

Greenhouse Gases and Climate Change

Implementation of Alternative 2 would contribute directly to emissions of GHGs from the combustion of fossil fuels. Carbon dioxide emissions from demolition and construction are shown in Table 4.1-2. This

limited amount of emissions would not have an impact on GHG emission totals at the Shipyard or in the region.

Sea-level rise and coastal flooding are projected to increase in the future, causing increased risk of damage to coastal infrastructure (USEPA, 2015d). The Navy's Climate Change Roadmap (Navy, 2010) outlines the Navy's approach to observing, predicting, and adapting to climate change. The document states that climate change is a national security challenge, with strategic implications for the Navy, and that climate change is affecting, and will continue to affect, U.S. military installations and access to natural resources worldwide (Navy, 2010). Like Alternative 1, Alternative 2 would repair and strengthen waterfront infrastructure at the Shipyard and increase the height of the Dry Dock 3 caisson by 1 foot, potentially reducing the vulnerability of dry dock operations to the impacts of climate change. Therefore, implementation of Alternative 2 would not result in significant impacts on air quality.

4.2 Water Resources

Water Resources Potential Impacts:

- No Action Alternative: No change in existing water resources.
- Alternative 1: Short-term minor impacts on water resources would occur during construction. Long-term, minor impacts on wetlands would result from permanent filling of approximately 95,400 square feet to 117,200 square feet (with Option 1) of the Piscataqua River. No impacts on floodplains would occur. Impacts would be minimized through use of standard BMPs and compliance with applicable federal and state permits and regulations.
- Alternative 2: Greater short-term impacts would occur during construction as a result of additional pile driving and fill under this alternative, and long-term impacts would be similar to those under Alternative 1.Impacts would be minimized through use of standard BMPs and compliance with applicable permits and regulations.

4.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change in existing water resources in or near the Project area. Therefore, no significant impacts on water resources would occur with implementation of the No Action Alternative.

4.2.2 Alternative 1 (Preferred Alternative)

Alternative 1 would involve in-water construction, dredging, and fill at Berths 11, 12, and 13 and Dry Dock 3 that would directly impact water resources. Indirect impacts could result from ground-disturbing and general construction activities in upland parts of the Project area.

4.2.2.1 Potential Impacts

Surface Water

Short-term impacts on surface water quality in the Piscataqua River would result from dredging, filling, and dewatering during construction. The proposed Berths 11, 12, and 13 structural repairs project would be required to comply with the conditions of an individual USACE permit that will be obtained before the start of construction and an MEDEP individual Natural Resources Protection Act (NRPA) permit and minor amendment to the Shipyard's Site Location of Development Law permit, which were approved on June 24, 2016 (see Appendix B). No dredging or fill would be required for the Dry Dock 3 caisson replacement and in-water caisson seat repairs proposed under Alternative 1. In-water work for the Dry Dock 3 caisson replacement project will be required to comply with the conditions of a Maine General Permit from the USACE that will be obtained prior to the start of construction and an individual

NRPA permit and minor amendment to the Shipyard's Site Location of Development Law permit that were approved on July 18, 2016 (see Appendix B).

Berths 11, 12, and 13 Structural Repairs

At the start of each phase of in-water construction for the proposed Berths 11, 12, and 13 structural repairs, a level trench would be dredged along the footprint of the bulkheads and filled with granular material to provide a seat for the concrete shutter panels. The approximately 1-foot-deep trench would represent "new" dredging below the permitted dredge depths for the berths. Before the start of dredging, temporary silt curtains with floating containment booms would be placed approximately 75 to 100 feet off of Berths 11 and 13 to contain debris or sediment suspended during the dredging, and would remain in place during construction. Berth 12 is a relatively short berth (150 feet in length) situated at the nose of the pier. The berth juts out into the Piscataqua River and is subjected to very swift tidal currents making it difficult to maintain an effective silt curtain under these conditions. Further, due to the strong currents, the river bottom in front of Berth 12 is heavily armored with riprap to provide scour protection. Therefore, the material that would be removed to facilitate the Berth 12 bulkhead installation includes some of the riprap and a minimal quantity of sediment. Because of the exposure to the current, the short overall berth length and the type/quantity of material being removed, the Navy has determined that the efforts to install, secure, and maintain a silt curtain at Berth 12 would lengthen the construction duration and the associated time-dependent impacts while providing little effective sedimentation control.

Water inside the silt curtains at Berths 11 and 13 would be cleaned of debris and silt as needed, but it is expected that sediments suspended during dredging would quickly settle out of the water column. Dredged sediments that are found to be contaminated above the threshold levels in the MEDEP Solid Waste Management Rules (Chapter 418) for Beneficial Reuse of Solid Wastes, and therefore cannot be reused as fill material behind the proposed bulkheads, would be dewatered at an upland stockpile site or on a construction barge, amended with concrete, and disposed of at an approved landfill. Construction dewatering discharges will be required to comply with the Water Quality Certification issued by the MEDEP as part of the NRPA permitting process. The Navy also will require the contractor to submit a Dewatering Plan, in accordance with the Maine Erosion and Sedimentation Control Law, detailing Project-specific dewatering methods. Disposal of dredge spoils at an in-water disposal site is not being considered as part of the Proposed Action; therefore, no impacts on surface water quality would result from disposal of dredge spoils.

Removal of contaminated sediments would comply with the hazardous waste operations and emergency response requirements specified in the Navy's ER Program, which specifies measures to protect human health and the environment from hazardous substances. More information on the types of contaminants potentially occurring in areas off of Berths 11, 12, and 13 and potential impacts resulting from the Proposed Action is provided in Sections 3.10 and 4.10.

Pile driving would be minimized under Alternative 1. Rock-socketing the king piles along the bulkhead footprints and placing the concrete shutter panels would result in minimal suspension of sediments in the construction areas. The socket drill used to install the king piles would operate within a casing that would contain sediments disturbed during drilling. Sediments and drill spoils captured during drilling would be disposed of at an approved landfill facility off of the Shipyard in accordance with state rules and regulations.

Sediments in the immediate construction areas at the berths would be re-suspended during dredging, resulting in temporary impacts on the surface waters from increased turbidity and decreases in the dissolved oxygen concentration. Turbidity and decreases in the dissolved oxygen concentration during in-water construction would not be expected to contribute to the impairment of the Piscataqua River for its designated uses in Maine and New Hampshire (see Section 3.2) because of the temporary nature of the potential water quality impacts.

Turbidity plumes associated with dredging would likely be of short duration and involve minimal spreading due to the dynamic nature of the estuarine environment and the grain size of the material being removed. Sediment in the Project area primarily consists of soft mud, sand, pebbles, and old mussel shells in areas of low energy current and hard sand, pebbles/cobbles and small boulders in areas of higher current flow (see Section 3.1.2). The coarser grain sizes would be expected to settle out of the water column fairly quickly and close to the area of disturbance (USEPA, May 1999). Also, because the Piscataqua River estuary is a dynamic coastal area, riverine flushing and tidal action, combined with the rapid settling of sediment, are expected to quickly return concentrations of suspended sediment to background levels (Reynolds et al., 1990). Turbidity can also decrease the dissolved oxygen concentration in the water column (USEPA, 2015f); however, the dynamic nature of the estuary results in mixing of the water column, which in turn would dilute and disperse any areas of depressed dissolved oxygen. In summary, there would be a temporary, minor, and localized adverse effect on the surface water quality during dredging as a result of turbidity. Within a short time after construction is complete the surface waters would return to pre-construction conditions. The berths are subject to periodic maintenance dredging; therefore, the increased turbidity resulting from dredging during the Proposed Action would be similar to that resulting from maintenance dredging at the Shipyard.

Construction of the bulkheads around Berths 11 (A and B), 12, and 13 (A and B), and Berth 11C if Option 1 is implemented, would require filling approximately 95,400 square feet to 117,200 square feet (with Option 1) of the previously filled area beneath the pier and the Piscataqua River bottom adjacent to the existing berth faces. Approximately 1,291,410 cubic feet to 1,554,660 cubic feet (with Option 1) of fill would be required. The area that would be filled and the amount of fill needed would be minimized to the maximum extent practicable by constructing the bulkheads within 5 feet of the existing faces of Berths 11B, 12, and 13(A and B), and the western end of Berth 11A. The Navy has applied for an individual USACE permit under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act for the bulkheads. An individual NRPA permit for the Berths 11, 12, and 13 structural repairs was approved by the MEDEP on June 24, 2016 (see Appendix B). The Project will comply with the conditions of these permits.

Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction in accordance with the Maine Natural Resources Protection Act (38 M.R.S.A. §480-Z), sections 404 and 401 of the Clean Water Act (33 U.S.C. §1251 et seq.), and section 10 of the Rivers and Harbors Act (33 U.S.C. §403 et seq.). The total fee will be determined by the total area of fill at Berths 11, 12, and 13. Fees paid under the Maine In Lieu Fee Compensation Program are used under the Maine Natural Resources Conservation Program for restoration, enhancement, creation, and preservation of Maine's protected natural trust resources, typically in the same biophysical region in which the impacts would occur. The goal of both programs is to strategically use in lieu fees to increase the extent and quality of protected natural trust resources, compared with the extent and quality of resource protection typically achieved by other methods of compensatory mitigation (USACE New England District n.d.[a]; MEDEP 2013).

Using clean pea stone during backfill would minimize the potential for debris or silt to escape the bulkheads. Temporary silt curtains and booms would be used during backfilling to catch debris or silt that escapes the bulkhead. Water inside of the silt curtains would be cleaned of debris and silt as needed. Using pea stone and the silt curtains and booms would minimize impacts on water quality outside the immediate in-water construction areas. Sediments suspended in the water column would be expected to quickly settle to the bottom for the reasons described above.

Sections of the timber and concrete pier deck would be removed at Berths 11, 12, and 13 as needed to allow backfill of the bulkheads, installation of the sister piles, and repair of existing piles. Standard best management practices (BMPs) would be used in the upland portions of the construction sites to minimize impacts on water quality in the Piscataqua River resulting from erosion of exposed soils and sedimentation, release of construction debris, or spills. The Navy will require the construction contractor to prepare and implement a Stormwater Management/Erosion and Sedimentation Control Plan that includes temporary and permanent erosion control measures and BMPs as stipulated in the latest edition of the *Maine Erosion and Sediment Control Best Management Practices (BMPs) Manual for Designers and Engineers* (MEDEP, 2016). Construction would comply with the Maine Erosion and Sediment Control Law, and erosion control measures would be installed prior to construction. The king pile and concrete shutter panel bulkhead, once complete, would prevent release of fill material into the river.

If dewatering is needed to remove infiltration of river water, snowmelt, or stormwater runoff from the construction work area during upland work, dewatering pumps may be used. The preferred method would be to allow water to infiltrate within the Project site, resulting in no discharge from the site. If the Project site needs to be dewatered, sediment will be removed before water is discharged to the Piscataqua River, in compliance with the Water Quality Certification issued by the MEDEP. It is expected that a filter-bag sediment removal system or sedimentation basin would be used; however, the exact dewatering method ultimately will be proposed by the construction contractor in the Project-specific Dewatering Plan.

Construction and demolition for the proposed berths structural repairs under Alternative 1 would comply with MEDEP Chapter 500, Stormwater Management Law (MEDEP, n.d.). Ground-disturbing activities also would be conducted in accordance with the Maine Site Location of Development Law. The Navy has obtained a minor amendment to the Shipyard's Site Location of Development Law permit (Permit #L-21179-26-A-N, dated March 6, 2003) for the Project (see Appendix B).

<u>Dry Dock 3 Caisson Replacement</u>

In-water repairs to the outer caisson seat at Dry Dock 3 under Alternative 1 would not require any new in-water construction or fill; therefore, impacts on surface waters as a result of this Project would be minimal and short-term. Increased turbidity in the immediate construction area may occur during repair of the outer caisson seat. Turbidity impacts would be temporary, minimal, and localized for the reasons described above. Using the tremie concrete method, in which concrete displaces water from the area being filled, during construction of the temporary cofferdam would prevent concrete from becoming diluted and dispersing into surrounding waters. Therefore, water quality impacts during concrete placement are not expected.

Repairs to the inner caisson seat would include hydro-demolition of concrete. Construction waste water resulting from this process, consisting of a concrete and water slurry, would be collected and treated before discharge to the Piscataqua River. The Navy will require the construction contractor to obtain a

Water Quality Certification and/or a discharge permit for discharging treated construction water to the river, and treatment and discharge of construction water would comply with the conditions of the certification or permit. Small amounts of water may leak into the temporary construction caisson and also would be treated before discharge to the Piscataqua River in compliance with the Water Quality Certification and/or discharge permit. The Navy also would require the construction contractor to comply with the Maine Erosion and Sediment Control Law and incorporate BMPs as discussed above for the collection, treatment, and discharge of construction water.

The Navy has applied for a Maine General Permit from the USACE for the in-water work proposed for this project. In-water work will comply with the conditions of this permit. Because of the project's location in and adjacent to the Piscataqua River, the Navy has applied for an individual NRPA permit and a minor amendment to the Shipyard's Site Location of Development Law permit with the MEDEP, which were approved on July 18, 2016 (see Appendix B).

Limited upland work would be required at Dry Dock 3 to install the new caisson. Repairs to the dry dock or pier at this location would incorporate standard BMPs as discussed above and would comply with the Maine Erosion and Sedimentation Control Law. Erosion control measures would be installed prior to construction, and a soil and erosion control plan would be implemented to guide appropriate placement of control measures on the site.

Because the proposed in-water projects would not result in changes to operations at the Berths 11, 12, and 13 or Dry Dock 3, no long-term changes in surface water quality are expected.

The proposed waterfront improvement projects would not convert any pervious surfaces to impervious surfaces and therefore would not change the pre-development hydrology of the Project sites. Potential short-term impacts on stormwater management are discussed in Section 4.8.

Compliance with applicable state laws and implementation of the BMPs noted above would minimize temporary water quality impacts during construction. As noted above, the pre-development hydrology of the Project sites would not be changed as a result of construction because the Project sites would remain paved. Based on the analysis above, the Proposed Action under Alternative 1 would result in short-term, localized, minor impacts on surface water. No significant short- or long-term impacts would result.

If funding is available, previously authorized maintenance dredging may occur at Dry Dock 3. Maintenance dredging of an estimated 29,106 cubic feet (1,078 cubic yards) of sediment from the entrance to the dry dock was previously approved in 2013 but was not funded. This dredging is not part of the Proposed Action but is part of the Shipyard's ongoing maintenance dredging program. A categorical exclusion has been prepared for the proposed maintenance dredging. The proposed maintenance dredging is discussed further in Chapter 5.

Wetlands

Alternative 1 would result in the permanent fill of approximately 95,400 square feet to 117,200 square feet (with Option 1) of the previously filled area beneath the pier and the Piscataqua River bottom within 5 feet of the existing berth faces. The previously unfilled area of river bottom that would be impacted would not exceed 17,275 square feet (0.40 acres) with implementation of Alternative 1. The proposed fill would impact the Piscataqua River, an estuarine and marine deepwater wetland, resulting in the permanent removal of water column, marine sediments, and benthic habitat (see Marine Sediments, below, and Section 4.5 for additional discussion). As noted, compensatory mitigation for the

loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction in accordance with the Maine Natural Resources Protection Act (38 M.R.S.A. §480-Z), sections 404 and 401 of the Clean Water Act (33 U.S.C. §1251 et seq.), and section 10 of the Rivers and Harbors Act (33 U.S.C. §403 et seq.).

In-water construction activities, such as dredging and pile driving, at Berths 11, 12, and 13 and the Dry Dock 3 caisson would result in short-term, localized impacts on water quality from re-suspended sediments and turbidity that could indirectly impact estuarine intertidal and marine intertidal wetlands along the eastern shoreline of Badgers Island, approximately 400 feet west-northwest of Dry Dock 3 and the northern shoreline of the Back Channel of the Piscataqua River, approximately 600 feet north of the northern side of Dry Dock 3. These impacts could range from increases in suspended sediments and decreases in dissolved oxygen levels that could impact fish species using wetland habitats to disruption of benthic habitats and organisms. Potential impacts on biological resources are discussed in Section 4.5. Impacts on water quality as a result of in-water construction would be temporary and localized, and because of their distance from the in-water construction areas, estuarine and marine intertidal wetlands are expected to experience temporary and minor impacts. Potential impacts would be reduced through use of silt curtains and booms off of Berths 11 and 13 and Dry Dock 3 during construction and the other measures to reduce impacts on water quality discussed above under Surface Waters.

Based on the above, Alternative 1 would result in short-term and long-term minor impacts on wetlands. Based on the small area of the Piscataqua River that would be permanently impacted, no significant impacts on wetlands would result.

Floodplains

The proposed waterfront improvement projects would include construction work in a designated special flood hazard area. The Proposed Action would not result in an increase in impervious surface in the special flood hazard area. The upland Project area is entirely paved and would remain paved following construction. No new regularly inhabited structures would be constructed as a result of the Proposed Action. Therefore, the Proposed Action would have no impact on the floodplain in the Project area.

The volume of fill proposed at Berths 11, 12, and 13 under Alternative 1 is not expected to notably impact the floodway of the Piscataqua River because of the size of the river and the amount of tidal mixing in the lower river. Therefore, no significant impacts on floodplains are expected as a result of the Proposed Action.

Marine Sediments

Dredging the construction footprints and installing and removing piles would temporarily disturb the seafloor in areas adjacent to Berths 11, 12, and 13. Construction of the bulkheads at Berths 11, 12, and 13 would result in permanent loss of an area of marine sediments not exceeding 17,275 square feet (0.40 acres). The remainder of the proposed fill would be deposited on the previously filled area beneath the fitting-out pier. The permanent loss of marine sediments would be insignificant on a landscape-scale, given the abundance of similar marine substrates in the surrounding estuary system that is of similar or better quality.

Indirect impacts on marine sediments in the Project area are likely to result from turbidity caused by dredging activities. The in-water construction areas would experience higher levels of turbidity than surrounding areas; however, finer sediments would be suspended in the water column and could settle on marine sediments in adjacent, undisturbed areas. As noted in Section 3.10, construction areas

adjacent to Berths 11 and 13 are included in the Dry Docks Area of Concern (AOC) in Operable Unit (OU) 4 at the Shipyard, where sediments may have been contaminated with heavy metals, oils and grease, and metal-plating wastes from wastewater outfalls or polycyclic aromatic hydrocarbons (PAHs) from former storage areas located north of Dry Dock 1 and southeast of Dry Dock 3. No further remedial action was determined necessary to address contamination in sediments in areas of the Dry Docks AOC in the Project area. Therefore, the potential re-suspension and transport of sediments in in-water construction areas may have minor impacts on adjacent marine sediments, but no significant impacts are expected to result. Impacts on marine sediments that would result from the proposed in-water projects would be similar to short-term impacts resulting from periodic maintenance dredging at the Shipyard. Within a short time after construction is complete, marine sediments would be expected to return to pre-construction conditions.

Minor disturbances of marine sediments from vessel propeller wakes and other vessel disturbances during operation of the berths would be similar to disturbances caused by past and current use of these facilities and would not represent a substantial change in the condition of marine sediments in the Project area.

Based on the above analysis, Alternative 1 would result in short- and long-term minor impacts on marine sediments. No significant impacts on marine sediments would result.

4.2.3 Alternative 2

Like Alternative 1, Alternative 2 would involve in-water construction and fill that would directly impact water resources. Alternative 2 would involve additional pile driving at Berths 11, 12, and 13 that would result in greater short-term impacts during construction. Construction and removal of a temporary cofferdam at the Dry Dock 3 caisson also would require pile driving and temporary fill in the Piscataqua River. Indirect impacts could result from general construction activities in upland parts of the Project area.

4.2.3.1 Potential Impacts

The Berths 11, 12, and 13 structural repairs proposed under Alternative 2 would result in short- and long-term impacts on water resources similar to those described under Alternative 1. However, because Alternative 2 would require additional pile driving, short-term impacts on water resources during construction would be greater in duration and intensity. These impacts would include impacts on surface water quality, wetlands, and marine sediments as a result of increased amounts of re-suspended sediments and turbidity, as well as the potential for decreases in dissolved oxygen levels over a larger area or for a longer duration. The discussion of impacts below focuses on the temporary impacts on water resources resulting from the construction and removal of a temporary cofferdam at Dry Dock 3 under Alternative 2. If Alternative 2 is selected, the Navy would consult separately with the USACE and MEDEP regarding the impacts of this alternative and required permits.

Surface Waters

Under Alternative 2, the proposed Dry Dock 3 caisson replacement project would require construction of a temporary circular, cellular cofferdam outside of the caisson. Dewatering of the dry dock during construction would be accomplished using Dry Dock 3's existing pump, and dewatering operations would comply with the requirements of the Shipyard's existing MPDES permit and Maine Waste Discharge License.

The temporary cofferdam would occupy an estimated footprint of 7,458 square feet, including the area enclosed by the cofferdam (an estimated 1,981 square feet). Before the temporary cofferdam is constructed, sediment would be dredged from the cofferdam footprint. The total amount of dredging required would not exceed the volume limits the USACE has approved for the Shipyard's regular maintenance dredging. Dredged sediments would be analyzed for various contaminants and potentially tested for toxicity using the toxicity characteristic leaching procedure. (More information on the types of contaminants potentially occurring in areas off of Berths 11, 12, and 13 and potential impacts resulting from the Proposed Action is provided in Sections 3.10 and 4.10.) The toxicity levels of the dredged sediments would be compared with MEDEP Solid Waste Management Rules (Chapter 418) for Beneficial Use of Solid Wastes to assess the sediments' suitability for use as fill material or for other construction purposes. If MEDEP thresholds for toxicity are not exceeded, the construction contractor may use the sediments for other construction uses; if levels for toxicity are exceeded, the dredged sediments would be dewatered and amended with concrete prior to disposal at an approved landfill in accordance with the Maine Solid Waste Management rules and regulations. Construction dewatering discharges will be required to comply with the Water Quality Certification issued by the MEDEP as part of the NRPA permitting process and a Project-specific dewatering plan. Disposal of dredge spoils at an in-water disposal site is not being considered as part of the Proposed Action; therefore, no impacts on surface water quality would result from disposal of dredge spoils.

During dredging and construction of the temporary cofferdam, sediments in the immediate construction area would be re-suspended, resulting in temporary impacts on surrounding waters from increased turbidity and decreases in dissolved oxygen concentration. A silt curtain and booms would be installed outside of the cofferdam footprint during its construction and removal to contain re-suspended sediments within the immediate construction area. The area inside the containment boom would be cleaned of debris as needed to prevent water quality impacts during construction. In addition, using the tremie concrete method, in which concrete displaces water from the area being filled, during construction of the temporary cofferdam would prevent concrete from becoming diluted and dispersing into surrounding waters. Therefore, water quality impacts during concrete placement are not expected.

Backfilling the cells and arcs of the temporary cofferdam may also result in temporary water quality impacts from turbidity, as fill sediments may escape the cofferdam during vibratory compaction. Turbidity impacts during compaction would be minor and localized, and suspended sediments would be expected to quickly settle out of the water column. Dewatering would begin once construction of the cofferdam is complete. The cofferdam cells and arcs would be dewatered, and water would be filtered through a sediment removal system before being discharged to the river. Collected sediments would be tested for toxicity and either used for construction purposes or disposed of at an approved landfill as described above.

The Navy will apply for a Category II USACE General Permit under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act for the proposed temporary fill associated with the temporary circular, cellular cofferdam. The Navy also will apply for an individual NRPA permit from the MEDEP for the proposed fill. Filling during construction of the temporary cofferdam will comply with the conditions of these permits. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction in accordance with the Maine Natural Resources Protection Act (38 M.R.S.A. §480-Z), sections 404 and 401 of the Clean Water Act (33 U.S.C. §1251 et seq.), and section 10 of the Rivers and Harbors Act (33 U.S.C. §403 et seq.). The amount of compensatory mitigation required under Alternative

2 will be determined based on the total area of permanent and temporary fill at Berths 11, 12, and 13 and Dry Dock 3.

The work area inside the cofferdam would be kept dry through use of water control and dewatering pumps. Dewatering would remove any rainwater or snowmelt that infiltrates the cofferdam. Dewatering discharges would be treated in accordance with the Maine Erosion and Sediment Control Law and discharged to the Piscataqua River. A sediment removal system would be used to remove sediments from waters discharged to the river. Water treatment and sediment removal measures would remain in place until the cofferdam is disassembled. The Navy would require the construction contractor to prepare and implement a Project-specific Dewatering Plan if Alternative 2 is selected.

The temporary cofferdam would be removed once the caisson replacement and seat repairs are completed. Temporary water quality impacts from turbidity during removal of the cofferdam would be similar to those described above. Removal of the fill material before the cofferdam is disassembled would minimize turbidity resulting from dredging. Once the temporary cofferdam is removed, the cofferdam footprint would be dredged to its final design depth, per USACE limits. Dredging would comply with the requirements of the Shipyard's joint USACE Maine General Permit and MEDEP NRPA permit for maintenance dredging. Dredged sediments would be tested for toxicity as noted above and would either be used for construction purposes if toxicity levels are below MEDEP thresholds or disposed of at an approved landfill as described above.

As noted under Alternative 1, limited upland work would be needed at Dry Dock 3 to install the new caisson. Repairs to the dry dock or pier at this location would incorporate standard BMPs as noted above and would comply with the Maine Erosion and Sedimentation Control Law. Erosion-control measures would be installed prior to construction, and a Stormwater Management/Erosion and Sedimentation Control Plan would be implemented during construction. Ground-disturbing activities also would be conducted in accordance with the Maine Site Location of Development Law. If Alternative 2 is selected, the Navy will apply for and obtain a minor amendment to the Shipyard's Site Location of Development Law permit (Permit #L-21179-26-A-N, dated March 6, 2003) for this alternative before beginning construction.

Short-term impacts on surface waters under Alternative 2 would be greater than those under Alternative 1 because of the temporary fill at Dry Dock 3. However, because this fill would be temporary and surface water impacts during construction would be localized, Alternative 2 likewise would result in short- and long-term minor impacts on surface water. No significant short- or long-term impacts would result.

Wetlands

Alternative 2 would require temporary fill of an estimated 7,458 square feet of the Piscataqua River at Dry Dock 3, in addition to the total area of approximately 95,400 square feet to 117,200 square feet (with Option 1) that would be filled at Berths 11, 12, and 13. The total area of temporary and permanent fill under Alternative 2 would be an estimated 102,858 square feet or 124,658 square feet (with Option 1). Impacts would be the same as those described under Alternative 1 but would occur across a larger area during construction. Direct and indirect impacts on wetlands as a result of fill and temporary impacts on water quality would end upon completion of construction. As noted, compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction. Based on the above, Alternative 2 would result in short-term and long-term minor impacts on wetlands. Based on the small

area of the Piscataqua River that would be permanently impacted, no significant impacts on wetlands would result.

Floodplains

Impacts on floodplains and the Piscataqua River floodway under Alternative 2 would be the same as those described under Alternative 1. Construction of a temporary cofferdam at Dry Dock 3 would not result in long-term changes to floodplains in or near the Project area. Therefore, no significant impacts on floodplains would result.

Marine Sediments

Dredging the construction footprints and installing and removing piles would temporarily disturb the seafloor in areas adjacent to Berths 11, 12, and 13 and Dry Dock 3. Construction of the bulkheads at Berths 11, 12, and 13 would result in permanent loss of an area of marine sediments not exceeding 17,275 square feet (0.40 acres). An additional estimated 7,458 square feet of marine sediments adjacent to Dry Dock 3 would be temporarily impacted by dredging and fill. The temporary and permanent loss of marine sediments would be insignificant on a landscape-scale, given the abundance of similar marine substrates in the surrounding estuary system that is of similar or better quality.

Indirect impacts on marine sediments in the Project area are likely to result from turbidity caused by dredging activities at both Project locations. Therefore, the potential re-suspension and transport of sediments in in-water construction areas may have minor impacts on adjacent marine sediments, but no significant impacts are expected to result for the reasons described under Alternative 1. Impacts on marine sediments that would result from the proposed in-water projects would be similar to short-term impacts resulting from periodic maintenance dredging at the Shipyard. Within a short time after construction is complete, marine sediments would be expected to return to pre-construction conditions.

Minor disturbances of marine sediments at both Project locations from vessel propeller wakes and other vessel disturbances during operation of the berths would be similar to disturbances caused by past and current use of these facilities and would not represent a substantial change in the condition of marine sediments in the Project area.

Based on the above analysis, Alternative 2 would result in minor short- and long-term impacts on marine sediments. No significant impacts on marine sediments would result.

Overall, potential short- and long-term impacts on water resources under Alternative 2 would be minor. No significant impacts on water resources would result from Alternative 2.

4.3 Bathymetry

The bathymetry analysis considers the potential for the Proposed Action to impact the water depth in the Piscataqua River and, consequently, navigation in areas near the Project area.

4.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no changes in the bathymetry of the Project area. Therefore, no significant impacts on bathymetry would occur with implementation of the No Action Alternative.

4.3.2 Alternative 1 (Preferred Alternative)

Alternative 1 would involve in-water dredging and deposition of fill that may impact bathymetry. The study area for bathymetry includes the in-water Project area.

Bathymetry Potential Impacts:

- No Action Alternative: No changes to bathymetry in the Project area.
- Alternative 1: Minor impacts on bathymetry at Berths 11, 12, and 13 would result from dredging and filling during construction. Alternative 1 would not affect navigation in the Piscataqua River.
- Alternative 2: Minor impacts on bathymetry at Berths 11, 12, and 13 and Dry Dock 3 would result from dredging and filling during construction. Fill at Dry Dock 3 would be temporary. Alternative 1 would not affect navigation in the Piscataqua River.

4.3.2.1 Potential Impacts

Construction of the bulkheads at Berths 11, 12, and 13 would require fill deposition primarily on previously filled land beneath the fitting-out pier, extending 5 feet beyond the existing berth faces. Fill would be deposited on approximately 95,400 square feet (2.19 acres)—the majority of which is previously filled land—if the bulkhead at Berth 11C is not constructed, and approximately 117,200 square feet (2.69 acres) if Option 1 is implemented and the Berth 11C bulkhead is constructed. Construction of the bulkheads would expand the fitting-out pier and permanently remove a small area of river bottom, not exceeding 17,275 square feet (0.40 acres) with implementation of Option 1. The permanent changes in bathymetry at the berths, which currently are dredged as part of the Navy's maintenance dredging program, would support the Shipyard's mission needs. The fill required to implement the Proposed Action would not affect navigation in the Piscataqua River because this area is within the restricted security perimeter of the Shipyard and outside of the federal navigation channel, and it would not impact use of the berths or Dry Docks 1 and 3.

The bulkheads would be placed slightly (approximately 1 foot) below the permitted dredge depth for the berths to prevent the bottom of the bulkhead from being undermined during future maintenance dredging. This would not impact bathymetry at the berths because the dredging required to seat the bulkheads would be limited to the bulkhead locations, and the bathymetry of adjacent areas would not be impacted.

Following completion of construction at Berths 11, 12, and 13, and Dry Dock 3, the bathymetry of adjacent areas of the river would not be impacted during normal operations. However, these berths and the dry dock entrance would continue to be dredged approximately every 10 years under the Shipyard's maintenance dredging program to maintain safe depths for navigation. Future maintenance dredging would comply with the requirements of the Shipyard's existing joint U.S. Army Corps of Engineers (USACE) Maine general permit/NRPA permit for maintenance dredging.

Based on the above, short- and long-term impacts on bathymetry would be minor. Alternative 1 would not affect navigation in the Piscataqua River; therefore, no significant impacts would result.

4.3.3 Alternative 2

4.3.3.1 Potential Impacts

The study areas and potential impacts on bathymetry under Alternative 2 resulting from the Berths 11, 12, and 13 structural repairs would be the same as those described for Alternative 1, the Preferred

Alternative. Permanent impacts on bathymetry at Berths 11, 12, and 13 would result from removal of a small area of river bottom when constructing the bulkheads. The permanent changes to bathymetry at the berths, which currently are dredged as part of the Navy's maintenance dredging program, would support the Shipyard's mission needs and would not affect navigation in the Piscataqua River.

Replacement of the Dry Dock 3 caisson would temporarily impact bathymetry within the 25,000-square-foot limit of disturbance adjacent to the dry dock. Before the temporary cofferdam is constructed, sediment would be dredged from the cofferdam footprint, an estimated area of 7,458 square feet. The total amount of dredging required would not exceed the volume limits the USACE has approved for the Shipyard's regular maintenance dredging. Fill material, concrete, and grout would be added to the cells and arcs of the cofferdam to stabilize it; however, these materials would be removed during deconstruction and removal of the temporary cofferdam and would not cause any long-term impacts on bathymetry. Once the temporary cofferdam has been removed, the river bottom within the cofferdam would be dredged to its final permitted design depth, per USACE limits. Construction and removal of the temporary cofferdam would not affect navigation in the river because the site of the cofferdam is within the Shipyard's restricted security perimeter. Future maintenance dredging would comply with the requirements of the Shipyard's existing joint USACE Maine general permit/NRPA permit for maintenance dredging.

Short- and long-term impacts on bathymetry under Alternative 2 would be greater than those under Alternative 1 but still minor. Alternative 2 likewise would not affect navigation in the Piscataqua River; therefore, no significant impacts would result.

4.4 Cultural Resources

Analysis of potential impacts on cultural resources considers both direct and indirect impacts. Direct impacts may be the result of physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the importance of the resource; introducing visual, atmospheric, or audible elements that are out of character for the period the resource represents (thereby altering the setting); or neglecting the resource to the extent that it deteriorates or is destroyed. The Navy is considering these impacts in accordance with NEPA and section 106 of the National Historic Preservation Act (NHPA).

NEPA requires all cultural resources to be considered, including not only those that are historic properties but also those that are not. As part of this evaluation, therefore, direct and indirect impacts are considered for all known archaeological and architectural resources. Section 106 of the NHPA provides that federal agencies take into account the effects of their actions on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP) (i.e., a historic property). In accordance with section 106 of the NHPA, the Navy also has evaluated the Proposed Action and alternatives to determine their effects on historic properties.

Cultural Resources Potential Impacts:

- No Action Alternative: No change to existing cultural resources in the Project area.
- Alternative 1: Replacement of the Dry Dock 3 caisson would result in an adverse effect on Dry Dock 3, a contributing resource in the Portsmouth Naval Shipyard Historic District. The Navy has consulted with the Maine SHPO, the ACHP, federally recognized tribes, and other interested parties regarding the finding of an adverse effect and has executed a Memorandum of Agreement with the Maine SHPO.
- Alternative 2: Impacts under Alternative 2 would be similar to those under Alternative 1.

According to **36 CFR 800.16(d)** the area of potential effects is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking.

4.4.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change in existing cultural resources in the Project area, including archaeological resources, architectural resources, or traditional cultural properties. Therefore, no significant impacts on cultural resources would occur with implementation of the No Action Alternative.

4.4.2 Alternative 1 (Preferred Alternative)

In-water and upland construction activities, including dredging, filling, excavation, demolition, and new construction under Alternative 1 may result in impacts on cultural resources. As described in Section 3.4, both of the proposed projects under Alternative 1 have an associated APE. The two APEs together make up the study area for potential impacts on cultural resources.

4.4.2.1 Potential Impacts

Historic Properties/Archaeological Resources

Berths 11, 12, and 13 Structural Replacement

The Navy has considered the potential impacts of Alternative 1 on archaeological resources within the APE for the Berths 11, 12, and 13 structural repairs under NEPA and the NHPA. The APE for Berths 11, 12, and 13 structural repairs is in an area of low archaeological sensitivity (Hardlines Design Company, 2012). As noted in the Integrated Cultural Resources Management Plan (ICRMP), the construction of quay walls and berths and dredging activities along the western shore of the Shipyard would have removed sediments from the river bottom down to bedrock. In addition, shipwrecks containing significant information are unlikely to be present in the waters around the Shipyard and, if extant, natural decay would have removed much, if not all, of the detectable remains. Benthic analysis confirmed that the area in which the Proposed Action would occur is subject to tidal currents and that bottom conditions consist of silt over sand and gravel and silt with boulders. Furthermore, the dredging and fill required for this project would occur primarily in an area that was filled in the mid-1900s to create man-made land (Hardlines Design Company, 2012).

In accordance with section 106 of the NHPA, the Navy determined that the proposed action under Alternative 1 would have no effect on archaeological resources. The Maine State Historic Preservation Office (SHPO) concurred with this determination in a letter dated March 1, 2016 (Appendix D).

The Navy also consulted with five federally recognized tribes, including the Aroostook Band of Micmac Indians, the Houlton Band of Maliseet Indians of Maine, the Indian Township Reservation of the Passamaquoddy Tribe of Maine, the Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine, in accordance with section 106. Responses were received from the tribes indicating either that they were not available to participate in consultation or that no effects were anticipated (see Appendix E).The Navy's ICRMP outlines procedures to handle an unanticipated

discovery to ensure compliance with federal laws and regulations. An unanticipated discovery is defined as a discovery (usually archaeological) made during a construction project in an area that was already deemed to have been adequately surveyed, without the unanticipated discovery being found, or to not require survey (Hardlines Design Company, 2012). If an unanticipated discovery is made, these procedures will be followed.

Dry Dock 3 Caisson Replacement

The Navy has considered the potential impacts of Alternative 1 on archaeological resources within the APE for the Dry Dock 3 caisson replacement project under NEPA and the NHPA. Alternative 1 would not have any direct impacts on known underwater or terrestrial archaeological sites at the Shipyard because none have been identified within the APE. Furthermore, the work done for this project would occur in an area that was filled in the early 1900s to create man-made land. Given the previous disturbance associated with activities occurring over time on the Shipyard and in its surrounding waters (i.e., dredging, land-forming activities, and moving currents), the APE is not located in an area deemed archaeologically sensitive (Hardlines Design Company, 2012).

In accordance with section 106 of the NHPA, the Navy determined that the proposed action under Alternative 1 would have no effect on archaeological resources. The Maine SHPO concurred with this determination in a letter dated March 2, 2016 (Appendix D).

The Navy also consulted with five federally recognized tribes and other interested parties in accordance with section 106. Responses were received from the tribes indicating either that they were not available to participate in consultation or that no effects were anticipated (Appendix E). No comments were received from the other interested parties. Upon the discovery of an unanticipated find, the procedures outlined in the ICRMP will be followed (Hardlines Design Company, 2012).

Historic Properties/Architectural Resources

Berths 11, 12, and 13 Structural Replacement

The Navy has considered the potential impacts of Alternative 1 under NEPA and the NHPA on architectural resources within the APE for the Berths 11, 12, and 13 structural repairs. Alternative 1 would result in direct impacts on Berths 11 (A and B), 12, and 13 (A and B) as well as indirect impacts on the visual setting of the berths; Dry Docks 1 and 3; Berth 1 (Flat-Iron Pier); Buildings 175 and WH 3; portions of Buildings 2, 92, 155 (scheduled for demolition); and the surrounding PNSY historic district.

Direct impacts on Berths 11 (A and B), 12, and 13 (A and B) would result from enclosing these berths with king pile and concrete shutter panel bulkheads. Direct impacts on the pier surface at the berths would result from removing existing concrete decking, wooden decking, and utilities; backfilling the areas behind the proposed bulkheads with compacted engineered fill material; resurfacing and restoring the pier surface at the berths with concrete; installing timber decking; and repairing existing corroded piles. The construction would occur in two phases. Construction of the bulkheads at Berths 11, 12, and 13 would result in moderate direct impacts on the pier structure at these berths.

The enclosure of Berth 11C through the implementation of Option 1 under Alternative 1 would not result in any other additional impacts. The work associated with this option would largely be in-water work. Under this option, the bulkhead installed at Berth 11C would extend from the western end of Berth 11B to the southern end of Berth 12.

Alternative 1 also would result in indirect impacts on the visual setting of Berths 1, 11, 12, and 13; Dry Docks 1 and 3; Buildings 175 and WH 3; and portions of Buildings 2, 92, 155 (scheduled for demolition); and the surrounding PNSY historic district.

Short-term, minor indirect impacts on these resources would result primarily from the presence of various types of construction equipment (e.g., bulldozers, backhoes, and trucks) and materials that would be temporarily visible within views of the berths. Construction equipment and materials would be present within the APE only during construction and would be removed once construction is complete. Construction equipment and materials, while consistent with the industrial nature of the Shipyard, would be present to a greater degree in the APE and would be more noticeable during the construction period.

When the project is completed, these structures would be indirectly impacted from the changes in the appearance to those portions of Berths 11, 12, and 13 that are visible above the waterline. The proposed bulkheads, however, would not change the overall appearance of the berths.

Modifications to the berths would be consistent with the continuing use and alteration of this portion of the PNSY historic district as an active, industrial waterfront. Furthermore, the visual setting of the APE has changed throughout the history of the Shipyard due to alterations to structures both within and outside the APE. Therefore, no mitigation is required or proposed to address the indirect, visual impacts of Alternative 1. As evaluated under NEPA, the impacts overall would be minor because the structural repairs to Berths 11, 12, and 13 would be consistent in appearance with the surrounding industrial waterfront.

In accordance with section 106, the Navy determined that the structural repairs to Berths 11, 12, and 13 would have no adverse effect on historic properties. The characteristics of Berths 11, 12, and 13 that enable them to be contributing elements to the historic district would not be adversely affected by the Proposed Action because the overall function of the berths and the shape of the pier enclosed by the berths would remain the same. Berths 11, 12, and 13 were constructed in the early 1940s to support the ramp-up in construction of new submarines at the Shipyard during World War II. The berths were modified substantially in 1960. The project would improve the structural condition of the berths and allow the continued operation of the Shipyard's portal cranes, which serve Dry Docks 1 and 3. Furthermore, the proposed project would be reversible; the new bulkheads would not permanently alter the underlying pier structure at the berths. The Navy further determined that the potential visual impacts resulting from Alternative 1 would have no adverse effect on historic properties that are architectural resources. The Maine SHPO concurred with this determination in a letter dated March 1, 2016 (see Appendix D).

The Navy also consulted with five federally recognized tribes in accordance with section 106. Responses were received from the tribes indicating either that they were not available to participate in consultation or that no effects were anticipated (Appendix E).

<u>Dry Dock 3 Caisson Replacement</u>

The Navy has considered the potential impacts of Alternative 1 on architectural resources within the APE for the Dry Dock 3 caisson replacement under NEPA and the NHPA. Alternative 1 would result in direct impacts on Dry Dock 3, as well as indirect impacts on the visual setting of Dry Dock 3; Building 175 and WH 3; Berths 12 and 13; and the surrounding historic properties and historic district.

Direct impacts on Dry Dock 3 would result from removing and replacing the existing steel caisson and altering the design of the associated inner and outer caisson seats. The designs of the new caisson and repaired caisson seats would be modified from the existing designs because of changes in manufacturing technology and to improve operational efficiency, as well as to take into consideration the projected sea-level rise in the lower Piscataqua River. The Shipyard is proposing to make the caisson 1 foot taller in order to accommodate of the projected slightly more than 1-foot of sea-level rise in the Piscataqua River. The dimensional change will also result in a slight change in width of 1 foot (6 inches into the dry dock and 6 inches into the river). In addition, the change in height will also necessitate the addition of a step or ramp to access the caisson on the north and south ends. The Shipyard also is proposing a design change at both the inner and outer seats to accommodate the projected sea-level rise within the Piscataqua River. The caisson seats would have essentially the same design but would be constructed 1 foot higher than the current elevation.

As the replacement would alter the materials and design of this historically important structure, the Navy has determined that, under NEPA, Alternative 1 would have a moderate direct impact on Dry Dock 3; however, this impact would be less than significant because the new caisson design generally would be similar in look and feel. It would not substantially change the overall look of the dry dock. The Navy determined that no other direct impacts on the other architectural resources within the APE would occur.

Alternative 1 would also result in indirect impacts on the visual setting of Dry Dock 3; Building 175 and WH 3; Berths 12 and 13; and the surrounding historic properties and the PNSY historic district. Temporary, indirect visual impacts would result during construction, as described for the Berths 11, 12, and 13 structural repairs, but would cease upon completion of construction.

Once constructed, when viewing Dry Dock 3, indirect impacts would result from changes in the appearance of the caisson and caisson seats that are visible above the waterline. Although the design of the caisson and the caisson seats would be altered, the overall appearance of these features generally would remain the same. Therefore, these indirect visual impacts would not be considered significant under NEPA.

Furthermore, modifications to the caisson and caisson seats would be consistent with continued use of Dry Dock 3 as an active, industrial facility that continues to support the evolving mission of the Shipyard to overhaul and repair vessels for the fleet. The minor modification would enable the dry dock to function for years into the future. The visual setting of the APE has changed throughout the history of the Shipyard due to alterations to structures both within and outside the APE. Therefore, the Navy proposes that no mitigation is required under NEPA to address the minor indirect, visual impacts of Alternative 1 on Dry Dock 3; Building 175 and WH 3; Berths 12 and 13; and the surrounding PNSY historic district because the Dry Dock 3 caisson replacement would be consistent in appearance with the surrounding industrial waterfront.

In consideration of its responsibilities under section 106, the Navy determined that the Dry Dock 3 caisson replacement would have an adverse effect on this historic property as a result of the actions that would damage the character-defining features of Dry Dock 3 as described above. As noted in Section 3.4 above, Dry Dock 3 is a contributing element to the PNSY Historic District under NRHP Criterion C.

The Navy also determined that the indirect visual effects of Alternative 1 would have no adverse effect on historic properties that are architectural resources as the visual changes occasioned by construction

activities and materials would be largely temporary. Once the project is completed, the visual setting would largely be the same as before construction began.

In accordance with section 106, the Navy consulted with the Maine SHPO, the ACHP, federally recognized tribes, and other interested parties regarding the finding of an adverse effect on Dry Dock 3 (see Appendix D and Appendix E). Responses were received from the tribes indicating either that they were not available to participate in consultation or that no effects were anticipated (Appendix E). No comments were received from the other interested parties.

An MOA between the Navy and the Maine SHPO for Dry Dock 3 was executed on August 11, 2016. As part of mitigation, the Shipyard will develop a Level II Maine Historic Engineering Record (MHER) for Dry Dock 3. (Appendix D).

The Dry Dock 3 caisson replacement project also would have no adverse effect on architectural resources that are historic properties other than Dry Dock 3. The Maine SHPO concurred with this determination in a letter dated March 2, 2016 (Appendix D).

4.4.2.3 Traditional Cultural Properties

No known traditional cultural properties have been identified within the Shipyard (Hardlines Design Company, 2012). Therefore, Alternative 1 would not be expected to result in any direct or indirect impacts on traditional cultural properties.

The Navy consulted with five federally recognized Native American tribes of Maine: the Aroostook Band of Micmac Indians, the Houlton Band of Maliseet Indians of Maine, the Indian Township Reservation of the Passamaquoddy Tribe of Maine, the Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine (Hardlines Design Company, 2012). Responses were received from the tribes indicating either that they were not available to participate in consultation or that no effects were anticipated (see Appendix E). The Navy has fulfilled its due diligence requirements with regard to communications for tribal consultation in accordance with its policies established in the ICRMP.

4.4.3 Alternative 2

In-water and upland construction activities, including dredging, filling, excavation, demolition, and new construction under Alternative 2 may result in impacts on cultural resources. The study area for potential impacts on cultural resources under Alternative 2 includes the same APEs described for the projects under Alternative 1.

4.4.3.1 Potential Impacts

Historic Properties/Archaeological Resources

<u>Berths 11, 12, and 13 Structural Replacement</u>

Similar to Alternative 1, Berths 11, 12, and 13 structural repairs under Alternative 2 are expected to result in no impacts on archaeological resources, including historic properties, described under Alternative 1. Alternative 2 differs from Alternative 1 in use of an in-water construction method requiring additional pile driving but would occur in the same locations. If Alternative 2 is implemented, the Navy will consult with the Maine SHPO regarding the effects of Alternative 2 on historic properties pursuant to section 106 of the NHPA.

Dry Dock 3 Caisson Replacement

The Dry Dock 3 caisson replacement under Alternative 2 would result in no impacts on archaeological resources, including historic properties, for the reasons described under Alternative 1. Alternative 2 differs from Alternative 1 in that a temporary cofferdam would be constructed to create a dry work area for more extensive repairs to be completed to the outer caisson seat. As noted, no known underwater or terrestrial archaeological sites have been identified within the APE, which includes the potential site of the cofferdam. If Alternative 2 is implemented, the Navy will consult with the Maine SHPO regarding the effects of Alternative 2 on historic properties pursuant to section 106 of the NHPA.

Historic Properties/Architectural Resources

Berths 11, 12, and 13 Structural Replacement

Alternative 2 would result in moderate direct and minor indirect impacts on Berths 11 (A and B), 12, and 13 (A and B) similar to those identified above for Alternative 1, except that steel sheet piles would be used to construct the bulkhead instead of concrete shutter panels. Both the steel sheet piles and the concrete shutter panels would generally serve a similar purpose. Their main difference would be in appearance due to the characteristics of the material used to enclose the bulkhead. Similar to Alternative 1, the proposed bulkheads and alterations to the pier surface associated with Alternative 2 would not change the overall appearance of the berths.

If Alternative 2 is implemented, the Navy will consult with the Maine SHPO regarding the effects of Alternative 2 on historic properties pursuant to section 106 of the NHPA.

Dry Dock 3 Caisson Replacement

Alternative 2 would result in similar moderate direct and minor indirect impacts on cultural resources to those of Alternative 1. Like Alternative 1, Alternative 2 would be expected to result in an adverse effect on Dry Dock 3 under section 106 of the NHPA. Alternative 2 differs from Alternative 1 in that a temporary cofferdam would be constructed to create a dry work area for more extensive repairs to be completed to the outer caisson seat. If Alternative 2 is implemented, the Navy will consult with the Maine SHPO regarding the effects of Alternative 2 on historic properties pursuant to section 106 of the NHPA.

4.4.3.2 Traditional Cultural Properties

No known traditional cultural properties have been identified within the Shipyard. Therefore, there would not be any direct or indirect impacts on any of these properties.

If Alternative 2 is implemented, the Navy will consult with five federally recognized Native American tribes of Maine: the Aroostook Band of Micmac Indians, the Houlton Band of Maliseet Indians of Maine, the Indian Township Reservation of the Passamaquoddy Tribe of Maine, the Penobscot Tribe of Maine, and the Pleasant Point Reservation of the Passamaquoddy Tribe of Maine, regarding the potential effects of Alternative 2 pursuant to section 106 of the NHPA (Hardlines Design Company, 2012).

4.5 Biological Resources

This analysis focuses on estuarine wildlife and vegetation that are important to the function of the lower Piscataqua River estuarine ecosystem or are protected under federal or state law or statute. Terrestrial biological resources in the industrial upland portion of the Project area are not discussed in this section for the reasons summarized in the introduction to Chapter 3.

Biological Resources Potential Impacts:

- No Action Alternative: No change to marine biological resources.
- Alternative 1: Impacts on marine biological resources would be short-term and minor during construction. In-water noise would not result in long-term adverse effects or significant impacts on marine mammals. Alternative 1 may affect, but is not likely to adversely affect, two ESA species, the Atlantic sturgeon and shortnose sturgeon.
- Alternative 2: Impacts resulting from increased pile driving would occur over a longer duration and affect a slightly larger area. Overall impacts would be similar to those under Alternative 1 and would be short-term and minor.

4.5.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change in marine biological resources. Therefore, no significant impacts on marine biological resources would occur with implementation of the No Action Alternative.

4.5.2 Alternative 1 (Preferred Alternative)

The study area for the analysis of effects on biological resources associated with Alternative 1 includes the areas directly or indirectly affected by in-water construction, including dredging and pile extraction and installation at Berths 11, 12, and 13 and underwater repair work at the Dry Dock 3 caisson. Within the Project area, this includes a 200-foot buffer around Berths 11, 12, and 13 and the Dry Dock 3 caisson (referred to as the Action Areas for the purposes of analyzing potential impacts on EFH and managed fish species), and an approximately 0.48-square-mile area in the lower Piscataqua River in which marine mammals may be affected by in-water construction noise (referred to as the Zone of Influence [ZOI].

Underwater noise, or changes in water pressure, associated with pile extraction, drilling, and driving would occur for a total of 300 days for all activities associated with Berths 11, 12, and 13 structural repairs under Alternative 1 (see Table 4.5-1). In-water construction would include impact pile driving, which produces pulsed sounds, and vibratory pile driving, which produces continuous sounds. In general, pulsed sounds have an increased capacity to induce physical harm to marine mammals and fish compared with continuous sounds (ICF Jones and Stokes and Illingworth and Rodkin, Inc., 2012).

Table 4.5-1 Pile Installation and Removal Activity for the Berths 11, 12, and 13 Structural Repairs under Alternative 1 (with Option 1)[1]

Activity (Method)	*Pile Type*	*Piles Installed (Berth 11)*	*Piles Installed (12 & 13)*	*Piles Extracted (Berth 11)*	*Piles Extracted (12 & 13)*	*Number of Days*
Temporary Piles for Trestle System (Impact)[2]	14-inch steel H-type piles	64	64	-	-	32[3]
Temporary Piles for Trestle System (Vibratory)[2]	14-inch steel H-type piles	-	-	64	64	32[3]
King Piles (Rock-socketed)	36-inch steel H-type piles	94	83	-	-	177[4]
Sheet Piles and Returns (Vibratory)	24-inch steel sheet piles	112	86	-	-	10[5]
Permanent Sister Piles (Impact)	14-inch steel H-type piles	50	37	-	-	22[3]
Timber Piles (Vibratory)	15-inch timber piles	7	13	77	116	27 [6]
Total Duration						300

(1) Pile numbers are approximate.

(2) The number of temporary piles for the trestle system varies from the total provided in Table 2-3 (64 piles at Berth 11 and 60 piles at Berths 12 and 13) because estimates from an earlier version of the Project design were used for the biological resources impacts assessments. The temporary trestle pile numbers provided in this table represent conservative estimates.

(3) Estimate based on assumption of one-hour transition and set up time, resulting in one pile per two hours and four piles per day (ICF Jones and Strokes and Illingworth and Rodkin, Inc. 2012).

(4) King piles estimate based on assumption of one socket drilled per day

(5) Sheet pile estimate based on assumption of 20 piles, installed two at a time, in 8 hours (i.e., one day)

(6) Estimate based on assumption of 30 minutes to drive each pile and 30-minute transition and set up time, resulting in one pile per hour and eight piles per day (ICF Jones and Strokes and Illingworth and Rodkin, Inc. 2012).

4.5.2.1 Potential Impacts

Marine Vegetation

Alternative 1 would result in both short-term direct impacts on marine vegetation and long-term impacts from loss of habitat. In-water activities would temporarily disturb substrate within the Project area and would result in direct impacts on marine vegetation within the bulkhead footprints from removal by dredging or burial in fluidized sediments during bulkhead construction. However, the species identified with the Project area are common, are known to occur in adjacent areas of the lower Piscataqua River, are not sensitive to anthropogenic disturbance, and have a dispersive life history; therefore, marine vegetation would be expected to rapidly recolonize disturbed areas. Most of the dredging and pile installation proposed at Berths 11, 12, and 13 would occur within the footprint of the fender piles that would be removed at Berths 11A, 12, and 13A, which would minimize impacts on benthic vegetation at these locations. The berths and entrance to Dry Dock 3 have historically been

dredged as part of a periodic maintenance dredging program to maintain safe operating depths for ships; thus, the impacts on marine vegetation that would result from in-water construction under Alternative 1 would be similar to those occurring during periodic maintenance dredging.

Construction of the bulkheads at Berths 11, 12, and 13 would result in the permanent loss of approximately 95,400 square feet (2.19 acres) of benthic habitat if the bulkhead at Berth 11C is not constructed and 117,200 square feet (2.69 acres) if the bulkhead at Berth 11C is constructed. The benthic habitat that would be permanently removed is beneath and adjacent to the existing berths along the Shipyard's industrial waterfront and is regularly disturbed as a part of maintenance dredging to maintain safe navigational depths at the berths. Further, vessel activity at the berths creates minor disturbances of benthic habitats (e.g., vessel propeller wakes) during waterfront operations.

The lower Piscataqua River supports a variety of estuarine habitats and aquatic life (New Hampshire Fish and Game Department [NHFGD] 2011), including sheltered habitat around neighboring islands that is less disturbed compared with the developed and industrialized areas surrounding the Shipyard, and suitable benthic habitat for marine vegetation close to the Project area is abundant. Further, marine vegetation could colonize fixed structures such as the Berth 11, 12, and 13 bulkheads. Thus, the bulkheads, once constructed, would be expected to provide habitat for species similar to those that currently occur in the Project area.

In-water work at Dry Dock 3 would not remove marine vegetation and would only temporarily disturb vegetation and increase turbidity in the water column. Disturbed vegetation would be expected to rapidly return to pre-construction conditions. Increased water column turbidity during construction would reduce light reaching benthic vegetation, which could temporarily reduce photosynthetic production. However, increased turbidity would be short-term and would not represent a significant change in baseline operational impacts from vessel disturbances.

Overall, minor short-term direct impacts on marine vegetation would occur during in-water construction, and negligible long-term impacts would result from loss of habitat and operation of the berths and Dry Dock 3. The Proposed Action would not result in significant impacts on marine vegetation.

Marine Mammals

Thresholds and Criteria for Pile Driving.

Under the MMPA, NOAA Fisheries has established threshold levels to determine when impacts on marine mammals have occurred (see Table 4.5-2) (NOAA Fisheries, 2005). Level A harassment (injury) takes are defined as activities that have the potential to injure a marine mammal or marine mammal stock in the wild and produce in-water noise thresholds of 180 dB root mean square (rms) re 1µPa for cetaceans and 190 dB rms re 1 µPa for pinnipeds for both impulse and continuous sounds. Level B harassment (disturbance) takes are defined as activities that result in behavioral disturbance of marine mammals and have in-water noise thresholds of 160 dB rms re 1 µPa for pulsed sounds and 120 dB rms re 1 µPa for continuous sounds for both cetacean and pinniped species.

Pile driving also can generate airborne noise that could potentially result in disturbance of marine mammals (pinnipeds) hauled out or at the water's surface. The appropriate airborne noise thresholds for behavioral disturbance for all pinnipeds, except harbor seals, is 100 dB re 20 µPa rms (unweighted) and for harbor seals is 90 dB re 20 µPa rms (unweighted) (see Table 4.5-2).

Table 4.5-2 Injury and Disturbance Thresholds for Underwater and Airborne Sounds[1]

Marine Mammal Functional Hearing Group	***Airborne Marine Construction Criteria (Impact & Vibratory Pile Driving) (re 20 µPa)***	***Underwater Vibratory Pile Driving & Drilling Criteria (e.g., non-pulsed/continuous sounds) (re 1 µPa)***		***Underwater Impact Pile Driving Criteria (e.g., pulsed sounds) (re 1 µPa)***	
	Distance Guideline Threshold (Haul out) [2]	***Level A Injury Take Threshold***	***Level B Disturbance Take Threshold***	***Level A Injury Take Threshold***	***Level B Disturbance Take Threshold***
Cetaceans (whales, dolphins, porpoises)	N/A	180 dB rms	120 dB rms	180 dB rms	160 dB rms
Pinnipeds (seals, sea lions, walrus; except harbor seal)	100 dB rms (unweighted)	190 dB rms	120 dB rms	190 dB rms	160 dB rms
Harbor seal	90 dB rms (unweighted)	190 dB rms	120 dB rms	190 dB rms	160 dB rms

[1] On August 5, 2016, NOAA Fisheries released final acoustic guidance regarding thresholds for determining the onset of permanent hearing threshold shifts (PTS) in marine mammals, the Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing, NOAA Technical Memorandum NMFS-OPR-55. The new guidance was taken into account during consultation with NOAA Fisheries. See the analysis in the addendum to the IHA application in Appendix F.

[2] Sound level at which pinniped haul-out disturbance has been documented. Not an official threshold, but used as a guideline.

Key:
dB = Decibel
µPa = MicroPascal
rms = Root mean square
N/A = Not applicable

Potential Responses to Underwater Pile Driving.

Marine mammals' responses to pile driving depend on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Responses vary in degree based on the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away the animal is from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. The

two potential types of responses, physiological responses and behavioral responses, are discussed below.

Physiological Responses. Physical responses to continuous or impulsive sound may range from mechanical vibration or compression of tissues with no resulting injury to tissue trauma and injury. Because the ears are the most sensitive organ to pressure, they are the organs most sensitive to injury (Ketten, D.R., 2000). Sound-related trauma can be lethal or sub-lethal. Lethal impacts are those that result in immediate death or serious debilitation (Ketten, 1995). Sub-lethal impacts include hearing loss, which is caused by exposure to perceptible sounds. Severe damage to the ear can include injuries to tissues and hearing structures, hemorrhage, and cerebrospinal fluid leakage (Ketten, 1995). Moderate injury implies partial hearing loss. Permanent hearing loss can also occur when the hair cells in the ear are damaged by one very loud event or by prolonged exposure to noise. Temporary loss of hearing sensitivity has been documented in controlled settings using captive marine mammals exposed to strong sound exposure levels (SELs) at various frequencies (Ridgway et al., 1997; Kastak et al., 1999; Finneran et al., 2003), but it has not been documented in wild marine mammals exposed to pile driving.

Behavioral Responses. Behavioral responses to sound are highly variable and context-specific. A number of factors may influence an animal's response to noise, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure (Richardson et al., 1995; National Research Council, 2005; Wartzok et al. 2003/04). While habituation to noise is possible, animals are most likely to habituate to sounds that are predictable and unvarying (Wartzok et al., 2003/04).

With both types of pile driving, it is likely that the onset of pile driving could result in temporary, short-term changes in an animal's typical behavior and/or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise by swimming away from the sound source and avoiding the area, increasing swimming speed, increasing surfacing time, and/or decreasing foraging in the affected area (Ridgway et al., 1997; Finneran et al., 2003; Morton and Symonds, 2002; CALTRANS, 2001; SRS Technologies and Illingworth and Rodkin, 2006; also see reviews in Gordon et al., 2004; Wartzok et al., 2003/04; and Nowacek et al., 2007). Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (CALTRANS, 2001; SRS Technologies and Illingsworth and Rodkin 2006).

<u>Zone of Influence (ZOI) for Berths 11, 12, and 13 Structural Repairs</u>

Alternative 1 would involve a total of 300 days of in-water pile installation and removal activities, including drilling, vibratory pile driving, and removal, and impact pile driving. Acoustic modeling was used to determine the area (or ZOI) exposed to in-water sound pressure levels (SPLs) during in-water work that would exceed the criteria in Table 4.5-1. Appendix F provides details on the methodology used for acoustic modeling.

The modeled ZOI for construction at Berths 11, 12, and 13 is shown on Figure 4.5-1. The total area exposed to noise levels exceeding the designated NOAA Fisheries thresholds for Level B harassment (behavioral) take under Alternative 1 would be 0.45 mi^2 (290.12 acres). As shown on the figure, the numerous land features and islands within the vicinity of the Project area in the Piscataqua River would limit the area of sound exposure. Additionally, construction would occur in phases, and the ZOIs for construction at Berths 11 and 13 individually would be smaller than the combined ZOI shown because land features at the Shipyard would block some of the in-water sound.

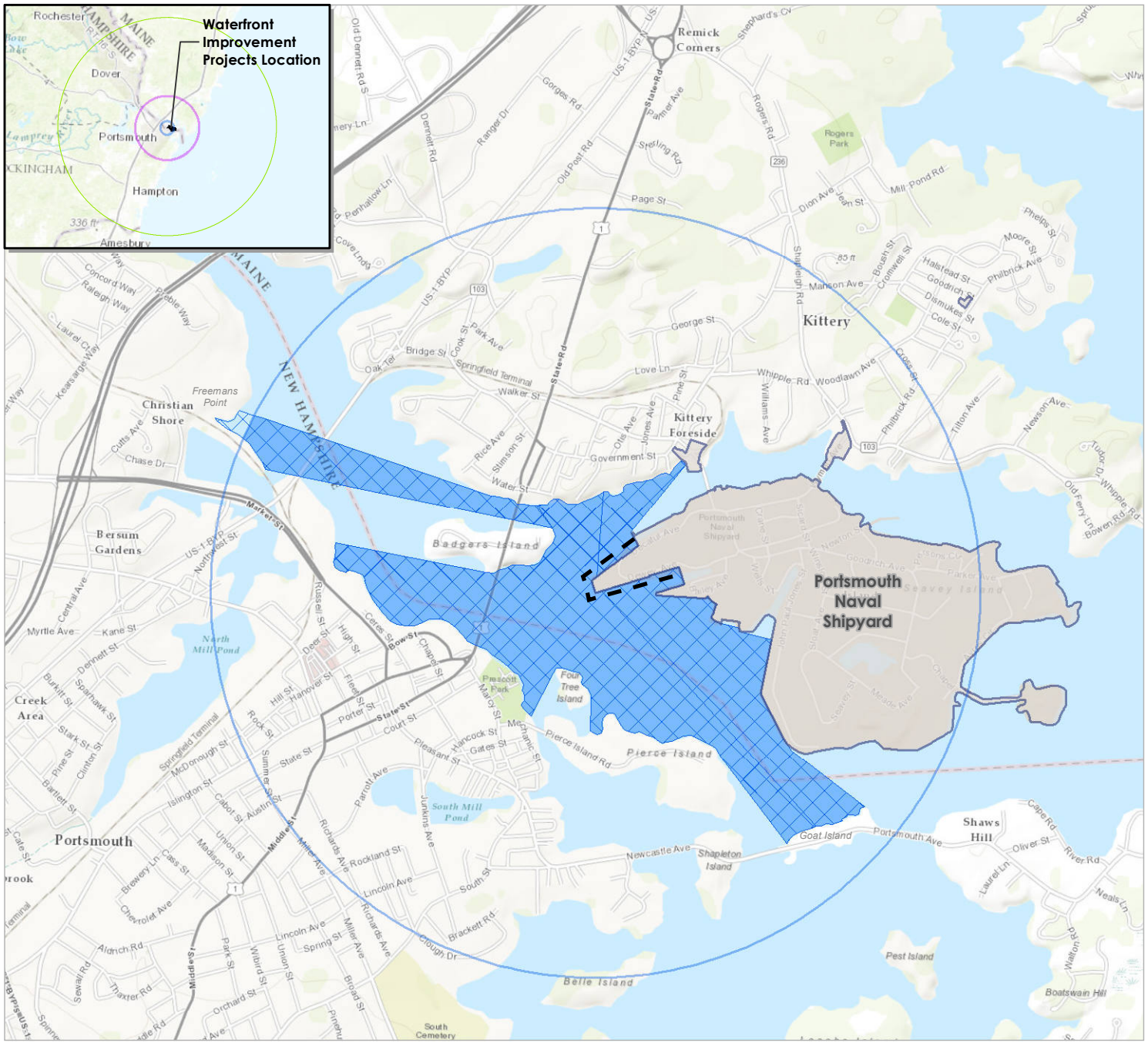


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Figure 4.5-1
Combined Zone of Influence for Underwater Vibratory and Underwater Impact Hammer
Portsmouth Naval Shipyard
York County, Maine

Legend

- Zone of Influence for Underwater Vibratory Hammer
- Zone of Influence for Underwater Impact Hammer
- 0.98 mi (1.58 Km) Radius
- 4.57 mi (7.35 Km) Radius
- 15.53 mi (25.12 Km) Radius
- Installation Area

N

0 1,000 2,000 3,000 4,000 Feet

Source: ESRI 2013; Department of Defense 2014.

Conclusions Regarding Impacts on Species or Stocks

For several reasons, no physiological responses or injuries to marine mammals are expected from underwater noise generated by pile driving operations during Berths 11, 12, and 13 structural repairs. First, vibratory pile driving, which would be used as the primary installation method, does not generate high peak SPLs that are commonly associated with injury. The sound that would be generated from the proposed vibratory pile driving is non-pulsed (e.g., continuous), which is not known to cause injury to marine mammals.

Impact pile driving would be minimized under Alternative 1 and would only occur over a short period of time during installation of the temporary piles for the trestle system and the 14-inch steel H-type sister piles. The project would involve impact pile driving that would exceed acoustic thresholds for Level A takes, potentially resulting in Level A takes of marine mammals. Mitigation measures developed in consultation with NOAA Fisheries will be implemented to minimize the potential for Level A takes. The mitigation measures that will be used would greatly reduce the chance that a marine mammal may be exposed to SPLs that could cause physical harm. These measures include stopping all pile driving if an animal is within or approaching the shutdown zones (180 feet [55 meters] for vibratory pile-driving and 246 feet [75 meters] for impact pile-driving), monitoring the Level A zones at all times (1,102 feet [336 meters] for harbor porpoises and 495 feet [151 meters] for seals), and dispersing monitors broadly enough around the project area for coverage of the Level A zones during all impact-pile driving and Level B zones during two-thirds of all vibratory pile-driving.

Underwater noise generated by in-water construction would have the potential to disturb or displace small numbers of marine mammals. Individual marine mammals may be exposed to SPLs during pile driving, extraction, and drilling at Berths 11, 12, and 13 that may result in Level B harassment (behavioral) takes. Any marine mammals that are taken (harassed) may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the Project area. Since pile driving would likely only occur for a few hours a day and intermittently over the entire construction period for Phases 1 and 2 of the Berths 11, 12, and 13 structural repairs, pile driving is unlikely to result in permanent displacement from the Project area. Any Level B harassment (behavioral) takes would have only a minor effect on individuals and no effect on populations due to the low marine mammal densities and small area of impact in the lower Piscataqua River.

The Navy submitted an Incidental Harassment Authorization (IHA) application to NOAA Fisheries for the first year of construction under Alternative 1 on February 10, 2016. Supplemental analyses were prepared during consultation with NOAA Fisheries and as a result of the public comment process. Through consultation, the Navy and NOAA Fisheries have agreed on the maximum number of potential takes of marine mammals that would be allowed to occur during the first year of construction and mitigation measures to minimize these impacts. The Navy will comply with the requirements and mitigation measures in the IHA that will be issued prior to the start of in-water construction. Based on the modeling results presented in the IHA application and supplemental analyses (see Appendix F) for the first year of construction, in-water construction under Alternative 1 is not expected to have any detectable adverse impact on population recruitment, survival, or recovery. The exposures outlined in Appendix F represent the maximum expected number of marine mammals that could be exposed to in-water sound reaching Level A (injury) or Level B harassment (behavioral) levels.

The Navy will employ a number of mitigation measures in an effort to minimize the number of marine mammals potentially affected by in-water sound during construction. The IHA application and

supplemental materials (see Appendix F) describe the mitigation management plan that will be implemented to minimize acoustic impacts on marine mammals. The IHA application addresses only the first year of construction, and the Navy will submit subsequent IHAs including similar mitigation measures to request additional takes for each year of in-water construction. Considering the low marine mammal densities in the area and the small area of impact, the numbers of marine mammals potentially affected by construction activities in subsequent years of the Project will likely be minimal for hooded seals and harp seals, with a greater number of takes possible for harbor porpoises, grey seals, and harbor seals, consistent with the numbers potentially affected during the first year (see Appendix F).

With regards to airborne noise, there are no known haul-out sites for any pinniped species within the vicinity of the Project area. The closest known seal haul-out site within the Piscataqua River is 1.5 miles downstream of the Project area. Initial noise propagation modeling indicated in-air noise from pile-driving and extraction would attenuate below the distance thresholds for pinniped haul-out sites before reaching this distance. Therefore, Alternative 1 would not cause acoustic disturbance for pinniped species while hauled out.

In-water construction at Berths 11, 12, and 13 may temporarily displace marine mammals and their prey from the Project area in the vicinity of these berths as a result of underwater noise and turbidity. However, it is not expected that any of these impacts would be significant. It is not expected that there would be a noticeable direct loss of habitat available to marine mammals due to any of the activities associated with the projects. The habitat that would be permanently removed as a result of construction of the bulkheads is adjacent to and beneath Berths 11, 12, and 13 and is regularly disturbed during industrial waterfront operations at the Shipyard. Marine mammals using habitat near the Project area are primarily transiting the area; no known primary foraging or haul-out areas are located in or within 1.5 miles of the Project area.

Pile driving and removal would not have permanent, adverse effects on marine mammal foraging habitat. Given the short daily duration of noise associated with individual pile driving and removal and the relatively small areas that would be affected, pile driving and extraction activities associated with Alternative 1 are not likely to have a permanent, adverse effect on any EFH, or population of fish species (see the sections below for additional discussion).

In-water construction at the Dry Dock 3 caisson would result in negligible impacts on marine mammals. Pressure washing and repairing the outer caisson seat would generate some in-water noise, but the level of noise would be consistent with existing background in-water noise in the vicinity of the Shipyard (discussed in Section 3.5). While in-water construction activities at Dry Dock 3 may displace marine mammals and their prey from the Project area, this displacement would be temporary and would cease once construction is complete. No long-term impacts on marine mammals, prey species, or their habitat would result from the Dry Dock 3 caisson replacement.

Overall, Alternative 1 would result in minor or moderate short-term impacts on marine mammals because of the potential for behavioral harassment of small numbers of marine mammals during construction. Construction noise could possibly injure small numbers of marine mammals, but this potential for Level A takes has been addressed through consultation with NOAA Fisheries and will be mitigated as described. This alternative is not expected to result in any long-term, adverse impacts on marine mammal populations, and no significant impacts on marine mammal populations are expected.

Fish

Potential impacts on fish, including managed EFH species (as defined in "Essential Fish Habitat Assessment for the Waterfront Improvement Projects" [see Appendix G]), would result primarily from temporary re-suspension of bottom sediments during dredging of the bulkhead footprint, noise generated during installation and removal of piles, and permanent loss of habitat at Berths 11, 12, and 13. These impacts are described below and, under Alternative 1, would occur primarily within the Action Area associated with the Berths 11, 12, and 13 structural repairs (see Figure 4.5-2).

Turbidity

Sediment disturbance would temporarily increase turbidity within the water column during dredging, trenching, and pile driving and extraction at Berths 11, 12, and 13. Increased turbidity may impair the ability of sight-feeding fish to feed in the area immediately surrounding construction areas. Turbidity can also decrease the dissolved oxygen concentration in the water column, which could specifically affect egg and larval life stages of fish species. These life stages are unable to avoid areas where turbidity may be increased and therefore may be directly affected by reduced dissolved oxygen. Also, turbidity can clog the gills of any fish within the plume area that are unable to move away from the disturbance.

Turbidity plumes associated with dredging, trenching, and pile driving and extraction at the berths would be of short duration and diffuse rapidly due to the dynamic nature of the estuarine environment and the grain size of the material being removed. Sediment in the Action Area primarily consists of soft mud, sand, pebbles, and old mussel shells in areas of low energy and hard sand, pebbles/cobbles, and small boulders in areas of higher current flow (CR Environmental, Inc., 2014). The coarser grain sizes would be expected to settle out of the water column fairly quickly and remain close to the area of disturbance, whereas finer mud and sand sediments would remain suspended for a longer period (USEPA, May 1999). However, because the lower Piscataqua River is a dynamic coastal area, riverine flushing and tidal action are expected to rapidly disperse and dilute turbidity, and therefore the area is expected to quickly return to background-level concentrations of suspended sediments (Reynolds et al., 1990).

Turbidity during backfilling of the Berths 11, 12, and 13 bulkheads would be minimized through use of clean pea stone as the primary fill material. Pea stone would be used to backfill the space from the bottom of the bulkhead to the approximate mean low water line. Dredged sediments that are suitable for reuse as fill may be incorporated into the pea stone.

A temporary silt curtain and boom would be installed outside of the bulkhead, approximately 75 to 100 feet off of Berths 11 and 13, to catch debris, sediment, and silt that may escape the bulkhead during backfilling. (Due to swift tidal currents at Berth 12, a silt curtain will not be used at this location.) Using pea stone and a temporary silt curtain and boom would minimize potential impacts on fish as a result of turbidity during backfill.

Similar to activities associated with construction of the berths, sediment disturbance could occur during in-water construction at Dry Dock 3 and temporarily increase turbidity, which could impact early life stages of fish. Turbidity increases at Dry Dock 3 would be short-term and controlled by a silt curtain and containment boom. Construction at Dry Dock 3 would occur in conjunction with activities at the berths, and, therefore, based on the overlap in construction schedule and Action Areas, turbidity associated with the Dry Dock 3 repairs would be masked by the greater impacts associated with dredging and pile

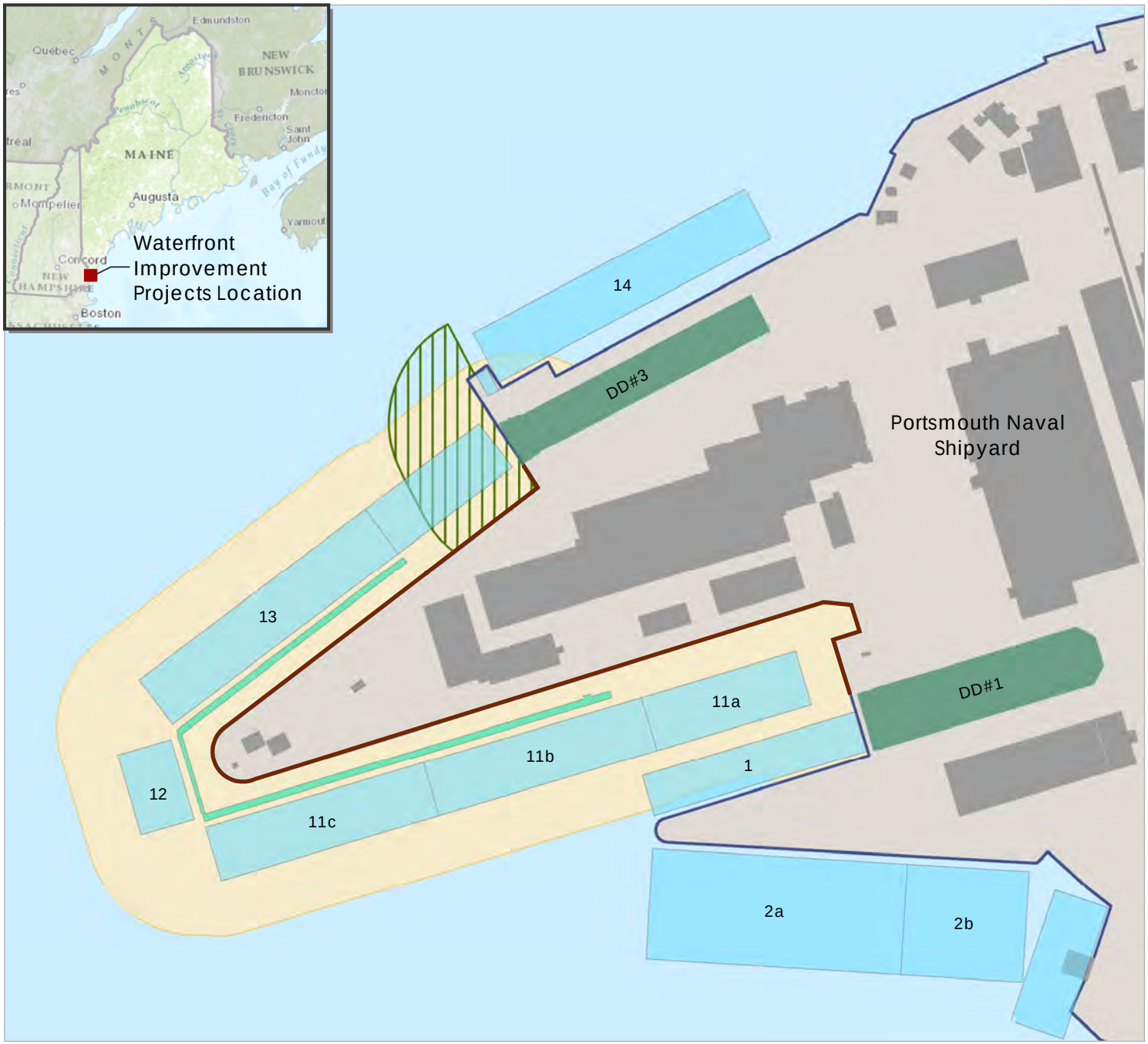

Figure 4.5-2
Action Areas at Berths 11, 12, and 13 and Dry Dock 3
Portsmouth Naval Shipyard
York County, Maine

Legend

- Existing Bulkhead
- Dry Dock
- Berth
- Existing Edges of Pier
- Existing Structures
- Installation Area

Action Area

- Dry Dock 3 Caisson Replacement
- Berths 11, 12, and 13 Structural Repairs

N

0 100 200 300 400 Feet

Source: ESRI 2013; Department of Defense 2014.

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driving activities at the berths. Once construction is complete, temporarily disturbed areas would naturally return to their pre-construction state.

Underwater Noise

The impacts of underwater sound on fish could be pathological, physiological, and/or behavioral, including physical damage, stress, and avoidance behavior (ICF Jones and Stokes and Illingworth and Rodkin, Inc., 2012). Fish with swim bladders would be more vulnerable to such pressure changes, which can cause capillaries to rupture or the swim bladder to rapidly expand and contract, leading to a temporary inability to control buoyancy (ICF Jones and Stokes and Illingworth and Rodkin, Inc., 2012). Temporary loss of hearing also may occur as a result of exposure to noise from impact pile driving (Popper and Hastings, 2009; Popper et al., 2005). In addition, sound can induce generalized stress responses in fish, particularly a startle response during initial activity, which can in turn induce behavioral changes such as avoidance of the Project area throughout the remainder of pile-driving activities (Wysocki et al., 2006).

The extent to which fish react varies among species, their life stage, and with other environmental conditions. A cooperative effort between several federal and state transportation and resource agencies along the West Coast of the U.S. resulted in the establishment of interim criteria for the onset of physical injury to fishes exposed to the underwater sounds generated by impact pile driving (Stadler and Woodbury, 2009). The onset of physical injury uses dual criteria of SPL and cumulative SEL, with injury expected to occur if either of these criteria are exceeded. A potential onset of physical injury is determined if either the peak SPL exceeds 206 dB relative to 1 micropascal (dB re 1 µPa) or the SEL, accumulated over all pile strikes generally occurring within a single day, exceeds 187 dB re 1 µPa squared per second (dB re 1 μPa^2/sec) for fishes 2 grams or larger, or 183 dB re 1 μPa^2/sec for smaller fishes. Adverse behavioral effects occur at a threshold of 150 dB re 1 µPa rms (Stadler and Woodbury, 2009).

The intensity of pile-driving sound is greatly influenced by factors such as the types of piles and hammers and the physical environment in which the driving activity takes place. In order to determine reasonable SELs that would be likely to result from pile driving during the Berths 11, 12, and 13 structural repairs, studies of pile-driving operations with similar properties to the Proposed Action were evaluated. Pile-driving noise associated with the proposed in-water projects would be expected to be approximately 177 dB SEL for impact pile driving and range from 144 to 176 dB SEL for vibratory pile driving and extraction (ICF Jones and Stokes and Illingworth and Rodkin, Inc., 2009, 2012). Reference source levels assumed to be representative of the piles for the waterfront improvement projects are defined and described in the EFH Assessment (Appendix G).

Pile driving would generate underwater noise that potentially could result in disturbance of fish in and near the Action Area for the Berths 11, 12, and 13 structural repairs. The intensity of this acoustic pressure wave would decrease as it propagates out from a source until the peak SPL and cumulative SEL drop below the calculable threshold values. The Simplified Attenuation Formula (SAF) developed by NOAA GARFO to estimate the area affected by underwater noise over the injury and behavioral thresholds in shallow, confined areas such as rivers and nearshore waters was used to estimate the distance from piles where these measures drop below the thresholds for fish (NOAA GARFO, 2016). This modeling approach is described and modeling results for each pile-driving and extracting activity presented in Appendix G.

Based on this modeling, which takes into account the confined nature of the Action Area and absorption of sound into the riverbed, underwater sound from vibratory pile driving or extraction would not exceed the injury threshold, and sound would attenuate to the behavioral threshold at a maximum of 269 feet (82 meters) without mitigation. The acoustic pressure wave generated from impact hammering would attenuate to the injury threshold by 46 feet (14 meters), with behavioral impacts on fish occurring up to 315 feet (96 meters) from the point of impact-hammer installations without mitigation.

Based on reference sound level data and established criteria for physical injury, the proposed in-water construction activities are expected to cause only localized pathological or physiological impacts on fish. However, behavioral changes in fish, including temporary displacement to adjacent habitats, would extend up to 315 feet from the Action Area for the Berths 11, 12, and 13 structural repairs as a result of the most significant noise-producing in-water construction. As noted in Section 4.5.2.1, the Great Bay National Wildlife Refuge and less-disturbed habitats around islands in the lower Piscataqua River would provide ample foraging habitat and shelter for fish displaced from the Action Area during in-water construction. While pile driving and extraction would displace EFH species and other fish, the Navy would minimize the amount of pile driving required to the extent practicable under Alternative 1 by using concrete shutter panels and drilled king piles as the primary method of constructing the bulkheads. The Navy would ensure that underwater noise does not exceed specified noise level limits and would implement reasonable and prudent mitigation measures as necessary to limit the impact of pile driving activities. The measures could include but are not limited to: reducing driving duration, reducing force settings, and using cushion blocks.

The Navy has consulted with NOAA Fisheries' Habitat Conservation Division pursuant to section 305 of the Magnuson-Stevens Fishery Conservation and Management Act regarding potential impacts on EFH and managed species as a result of the Proposed Action under Alternative 1. The Habitat Conservation Division has determined, based on review of the Project, that Alternative 1 would have minimal adverse effects on EFH for federally managed species (NOAA Fisheries Habitat Conservation Division 2016 [see Appendix G]). Therefore, NOAA Fisheries has no conservation recommendations and no further consultation is required pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation and Management Act.

<u>Loss of Pelagic Habitat</u>

Pelagic (open water) habitat within the footprints of the bulkheads at Berths 11, 12, and 13 would be permanently replaced with physical structures. Based on water column depths of between 17 and 40 feet at the locations of the bulkheads, the Proposed Action would result in the removal of 1.6 to 4.7 million cubic feet of open water. This open water habitat is adjacent to the Shipyard's industrial waterfront and is regularly subjected to vessel noise and wakes. Further, pelagic species are, by definition, mobile and typically range throughout the bay and estuary systems they inhabit in response to localized physical and chemical conditions as well as prey availability. Due to the regular vessel and other industrial operations at the Shipyard, the pelagic habitat that would be impacted is regularly disturbed, subjected to localized degradation in water quality, and not expected to support pelagic species beyond those transiting the area. Thus, the permanent loss of pelagic habitat as a result of the Proposed Action would be negligible.

Based on the temporary disturbance associated with in-water construction activities, the previously disturbed nature of the Project area, and the abundance of suitable habitat near the Action Area, impacts on fish as a result of the Proposed Action would be short-term and minor.

Benthic Invertebrates

In-water construction activities would temporarily disrupt communities of benthic epifauna/infauna, including benthic communities that are designated EFH for managed fish species, near Berths 11, 12, and 13. The benthic habitat underneath the existing pier structure where the construction activities would be focused is predominantly soft mud transitioning to sandy substrates farther from the pier. During the 2014 benthic survey of the Project area, sand shrimp were the dominant species recorded, with other benthic invertebrates, such as the sea star (*Asteria vulgaris*), blue mussel (*Mytilus edulis*), branched hydroid (*Hydroza* spp.), orange sheath tunicate (*Botrylloides violaceaus*), sea anemone (*Metridum senle*), Jonah crab (*Cancer borealis*), and rock crab, also observed.

Dredging activities would temporarily fluidize benthic sediments, resulting in direct mortality of less motile benthic invertebrates, such as polychaetes and bivalves (e.g., mussels, clams). Areas that would be temporarily disturbed during construction are expected to recolonize with similar benthic communities composed of organisms or offspring of organisms from adjacent benthic areas.

Indirect impacts on benthic organisms would result from turbidity caused by dredging and trenching activities. The area within the construction footprint would likely experience higher levels of turbidity than the surrounding area; however, finer sediments would be suspended in the water column and could settle on benthic communities in adjacent, undisturbed areas. Suspension feeders (i.e., bivalves) and surface deposit feeders (i.e., polychaetes) would be the most susceptible to burial. However, it is expected that these impacts would be minor and temporary in nature. Benthic communities are very resilient to habitat disturbance and would likely recover to pre-disturbance levels within two years or less of the completion of construction (Brooks et al., 2006; Diaz et al., 2004).

Replacement of the Dry Dock 3 caisson under Alternative 1 would have negligible impacts on benthic invertebrates. Individual animals may be removed and killed during pressure washing of the outer caisson seat. Indirect impacts on benthic invertebrates in areas surrounding the Dry Dock 3 caisson as a result of increased turbidity or burial may occur but would be expected to be negligible, since no new in-water construction or substantial sediment disturbance would be required under this alternative.

Before beginning in-water construction at Berths 11, 12, and 13 and the Dry Dock 3 caisson, lobsters within the in-water construction areas will be physically removed and relocated to mitigate possible injury or loss of individuals. Trapping via ventless traps will be completed at each Project site not more than two weeks prior to the start of in-water construction. All lobster relocation plans will be coordinated with the MEDMR prior to implementation.

In summary, there would be short-term and minor direct and indirect adverse impacts on benthic invertebrate species in and adjacent to Berths 11, 12, and 13 and Dry Dock 3 during construction as a result of disturbance of the benthos and associated turbidity. However, the impacts that would result from the proposed in-water construction activities would be similar to those resulting from maintenance dredging at the Shipyard. Within a short time after construction is complete, temporarily disturbed areas would to return to pre-construction conditions, allowing the recolonization of benthic invertebrates. Long-term impacts on benthic invertebrate species would result from permanent loss of benthic habitat at Berths 11, 12, and 13, as discussed below. These impacts would be minor. No significant impacts on benthic invertebrate species would result from Alternative 1.

Benthic Habitat

Dredging construction footprints and installing and removing piles would temporarily disturb the seafloor near Berths 11, 12, and 13. The primary temporary impact on benthic habitats during construction would be disruption of the benthos and temporary fluidization of sediments, resulting in temporary loss of benthic habitat. Impacts on benthic habitat would be avoided to the extent practicable by limiting dredging activities to the areas immediately within the construction footprint for the bulkheads. Indirect impacts on benthic habitat during construction are likely to result from turbidity and re-suspended sediments caused by dredging activities. The area within the construction footprint could have higher levels of turbidity than the surrounding area. However, it is expected that these impacts would be minor and temporary as the benthos is expected to naturally recover to pre-construction conditions in a short period of time.

While temporarily disturbed habitats would quickly return to their pre-construction conditions, construction of the bulkheads at Berths 11, 12, and 13 would result in permanent loss of approximately 95,400 square feet (2.19 acres) of benthic habitat if the bulkhead at Berth 11C is not constructed and 117,200 square feet (2.69 acres) if the bulkhead at Berth 11C is constructed. The benthic habitat that would be permanently removed is adjacent to and beneath the existing berths along the Shipyard's industrial waterfront, includes existing fill material beneath the fitting out pier, and is regularly disturbed as a part of maintenance dredging to maintain a safe navigational depth at the berth. Further, vessel activity at the berths creates minor disturbances of benthic habitats (e.g., from vessel propeller wakes) during waterfront operations.

The lower Piscataqua River supports a variety of estuarine habitats and aquatic life (NHFGD 2011), including sheltered habitat around neighboring islands that is less disturbed compared with the developed and industrialized areas surrounding the Shipyard. Therefore, suitable benthic habitat is abundant close to the Project area, and displaced species would be expected to find ample forage and shelter in nearby undisturbed areas. The bulkheads, once constructed, also would be expected to provide habitat for sessile benthic species similar to those currently occurring in the Project area.

Compensatory mitigation for the loss of coastal habitat functions and values will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction at Berths 11, 12, and 13 in accordance with the Maine Natural Resources Protection Act (38 M.R.S.A. §480-Z), sections 404 and 401 of the Clean Water Act (33 U.S.C. §1251 et seq.), and section 10 of the Rivers and Harbors Act (33 U.S.C. §403 et seq.). The total fee will be determined by the total area of fill in the Project area.

Repair of the outer caisson seat at Dry Dock 3 would not impact benthic habitat beyond negligible short-term turbidity increases. Repair of the outer caisson seat and replacement of the Dry Dock 3 caisson would not result in any short- or long-term direct impacts on benthic habitat surrounding the dry dock.

In summary, there would be temporary and minor direct and indirect adverse impacts on the quality of benthic habitat in and adjacent to the Project area during construction as a result of benthic disturbance and turbidity. However, the impacts that would result from the proposed in-water construction activities would be similar to those resulting from maintenance dredging at the Shipyard. Within a short time after construction is complete, the benthic habitat would be expected to return to pre-construction conditions. Minor disturbances of benthic habitats from vessel propeller wakes and other vessel disturbances during operation of the berths and Dry Dock 3 would be similar to those caused by past and current use of the facility and would not represent a significant change in baseline conditions.

Threatened and Endangered Species

Atlantic Sturgeon

Spawning Atlantic sturgeon are not known within the lower Piscataqua River; however, sub-adult Atlantic sturgeon overwinter in estuarine and marine habitats and are known to use the Great Bay estuary system as year-round nursery habitat (Atlantic Sturgeon Status Review Team, 2007). Given the lack of known spawning within the Piscataqua River or Great Bay estuary, Alternative 1 would have no effect on egg, larval, and adult life stages of the Atlantic sturgeon.

Sub-adult Atlantic sturgeon inhabiting the lower Piscataqua River could be impacted by increased turbidity resulting from dredging and trenching as well as underwater noise at Berths 11, 12, and 13 and underwater concrete repairs at Dry Dock 3. These impacts would be the same as those described for other fish species and would be localized and short-term, ceasing upon completion of construction (see 'Fish' in Section 4.5.2.1). Sub-adults are highly mobile and capable of long-range migrations (Atlantic Sturgeon Status Review Team, 2007); therefore, individuals occurring in the Action Areas would be expected to avoid active construction areas.

As noted in previous sections, the benthic habitat and water column that would be permanently lost at Berths 11, 12, and 13 are subject to periodic disturbance from maintenance dredging and vessel operations (see 'Benthic Habitat' in Section 4.5.2.1). While Atlantic sturgeon would be permanently displaced from the bulkhead footprints, this displacement would not be expected to adversely affect the species, based on the disturbed nature of habitat in the Action Areas and the species' migratory nature. In addition, the lower Piscataqua River supports a variety of estuarine habitats and aquatic life (NHFGD 2011), including sheltered habitat around neighboring islands that is less disturbed compared with the developed and industrialized areas surrounding the Shipyard. Therefore, the Navy has determined the Proposed Action may affect, but is not likely to adversely affect, the Atlantic sturgeon. The Navy has consulted with NOAA Fisheries under section 7 of the ESA regarding potential adverse effects on the Atlantic sturgeon as a result of the Proposed Action under Alternative 1. NOAA Fisheries provided concurrence, based on review of the Project, that the Proposed Action is not likely to adversely affect the Atlantic sturgeon (NOAA Fisheries Office of Protected Resources, May 2016). Therefore, no further consultation pursuant to section 7 of the ESA is required.

As described in Section 3.5.2.5, the proposed critical habitat for the Gulf of Maine DPS of the Atlantic sturgeon includes the Piscataqua River from its confluence with the Salmon Falls and Cocheco rivers downstream to where the main river discharges at the Atlantic Ocean (NOAA 2016). The Project area lies entirely within this proposed critical habitat. While critical habitat has only been proposed to date, and final designation is pending, section 7(a)(4) of the ESA requires the Navy to confer with NOAA Fisheries to avoid or minimize potential impacts on proposed critical habitat. The Navy has determined that, based on NOAA Fisheries' guidance for conferencing under section 7(a)(4), effects on proposed critical habitat would be insignificant or discountable and conferencing is not required for the Proposed Action under section 7(a)(4) (NOAA Fisheries, n.d.). NOAA Fisheries has indicated that this determination is appropriate based on the analysis in the EA and existing consultation documents provided for the Gulf of Maine DPS of the Atlantic sturgeon (Trefry 2016; see Appendix H).

Shortnose Sturgeon

Spawning and overwintering shortnose sturgeon are not known to occur within the Piscataqua River; however, shortnose sturgeon may forage in the lower Piscataqua River in the spring, and fall migrants may transit the lower river. Based on the lack of documented spawning in the Great Bay estuary or Piscataqua River, Alternative 1 would have no effect on egg, larval, and adult life stages of the shortnose sturgeon.

Sub-adult shortnose sturgeons inhabiting the lower Piscataqua River could be impacted by increased turbidity resulting from dredging and trenching as well as underwater noise at Berths 11, 12, and 13, and underwater concrete repairs at Dry Dock 3. These impacts would be the same as those described for other fish species and would be localized and short-term, ceasing upon completion of construction (see 'Fish' in Section 4.5.2.1). However, sub-adults are highly mobile (NOAA Fisheries, 1998a), and individuals in the Action Areas would be expected to avoid active construction areas.

Given the abundance of suitable habitat within the Great Bay estuary system, the shortnose sturgeon's migratory nature, and the short-term nature of impacts, individuals displaced by construction are not expected to be adversely impacted. The permanent loss of benthic and water column habitat is expected to be minor, given the species migratory nature, the disturbed nature of habitats adjacent to the Shipyard, and the variety of estuarine habitats and aquatic habitats within the lower Piscataqua River (see' Benthic Habitat' in Section 4.5.2.1). Therefore, the Navy has determined that the Proposed Action may affect, but is not likely to adversely affect, the shortnose sturgeon. The Navy has consulted with NOAA Fisheries under section 7 of the ESA regarding potential impacts on the shortnose sturgeon as a result of the Proposed Action under Alternative 1. NOAA Fisheries provided concurrence, based on review of the Project, that the Proposed Action is not likely to adversely affect the shortnose sturgeon (NOAA Fisheries Office of Protected Resources, May 2016 [see Appendix H]). Therefore, no further consultation pursuant to section 7 of the ESA is required.

4.5.3 Alternative 2

The study area for the analysis of effects on marine biological resources under Alternative 2 would be the same as the study area for Alternative 1, the Preferred Alternative. However, Alternative 2 would incorporate different in-water construction techniques at Berths 11, 12, and 13 that would require a greater number of piles to be driven to construct the bulkheads. In addition, under Alternative 2 more extensive repairs would be completed to the outer caisson seat at Dry Dock 3 that would require construction of a temporary, circular cellular cofferdam using steel round piles and steel sheet piles around the entrance to Dry Dock 3 to create a dry work area. The general construction method for the temporary, circular cellular cofferdam proposed under Alternative 2 is described in Appendix A. Construction of the temporary cofferdam would impact a larger 25,000 square-foot area (Action Area) around Dry Dock 3 compared with Alternative 1. The increased pile driving associated with both projects under Alternative 2 would extend the duration of elevated turbidity and underwater noise within the Action Areas to a total of 698 days (Table 4.5-3).

Table 4.5-3 Pile Installation and Removal Activity for the Berths 11, 12, and 13 Structural Repairs and Dry Dock 3 Cofferdam under Alternative 2 (with Option 1)[1]

Activity (Method)	*Pile Type*	*Piles Installed (Berth 11)*	*Piles Installed (12 & 13)*	*Piles Extracted (Berth 11)*	*Piles Extracted (12 & 13)*	*Number of Days*
Berths 11, 12, and 13 Structural Repairs						
Temporary Piles for Trestle System (Impact) [2]	14-inch steel H-type piles	64	64	-	-	32[3]
Temporary Piles for Trestle System (Vibratory) [1]	14-inch steel H-type piles	-	-	64	64	32[3]
King Piles (Rock-socketed)	36-inch steel H-type piles	240	195	-	-	435[4]
Sheet Piles and Returns (Vibratory)	24-inch steel sheet piles	521	472	-	-	50[5]
Permanent Sister Piles (Impact)	14-inch steel H-type piles	50	37	-	-	22[3]
Timber Piles (Vibratory)	15-inch timber piles	7	13	77	116	27[6]
Total Duration for Berths 11, 12, and 13 Structural Repairs						598
Dry Dock 3 Caisson Replacement (Temporary Cofferdam)						
Activity (Method)	***Pile Type***	***Piles Installed***		***Piles Extracted***		***Number of Days***
Spud Piles for Dry Dock 3 (impact)	24-inch steel round	50		-		25[7]
Cellular Cofferdam at Dry Dock [3] (Vibratory)	20-inch steel sheet	500		500		50[5]
Spud Piles for Dry Dock 3 (vibratory)	24-inch steel round	-		50		25 [6]
Total Duration for Dry Dock 3 Caisson Replacement (Temporary Cofferdam)						100

(1) Pile numbers are approximate.

(2) The number of temporary piles for the trestle system varies from the total provided in Table 2-3 (64 piles at Berth 11 and 60 piles at Berths 12 and 13) because estimates from an earlier version of the project design were used for the biological resources impacts assessments. The temporary trestle pile numbers provided in this table represent conservative estimates.

(3) Estimate based on assumption of one-hour transition and set up time, resulting in one pile per two hours and four piles per day (ICF Jones and Strokes and Illingworth and Rodkin, Inc., 2012).

(4) King piles estimate based on assumption of one socket drilled per day

(5) Sheet piles estimate based on assumption of 20 piles in eight hours (i.e., one day) installed two at a time

(6) Estimate based on assumption of 30 minutes to drive each pile and 30-minute transition and set up time, resulting in one pile per hour and eight piles per day (ICF Jones and Strokes and Illingworth and Rodkin, Inc., 2012).

(7) Spud piles estimate based on assumption of two piles in eight hours (i.e., one day)

Like Alternative 1, the primary impacts on marine biological resources under Alternative 2 would be attributable to suspended sediments, temporary displacement, loss of habitat, and underwater noise. These impacts on marine vegetation, marine mammals, fish, and benthic invertebrates would be similar to those described under Alternative 1. Given the larger Action Area and increased pile-driving activity resulting from construction and removal of the temporary cofferdam at Dry Dock 3, impacts resulting from in-water noise and turbidity under Alternative 2 would occur over a longer duration and affect a larger area than those under Alternative 1. However, due to the topographical constraints of the area, sound propagation would be limited. The total area exposed to noise levels exceeding the NOAA Fisheries thresholds for Level B harassment (behavioral) take of marine mammals would only increase slightly, to 0.48 mi^2 (304.9 acres). Further, most of the additional pile driving under Alternative 2 would use a vibratory hammer rather than an impact hammer. The Navy would employ mitigation similar to that described under Alterative 1 developed in consultation with NOAA Fisheries. Consequently, the numbers of marine mammal takes under Alternative 2 would be comparable to those under Alternative 1, and impacts on marine mammal populations would remain short-term and minor or moderate.

The pulsed sound from impact hammering spud piles at Dry Dock 3, while short in duration, would propagate farther than underwater noise generated under Alternative 1. Behavioral impacts on fish would occur up to 459 feet (140 meters) from the point of impact hammering; vibratory extraction of the spud piles would have behavioral impacts on fish up to 350 feet (106.7 meters). Therefore, while impacts would remain short-term and minor, fish would experience behavioral changes over a longer duration and a greater area surrounding the Action Area at Dry Dock 3 under Alternative 2 compared with Alternative 1. As noted under Alternative 1, these attenuation distances are based on open-water conditions, and topographic features in and along the Piscataqua River would prevent some of the sound propagation. Therefore, these distances are conservative.

If Alternative 2 is implemented, the Navy would consult separately with NOAA Fisheries regarding potential impacts on threatened and endangered species, including proposed critical habitat for the Atlantic sturgeon; EFH; and marine mammals from the different in-water construction methods proposed at Berths 11, 12, and 13 and Dry Dock 3.

4.6 Visual Resources

The evaluation of visual resources in the context of environmental analysis typically addresses the contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The existing landscape character described in Section 3.7 is compared with the Proposed Action's visual qualities to determine the compatibility or contrast resulting from the Proposed Action.

Visual Resources Potential Impacts:

- No Action Alternative: No change to existing visual resources.
- Alternative 1: Minor to moderate short-term visual impacts would occur during construction. Short-term impacts would cease once construction is complete. Long-term visual impacts would be minor. No significant impacts on visual resources would occur.
- Alternative 2: Impacts under Alternative 2 would be the same as those under Alternative 1.

As noted in Section 3.7, the affected environment, or study area, for visual resources consists of the Project sites and adjacent lands with views of the Project sites. These include the Shipyard itself, along the fitting-out pier and the flatiron pier, and the shorelines of the surrounding communities, the Town of Kittery and the City of Portsmouth.

4.6.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change in existing visual resources. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.6.2 Alternative 1 (Preferred Alternative)

In-water construction areas and the presence of construction equipment would result in short-term impacts on visual resources in the study area. Minor long-term impacts would be anticipated, as the improvements associated with the in-water projects would largely be visible only at the waterline from surrounding scenic and visually sensitive areas on the Shipyard and in waterfront areas of Kittery and Portsmouth.

4.6.2.1 Potential Impacts

Potential impacts on scenic resources on Portsmouth Naval Shipyard would be largely minimal due to its industrial character and current operations as a functioning industrial shipyard. The appearance of the Shipyard has changed over time due to the construction, modification, and demolition of various buildings and structures, including those on the fitting-out pier.

The proposed in-water projects under Alternative 1, with or without Option 1, would cause limited changes in the appearance of the Shipyard, particularly above the water line. The most noticeable visual changes would be temporary and occur during construction, when large pieces of construction equipment, such as pile drivers, cranes, and trucks, and construction materials would be at the sites and when barges may be operating in the waters off the Shipyard. Visual impacts during construction would be temporary and would cease once construction is complete. Construction for the in-water work is expected to last a total of approximately four years, occurring in phases between January 2017 and June 2019 and between October 2020 and October 2022.

The Proposed Action would result in short- and long-term changes in the appearance of the Project area in views from locations outside the Shipyard. The Proposed Action would have greater impacts on visual resources in the short-term, during the construction period. The intensity of these impacts would vary depending upon the location of the viewer and the distance from the Project area. Long-term visual impacts on views from locations outside the Shipyard would be anticipated to be minimal, and the degree of visual contrast between the improvements in the Project area would diminish as the distance between the Project area and the viewer increases.

Potential impacts on views from the following visually sensitive and scenic areas have been evaluated.

- **The Back Channel of the Piscataqua River and the Town of Kittery Shoreline Scenic Area** are located less than 0.25 mile to the northwest of the Shipyard. The Back Channel of the Piscataqua River (located between the Shipyard and the Town of Kittery) and the Town of Kittery Shoreline Scenic Area (which includes the entire shoreline of Kittery, including the Shipyard) would have views of the construction activities related to the in-water work at Dry Dock 3, Berth 12, and Berth 13, especially from the Back Channel, where recreational fishers may be present for extended periods of time. Short-term, moderate impacts are expected to occur during construction. The new in-water facilities, once in operation, would largely blend into the overall appearance of the Shipyard, resulting in minor long-term impacts.
- **The Piscataqua River** main channel is located between the Shipyard and the City of Portsmouth. Views from the main channel to the west, south, and southeast of the Shipyard would include the fitting-out pier. Impacts would be anticipated to be minor to moderate, depending on the viewer, the speed and purpose of travel in the river, and an individual's familiarity with the Shipyard. Each of these variables would influence how the visual changes resulting from the Proposed Action would be perceived. In general, short-term construction activities would cause more intense visual impacts. Following the construction period, the bulkheads at Berths 11, 12, and 13 and the Dry Dock 3 caisson would only be intermittently visible during low tides and times when the berths are not occupied. The new in-water facilities, once in operation, would largely blend into the overall appearance of the Shipyard, resulting in minor long-term impacts.
- **The Wallingford Square Scenic Area** is less than 0.25 miles from the fitting-out pier. In general, construction activities associated with the projects would be the most noticeable, but once in operation, the waterfront improvements would largely blend into the visual setting of the surrounding areas of the Shipyard. Minor short- and long-term impacts would be anticipated to occur.
- **Badgers Island** is located less than 0.25 miles west of the Shipyard. Construction associated with the projects would be visible from properties on the eastern shoreline of the island. Visual impacts would be anticipated to be minor to moderate, dependent on the viewer, the location in which one is viewing the Shipyard, and an individual's familiarity with the Shipyard. Each of these variables would influence how the changes would be perceived. In general, construction activities associated with the projects would be the most noticeable, but once in operation, the improvements would largely blend into the visual setting of surrounding areas of the Shipyard, resulting in minor long-term impacts.
- **Government Street** and **The Kittery Foreside District** are located less than 0.25 miles north of the Shipyard. Views of the Shipyard from Government Street and inland areas of the Kittery Foreside District would be limited due to existing development and vegetation along Kittery's shoreline, while views from the shoreline in the Kittery Foreside District would be more prominent. Given the limited views of the Project area from Government Street and the inland areas of the Kittery Foreside District, the Proposed Action is not expected to result in noticeable visual impacts at these locations. Short- and long-term impacts on views from the shoreline at the Kittery Foreside District would be the same as those impacts described for the Kittery Shoreline Scenic Area above.
- **Prescott Park, Four Tree Island Park, and Peirce Island Park** are located between 0.2 and 0.4 miles south-southwest of the Shipyard. Short- and long-term visual impacts at these locations

would be expected to be minor to moderate, depending on the viewer and the individual's familiarity with the Shipyard. In general, construction activities would be the most noticeable visual aspects of the Proposed Action while, once in operation, the improvements would largely blend into the overall visual setting of the Shipyard, resulting in minor long-term impacts. These impacts would also apply to **the Coastal Byway**, which varies in distance from the Shipyard depending on the route, and the **Portsmouth Historic District (including the Strawbery Banke Historic District),** which is located within 0.5 miles of the Shipyard to the southwest.

Based on the above, Alternative 1 would result in minor to moderate short-term visual impacts during construction and overall minor long-term visual impacts. Short-term impacts would cease once construction is complete. Alternative 1 would not result in significant impacts on visual resources.

4.6.3 Alternative 2

As noted under Alternative 1, in-water construction areas and the presence of construction equipment would result in short-term impacts on visual resources in the study area. Only minor long-term impacts would be anticipated, as the improvements associated with the in-water projects would largely be visible only at the waterline.

4.6.3.1 Potential Impacts

Alternative 2 would result in the same visual impacts as those described above for Alternative 1, the Preferred Alternative. Therefore, Alternative 2 would not result in significant impacts on visual resources.

4.7 Noise

Analysis of potential noise impacts includes estimating likely airborne noise levels from the Proposed Action and determining potential effects on sensitive receptor sites.

To assess the potential severity of temporary noise levels during construction, cumulative noise exposure criteria published by the Federal Transportation Agency (FTA) has been considered. Based on general community reactions to noise at varying levels, the FTA has published a cumulative noise level curve (Figure 4.7-1) that shows that for ambient noise levels such as those existing in suburban areas near the Shipyard, a noise exposure increase of more than approximately 8 A-weighted decibels (dBA) would result in a severe impact. Based on this methodology, in areas where the existing noise exposure is below or at 55 dBA, a noise exposure increase of less than approximately 8 dBA would be noticeable but would be considered moderate to minor (FTA, 2006).

Noise Potential Impacts:

- No Action: No change in existing ambient noise levels. Continued noise from Shipyard operations.
- Alternative 1: Construction would result in a temporary increase in ambient noise levels during daytime hours and minor to moderate impacts at nearest sensitive receptors.
- Alternative 2: Construction would result in a temporary increase in ambient noise levels during daytime hours and moderate impacts at the nearest sensitive receptors. Increases in ambient noise levels during construction would be greater than under Alternative 1.

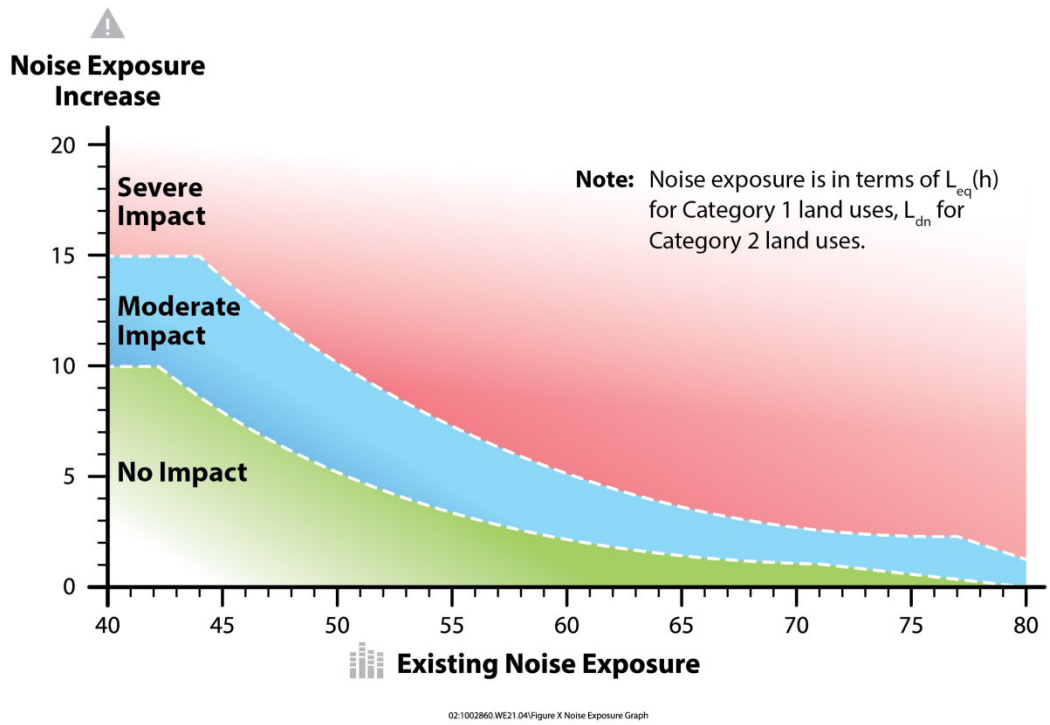

Figure 4.7-1 Increase in Cumulative Noise Levels Allowed by Criteria (dBA)

4.7.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to baseline noise levels. Therefore, no significant impacts on the existing noise environment would occur with implementation of the No Action Alternative.

4.7.2 Alternative 1 (Preferred Alternative)

The study area for noise under Alternative 1 includes areas and receptors within a 0.5-mile radius of the Project sites. Noise-sensitive receptors nearest to each site are identified in Table 3.7-2. The operation of heavy equipment, including pile drivers and trucks during construction at all of the Project sites, would result in short-term noise impacts. This EA evaluates noise metrics relevant to a discussion of noise produced during temporary, intermittent construction operations, as described below.

4.7.2.1 Potential Impacts

Construction of the proposed projects under Alternative 1 would generate temporary noise due to the use of heavy construction equipment and heavy-duty vehicles. In particular, temporary noise during construction would be influenced by the use of vibratory hammers and pile drivers, which have the loudest noise levels associated with general construction equipment. Table 4.7-1 presents the estimated hourly sound equivalent levels (L_{eq}) produced by typical construction equipment that would be used during the proposed projects and how these levels would be perceived at various distances. The hourly L_{eq} describes the cumulative noise exposure that a receptor would perceive from construction equipment over a one-hour period. Combined noise levels from the Project construction equipment operating during an average daytime hour would be expected to be about 96 dBA at a distance of 50

feet. In addition, the Project would generate traffic to and from construction sites, primarily from heavy- and medium-duty trucks used for material and equipment hauling. Generally, noise from trucks has been reported as 84 dBA at 50 feet (Federal Highway Administration [FHWA], 2006).

Table 4.7-2 compares the estimated hourly L_{eq} with two additional noise metrics described in Chapter 3: SEL and the day-night average sound level (DNL). As described in Section 3.9, the SEL describes a receptor's cumulative noise exposure from a single noise event, such as a vehicle passing by or the use of loud equipment over a specific period of time. Generally, people react to the duration of noise events, judging longer events to be more annoying than shorter ones (FTA, 2006). DNL describes a receiver's cumulative noise exposure from all construction noise events over a full 24-hour period, accounting for nighttime sensitivity. DNL is generally used as the measure of cumulative noise impact for residential land uses. Table 4.7-3 shows the predicted DNL at the nearest sensitive receptors identified in Table 3.7-2.

Table 4.7-1 Alternative 1 (Preferred Alternative) Construction Hourly Sound Equivalent Level at Various Distances

Equipment Type	*Number of Units*	*Usage Factor (%)*	*$L_{eq(h)}$ at 50 feet (dBA)*	*$L_{eq(h)}$ (dBA) by Distance (feet)*					
				100	*250*	*500*	*1,000*	*1,500*	*2,000*
Cranes	6	16	85	79	71	65	59	55	53
Drill rig	1	20	78	72	64	58	52	48	46
Compressor (air)	2	40	79	73	65	34	54	49	47
Concrete pump	1	50	78	72	64	58	52	48	46
Diesel hammer	1	20	83	77	69	63	57	53	51
Dozer	1	40	81	75	67	61	55	51	49
Front-end loader	2	40	79	73	65	59	53	49	47
Gas engine vibrator	1	50	82	76	68	62	56	52	50
Gas welding machine	1	40	70	64	56	50	44	40	38
Grader	1	40	81	75	67	61	55	51	49
Hydraulic excavator	1	40	81	75	67	61	55	51	49
Vibratory hammer	1	20	83	77	69	63	57	53	51
Vibratory roller	1	20	78	72	64	58	52	48	46
Vibratory pile driver	1	20	94	88	80	74	68	64	62
Total			96	90	82	76	70	67	64

Source: Federal Highway Administration 2006.

Key:
dBA = Decibel (A-weighted average)
$L_{eq(h)}$ = Hourly Sound Equivalent Level

Table 4.7-2 Alternative 1 (Preferred Alternative) Construction Noise Summary

Project Construction Noise Descriptors	*Estimated Sound Levels (dBA) by Distance (feet)*						
	50	*100*	*250*	*500*	*1,000*	*1,500*	*2,000*
Sound Exposure Level (SEL)	136	130	122	116	110	106	104
Hourly Equivalent Sound Level (L_{eq})	96	90	82	76	70	67	64
Day-Night Average Sound Level (DNL)	82	76	68	62	56	53	50

Key:
dBA = Decibel (A-weighted average)
SEL = Sound exposure level. It describes a receptor's cumulative noise exposure from a single noise event. Louder events have greater SELs than do quieter ones. In addition, events that last longer in time have greater SELs than do shorter ones.
L_{eq} = Equivalent sound level. It describes a receptor's cumulative noise exposure from all events over a 1-hour period of time
DNL = Day-night average sound level. It describes a receptor's cumulative noise exposure from all events over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. Since the Project would only occur during daytime hours, DNL only accounts for daytime construction noise.

Table 4.7-3 Alternative 1 (Preferred Alternative) Cumulative Construction Noise Exposure at Nearest Sensitive Receptors

Project Location	*Nearest Sensitive Noise-Receptor and Relative Location*	*Distance to Receptor (feet)*	*DNL at Receptor (dBA)*	*Project Noise Exposure Increase (dBA)*[1]	*Expected Noise Impact*[2]
Dry Dock 3[3]	Residence north of Dry Dock 3 on Knight Ave, Kittery	690	54	N/A	No Impact
	School northeast of Dry Dock 3, on Williams Ave, Kittery	1,600	47	N/A	No Impact
Berths 11A, 11B, and 11C	Residence building southwest of Berths 11A, 11B, and 11C adjacent to Prescott Park, Portsmouth	1,730	52	N/A	No Impact
Berth 12	Residence northwest of Berth 12, on Island Ave, Badgers Island	740	59	4	Moderate
Berth 13A	Residence northwest of Berth 13A, on Old Armory Way, Kittery	950	57	2	No Impact
Berth 13B	Residence west of Berth 13B, on Island Avenue, Badgers Island	700	59	4	Moderate

Source: Google Earth, 2015; FTA, 2006.
Notes:
(1) It has been assumed that the existing ambient noise level at receptors during daytime hours is equivalent to the Town of Kittery's daytime noise standard of 55 dBA.
(2) Based on the Federal Transportation Administration's noise impact criteria for increase in cumulative noise levels. For an existing noise exposure of 55 dBA, the FTA's allowable DNL noise exposure increase in residential areas is 3 dBA. An increase between 3 and 8 dBA would be a moderate impact, while any increase above 8 dBA would be a severe impact (FTA, 2006).
(3) Estimates for the Dry Dock 3 caisson replacement exclude the use of vibratory hammers and hydraulic excavators.
Key:
dBA = Decibel (A-weighted average)
N/A = Not applicable

Construction of the bulkheads at Berths 11, 12, and 13 would require the use of drilling and pile-driving equipment. This type of equipment along with multiple cranes and compressors would be the dominant sources of noise during construction. Additionally, the proposed projects would require multiple heavy-duty truck trips for material and equipment hauling. As shown in Table 4.7-1, approximately 14 peak-hour daily truck trips would be required for Phase 1 and 10 daily trips for Phase 2. In total, approximately 2,150 truck trips would take place in the course of the Project, or approximately 2,600 total truck trips if Option 1 were selected. The use of heavy-duty equipment and transit of additional vehicles through Gates 1 and 2 would be temporary and intermittent during the proposed construction periods. All construction and material/equipment-hauling activities would occur during daytime hours.

Noise levels decrease by about 6 dBA for each doubling of the distance between the fixed noise source and the receptor. As shown in Table 4.7-3, several sensitive residential receptors have been identified between approximately 690 feet and 1,730 feet from the Project sites. Additionally, Table 3.7-2 identifies residential receptors adjacent to Gates 1 and 2 that would be temporarily exposed to an increase in traffic noise. Sensitive receptors identified in Tables 3.7-2 and 4.7-3 are located in the Town of Kittery, Maine, and the City of Portsmouth, New Hampshire. Construction would be audible (i.e., result in increases in noise levels greater than 3 dBA above ambient noise levels) during daytime hours at the majority of these receptors. However, given the temporary and intermittent nature of the proposed construction work, the short-term impact on nearby residential receptors would be considered minor to moderate.

The Town of Kittery Municipal Code, Title 16, section 16.9.1.9(E) exempts noise created from construction and maintenance activities from the municipal sound pressure level regulations, as long as such activities occur between 7:00 a.m. and 9:00 p.m. Similarly, the City of Portsmouth Noise Control Ordinance exempts construction, demolition, or repair of buildings from local noise standards if those activities are performed between 7:00 a.m. and 6:00 p.m. In particular, the City of Portsmouth prohibits the operation of pile drivers and hammers between 10:00 p.m. and 7:00 a.m. Although these local ordinances do not apply to the Navy, the Navy strives to minimize impacts from construction noise on surrounding communities. As noted, construction would occur only during daylight hours and would be consistent with the requirements established by the Town of Kittery and City of Portsmouth.

Therefore, implementation of Alternative 1 would not result in significant impacts on the noise environment during construction. During Shipyard operations, it is expected that noise levels would be similar to those described in Table 3.7-3, resulting in no increase over baseline levels or long-term noise impacts.

4.7.3 Alternative 2

The study area for noise for Alternative 2 is the same as the study area described for Alternative 1, comprising areas and receptors within a 0.5-mile radius of the Project sites. The noise-sensitive receptors nearest to each of these sites are identified in Table 3.7-2. The operation of trucks and heavy equipment, including pile drivers, during construction at both Project sites would result in short-term noise impacts. Alternative 2 would require additional pile driving at Berths 11, 12, and 13, pile driving at Dry Dock 3, and an increase in peak daily vehicle trips (as shown in Table 4.7-1)—all of which would result in greater short-term noise impacts compared with Alternative 1.

4.7.3.1 Potential Impacts

Alternative 2 would require the same general construction methods and types of equipment described for Alternative 1. However, as shown in Table 2-4, Alternative 2 would require additional pile driving at Berths 11, 12, and 13 because of the use of steel sheet piles to construct the bulkheads and the increase in the number of king piles, and at Dry Dock 3 because of the pile driving and extraction to construct and remove the temporary cofferdam. The increase in number of piles that would be installed during the same period of construction would require additional impact-driving and drilling equipment, resulting in higher hourly L_{eq}, SEL, and DNL levels than those estimated for Alternative 1, as shown in Tables 4.7-4 and 4.7-5 below.

Table 4.7-4 Alternative 2 Construction Noise Summary

Project Construction Noise[1]	*Estimated levels (dBA) by Distance (feet)*						
	50	*100*	*250*	*500*	*1,000*	*1,500*	*2,000*
Sound Exposure Level (SEL)	138	132	124	118	112	109	106
Hourly Equivalent Sound Level (L_{eq})	99	93	85	79	73	69	67
Day-Night Average Sound Level (DNL)	85	79	71	65	59	55	53

Notes:
[1] Project construction noise estimates for Alternative 2 are conservative and assume the use of a total of four vibratory hammers and two pile drivers operating in a single day.

Key:
dBA = Decibel (A-weighted average)
SEL = Sound exposure level. It describes a receptor's cumulative noise exposure from a single noise event. Louder events have greater SELs than do quieter ones. In addition, events that last longer in time have greater SELs than do shorter ones.
L_{eq} = Equivalent sound level. It describes a receptor's cumulative noise exposure from all events over a one-hour period of time
DNL = Day-night average sound level. It describes a receptor's cumulative noise exposure from all events over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. Since Project activities would only occur during daytime hours, DNL only accounts for daytime construction noise.

Although construction activities would be temporary and intermittent, as shown in Table 4.7-5, simultaneous operation of loud equipment would likely exceed existing DNL by more than 3 dBA at the nearest residential receptors to Dry Dock 3 and Berths 12 and 13, resulting in a short-term, moderate impact during construction. Based on the Federal Transportation Administration's noise impact criteria for increase in cumulative noise levels in residential areas, an increase between 3 and 8 dBA would be a moderate impact in residential areas with ambient noise levels of 55 dBA, while any increase above 8 dBA would be a severe impact (FTA, 2006). In the event the operation of additional impact-driving and drilling equipment results in an increase over 8 dBA, impacts on the nearest sensitive receptors would be significant.

Table 4.7-5 Alternative 2 Construction Noise Exposure at Nearest Sensitive Receptors

Project Location	*Nearest Sensitive Receptor and Relative Location*	*Distance to Receptor (feet)*	*DNL at Receptor (dBA)[1]*	*Project Noise Exposure Increase (dBA)[2]*	*Expected Noise Impact[3]*
Dry Dock 3	Residence north of Dry Dock 3 on Knight Avenue, Kittery	690	62	7	Moderate
	School northeast of Dry Dock 3, on Williams Avenue, Kittery	1,600	55	0	No impact
Berths 11A, 11B, and 11C	Residence building southwest of Berths 11A, 11B, and 11C adjacent to Prescott Park, Portsmouth.	1,730	54	N/A	No impact
Berth 12	Residence northwest of Berth 12, on Island Avenue, Badgers Island	740	61	6	Moderate
Berth 13A	Residence northwest of Berth 13A, on Old Armory Way, Kittery	950	59	4	Moderate
Berth 13B	Residence west of Berth 13B, on Island Avenue, Badgers Island	700	62	7	Moderate

Source: Google Earth, 2015; FTA, 2006.

Notes:
(1) Project construction noise estimates for Alternative 2 are conservative and assume the use of a total of four vibratory hammers and two pile drivers operating at a single day.
(2) It has been assumed that the existing ambient noise level at receptors during daytime hours is equivalent to the Town of Kittery's daytime noise standard of 55 dBA.
(3) Based on Federal Transportation Administration's noise impact criteria for increase in cumulative noise levels. For an existing noise exposure of 55 dBA, the FTA's allowable DNL noise exposure increase in residential areas is 3 dBA. An increase between 3 and 8 dBA would be a moderate impact, while any increase above 8 dBA would be a severe impact (FTA, 2006).

Key:
dBA = Decibel (A-weighted average)
N/A = Not applicable
SPL = Sound pressure level

Therefore, implementation of this alternative could result in short-term moderate impacts on the noise environment during construction. During Shipyard operations, it is expected that noise levels would be similar to those described in Table 3.7-3, resulting in no increase over baseline levels or long-term noise impacts.

4.8 Infrastructure

This section analyzes the magnitude of anticipated increases or decreases in public works infrastructure demands, considering historic levels, existing management practices, and storage capacity, and evaluates potential impacts on public works infrastructure associated with implementation of the alternatives for the Proposed Action. Impacts are evaluated by whether they would result in the use of a substantial proportion of the remaining system capacity, reach or exceed the current capacity of the system, or require development of facilities and sources beyond those existing or currently planned.

Infrastructure Potential Impacts:

- No Action Alternative: No changes to existing infrastructure at the Shipyard.
- Alternative 1: Short-term, minor impacts would result from the need to dispose of construction and demolition debris. Negligible impacts on stormwater management and energy use would result.
- Alternative 2: Short- and long-term impacts would be similar to those under Alternative 1.

4.8.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and there would be no change to the existing infrastructure of the Shipyard. Therefore, no significant impacts on infrastructure would occur with implementation of the No Action Alternative.

4.8.2 Alternative 1 (Preferred Alternative)

The study area for potential impacts on infrastructure is Portsmouth Naval Shipyard. Alternative 1 would not result in increases in demand for utilities that would affect or require upgrade of utility infrastructure in the surrounding community. Therefore, Alternative 1 would not result in impacts on utility infrastructure off the Shipyard.

Work on the pier surface at Berths 11, 12, and 13 during construction may affect underground utility infrastructure. Construction would result in solid waste that would need to be collected at each project site for disposal, and ground-disturbance during construction may affect stormwater management at the Shipyard.

4.8.2.1 Potential Impacts

Stormwater

Berths 11, 12, and 13 structural repairs would require extending existing storm drain outfalls located along these berths through the proposed fill and concrete shutter panels to discharge on the water side of the proposed bulkheads. Storm drains along the berths, which collect and discharge stormwater from inland facilities and paved areas of the CIA, would be relocated and repaired as necessary to address existing deterioration of the drains or prevent future maintenance issues. New pipes installed at the ends of the drains would be increased to the next-largest size of pipe to allow for future changes to stormwater infrastructure. Drainage openings in the concrete pier deck that discharge stormwater runoff from the pier directly to the river would remain in place (MN-FST 2015a).

Following construction of the bulkheads, the existing timber pier deck would be extended outward to the new berth faces, which would expand the surface of the pier deck by an estimated 17,275 square feet (0.40 acres). Stormwater collected on the new deck surface would drain directly to the river. The proposed Berths 11, 12, and 13 structural repairs would not result in the conversion of pervious surface

to impervious surface and would not substantially change the pre-development hydrology of the fitting-out pier because precipitation falling on the timber pier deck extension would drain directly to the river. Therefore, the proposed Berths 11, 12, and 13 structural repairs under Alternative 1 would be exempt from the requirements of section 438 of the Energy Independence and Security Act of 2007. The proposed Project also would be exempt from the Navy's Low Impact Development policy, which applies to projects that alter the pre-development hydrology of a site. Short- and long-term impacts on stormwater management resulting from this Project would be negligible.

The proposed Dry Dock 3 caisson replacement and concrete sill repairs would not affect stormwater infrastructure at the dry dock or result in any increases in impervious surface; therefore, this Project would not result in impacts on stormwater management.

Solid Waste Management

Solid waste generated under Alternative 1 would consist of construction and demolition (C&D) debris from removal of concrete and wood decking, utility infrastructure, and the timber fender system at Berths 11, 12, and 13 and Dry Dock 3, and limited quantities of hazardous waste (discussed in Section 4.10). The construction contractor would be responsible for collecting, managing, and disposing of C&D debris and other solid waste generated by each project.

Alternative 1 would generate an estimated 132,300 cubic feet (4,900 cubic yards) of solid waste, including dredge spoils, at Berths 11, 12, and 13. A smaller amount of solid waste, including an estimated 16,200 cubic feet (600 cubic yards) of concrete and 7,000 pounds of steel would be generated at Dry Dock 3. The amount of solid waste generated under Alternative 1 would be minimized through salvaging or recycling materials removed from the berths and dry dock to the greatest extent practicable. The construction contractor would comply with Navy requirements for solid waste management, which conform to applicable federal, state, and local regulations intended to protect the environment through management of solid waste. The requirements address work practices that would be implemented to ensure that the amount of solid waste generated is minimized, solid waste is recycled to the extent practicable, and solid waste that cannot be salvaged or recycled is disposed of in an environmentally responsible manner at permitted and approved C&D debris landfills. Solid waste generated under Alternative 1 is not expected to exceed the capacities of regional recycling and landfill facilities; therefore, implementation of Alternative 1 would have a negligible short-term impact on solid waste management. Implementation of Alternative 1 would have no long-term impacts on solid waste management on the Shipyard. Following implementation of Alternative 1, the Shipyard would continue to manage solid waste under standard operating procedures.

Dredge spoils exceeding MEDEP Solid Waste Management Rules (Chapter 418) criteria for toxicity would be disposed of by the construction contractor at an authorized landfill in accordance with the requirements of the solid waste management rules and regulations (38 M.R.S.A. section 1301) (MN-FST, 2015b). The volume of dredge spoils disposed of under this alternative would be reduced as much as practicable through reuse of dredged sediments for construction or other purposes. The volume of dredge spoils potentially requiring disposal is not expected to exceed the capacity of regional landfills; therefore, Alternative 1 would have short-term, minor impacts on solid waste management, and no long-term impacts are expected.

Energy

Construction of the proposed in-water projects may result in a minor short-term increase in the consumption of energy at the Shipyard as a result of the operation of construction equipment. However, construction projects are in progress on an ongoing, regular basis at the Shipyard, so any increase in electrical consumption would be minor and within the range of normal electricity use at the Shipyard.

Relocation or removal of electrical infrastructure would be required during the Berths 11, 12, and 13 structural repairs, particularly at Berth 11A. This infrastructure would be removed and reinstalled, replaced, or not replaced as warranted by operational requirements. For instance, conduits connected to floodlights at the piers would be removed and the lights replaced with solar-powered floodlights (MN-FST, 2015b). No work on the electrical system at Dry Dock 3 would be required as part of the Dry Dock 3 caisson replacement project (Appledore Marine Engineering, n.d.).

The Proposed Action would not result in any changes in Shipyard operations; therefore, electrical consumption at the Shipyard following completion of the berth structural repairs and Dry Dock 3 caisson replacement is not expected to change, and negligible short- or long-term impacts on Shipyard or regional electrical infrastructure would result.

Based on the above, implementation of Alternative 1 would not result in significant impacts on infrastructure.

4.8.3 Alternative 2

The study area for potential impacts on infrastructure is Portsmouth Naval Shipyard. Alternative 2 would not result in increases in demand for utilities that would affect or require upgrading of utility infrastructure in the surrounding community. Therefore, Alternative 1 would not result in impacts on utility infrastructure off the Shipyard.

Ground-disturbance at Berths 11, 12, and 13 during construction may affect buried utility infrastructure. Construction would result in solid waste that would need to be collected at each project site for disposal and may affect stormwater management at the Shipyard.

4.8.3.1 Potential Impacts

Impacts on Shipyard utilities and infrastructure under Alternative 2 would be similar to those described under Alternative 1 for each of the proposed waterfront improvement projects. The different in-water construction techniques proposed for the Berths 11, 12, and 13 structural repairs project under Alternative 2 would not result in substantially different impacts on infrastructure at these berths because the same areas would be impacted during construction. The extent of the concrete pier deck and timber fender system at Berths 11, 12, and 13 that would be demolished under Alternative 2, with and without Option 1, would be the same as the extent demolished under Alternative 1. The construction techniques proposed under Alternative 2 would not generate a greater amount of solid waste or C&D debris.

Impacts on solid waste management under Alternative 2 would be similar to those described under Alternative 1. However, Alternative 2 would require more dredging than Alternative 1 since the temporary cofferdam footprint at Dry Dock 3 also would be dredged, and a larger volume of dredge spoils would be disposed of under this alternative. Dredge spoils would be disposed of at an authorized landfill in accordance with the Maine Solid Waste Management rules and regulations. Based on the

small area that would be dredged at Dry Dock 3 (an estimated 7,458 square feet), Alternative 2 would result in greater, but still minor, impacts on solid waste management.

Like Alternative 1, Alternative 2 would result in short-term minor and no long-term impacts on infrastructure. Implementation of this alternative would not result in significant impacts on infrastructure.

4.9 Transportation

The transportation analysis considers the impact of the construction traffic likely to be generated over the course of the Proposed Action on the local transportation network, as well as any permanent changes in transportation patterns that may result from the Proposed Action.

Transportation Potential Impacts:

- No Action Alternative: No change in existing transportation conditions.
- Alternative 1: Temporary, minor increases in vehicle traffic would occur during construction but would result in no significant impact.
- Alternative 2: Average peak and daily vehicle trips during construction would be slightly higher under Alternative 2. No significant impact on transportation would result.

4.9.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur, and no changes would occur to current transportation conditions. Therefore, no significant impacts would occur with implementation of the No Action Alternative.

4.9.2 Alternative 1 (Preferred Alternative)

The study area encompasses the Shipyard and the transportation network that provides access to the Shipyard, as described in Section 3.11.

Alternative 1 would require transportation of equipment and materials via trucks and construction workers via personal vehicles to and from the Project sites to complete the waterfront improvement projects. It is anticipated that the cranes that would be used to complete in-water work at the berths would be delivered to the Project site via barge.

4.9.2.1 Potential Impacts

A short-term increase in truck and privately owned vehicle (POV) traffic in the vicinity of the Shipyard would occur during construction under Alternative 1 because demolition waste, dredged sediments, and drill spoils captured during drilling would be transported to approved regional recycling facilities or landfills; construction equipment, fill material, concrete, king piles, steel sheet piles, and other construction materials would be transported to the Project sites; and construction workers would commute to and from the sites. Table 4.9-1 shows average and peak truck and POV trips during each phase of construction. Delivering fill material to the Project site at Berths 11, 12, and 13 would account for the majority of the truck trips. In total, approximately 3,150 truck trips would take place in the course of the Project, or approximately 3,700 total truck trips if Option 1 were selected.

POV trips would account for the majority of overall vehicle trips during construction of the waterfront improvement projects. As shown in Table 4.9-1, the estimated peak trip numbers are also used as conservative proxies for the average trips. In total, approximately 14,500 POV trips would occur during the six-year-long construction period for the Proposed Action or 20,500 total POV trips if Option 1 were selected. The numbers of POV trips shown in Table 4.9-1 are conservative estimates. Because parking is

limited on the Shipyard, some carpooling would be expected, which would reduce the number of trips. In addition, the number of personnel required at the Project sites would vary depending on the phase of construction; therefore, the actual average POV and total vehicle trips are expected to be less than the averages shown in the table.

Table 4.9-1 Average Daily Truck Trips and Privately Owned Vehicle (POV) Trips for the Proposed Waterfront Improvement Projects, Alternatives 1 (Preferred Alternative) and 2

Construction Phase	*Average Daily Truck Trips*	*Peak Daily Truck Trips*	*Average Daily POV Trips*	*Peak Daily POV Trips*	*Average Daily Trips (Truck + POV)*	*Peak Daily Trips (Truck + POV)*
Alternative 1, Phase 1 (Berth 11 structural repairs and Dry Dock 3 caisson replacement)	2	18	34	34	36	52
Alternative 1, Phase 1, Option 1	3	18	58	58	61	76
Alternative 1, Phase 2	5	18	24	24	29	42
Alternative 2, Phase 1 (Berth 11 structural repairs and Dry Dock 3 caisson replacement)	2	18	43	43	45	61
Alternative 2, Phase 1, Option 1	3	18	68	68	71	86
Alternative 2, Phase 2	4	18	24	24	28	42

Because construction work on Berth 11 would overlap in time with work on the Dry Dock 3 caisson replacement, under Alternative 1 there could be up to 61 total truck and POV trips on average and 76 truck and POV trips on peak work days if Option 1 is selected. The peak number of truck trips would be anticipated to occur during the Project stages requiring loads of fill to be delivered to Berths 11, 12, and 13.

Table 4.9-2 shows this overall peak daily construction traffic as a percentage of the measured average annual daily traffic (AADT) of local roads and highways around the Shipyard. As shown in Table 4.9-2, 76 daily trips, the highest estimated peak daily number of trips, would be at or below 1 percent of the AADT for most of the listed roads and 3 percent or less of the AADT for all of the listed roads.

Table 4.9-2 Overall Peak Construction Traffic as a Percentage of Existing Average Annual Daily Traffic (AADT), Alternative 1 (Preferred Alternative)

Road	*Section*	*AADT (Year)*	*Overall Peak Construction Traffic (% of AADT)*
Interstate 95	Northbound at the New Hampshire State line	36,320 (2014)	<1%
	Southbound at the New Hampshire state line	37,500 (2014)	<1%
U.S. Route 1	At the New Hampshire State line (Memorial Bridge) (Northbound and Southbound)[1]	8,650 (2010)	1%
	Northbound north of State Route (S.R.) 103 (Walker Street)	4,110 (2013)	2%
	Southbound south of S.R. 103 (Walker Street)	4,420 (2010)	2%

Table 4.9-2 Overall Peak Construction Traffic as a Percentage of Existing Average Annual Daily Traffic (AADT), Alternative 1 (Preferred Alternative)

Road	*Section*	*AADT (Year)*	*Overall Peak Construction Traffic (% of AADT)*
U.S. Route 1 Bypass	At the New Hampshire State line (Sarah Mildred Long Bridge) (Northbound and Southbound)[1]	15,670 (2011)	<1%
	Northbound southwest of U.S. Route 1	4,110 (2010)	2%
	Southbound southwest of U.S. Route 1	2,640 (2010)	3%
S.R. 236 (Shapleigh Road)	Southeast of Rogers Road (Northbound and Southbound)[1]	12,070 (2013)	1%
S.R. 103 (Walker Street)	East of U.S. Route 1 (Eastbound and Westbound)[1]	8,460 (2013)	1%

Source: Maine Department of Transportation, 2015

[1] Where both directions are indicated, AADT indicates total number of vehicles traveling in both directions.

This level of traffic would not be expected to result in significant impacts on transportation on local roads.

In terms of traffic entering and exiting the Shipyard, construction traffic would not be expected to have a significant impact on overall Shipyard traffic congestion during the course of the Project. The recent repairs to Bridge 1 would allow construction traffic (and all traffic) to flow over both Bridge 1 and Bridge 2. Construction traffic for the Proposed Action represents only a small fraction of total daily trips in and out of the Shipyard, and the Shipyard is accustomed to accommodating multiple construction projects at any given time.

Therefore, construction under Alternative 1 would result in short-term, minor impacts on transportation. There would be no long-term or significant impacts on the local transportation network or Shipyard traffic under Alternative 1.

4.9.3 Alternative 2

Alternative 2 would also require transportation of equipment and materials via trucks, and construction workers via personal vehicles, to and from the Project sites to complete the waterfront improvement projects. As in Alternative 1, it is anticipated that the cranes that would be used to complete in-water work at the berths would be delivered to the Project site via barge. Alternative 2 would require transporting additional materials and fill to Dry Dock 3 for construction of the temporary cofferdam.

4.9.3.1 Potential Impacts

As under Alternative 1, a short-term increase in truck and POV traffic in the vicinity of the Shipyard would occur during construction under Alternative 2 because demolition waste and drill and dredge spoils would be transported to approved regional recycling facilities or landfills; equipment and materials would be transported to and from the Project sites; and construction workers would commute to and from the sites. The average and peak daily truck trips, POV trips, and total trips under Alternative 2 were calculated the same way as under Alternative 1. As shown in Table 4.9-1, the differences in construction materials and equipment needed for Alternative 2 result in a slightly higher number of

average and peak daily POV trips relative to Alternative 1. However, as shown in Table 4.9-3, the overall peak daily construction traffic of 86 trips under Alternative 2, expressed as a percentage of the measured AADT of local roads and highways around the Shipyard, would be the same as under Alternative 1. Therefore, as under Alternative 1, construction of Alternative 2 would result in short-term, minor impacts on transportation, and there would be no long -term or significant impacts on the local transportation network.

Table 4.9-3 Overall Peak Construction Traffic as a Percentage of Existing Average Annual Daily Traffic (AADT), Alternative 2

Road	*Section1*	*AADT (Year)*	*Overall Peak Construction Traffic (% of AADT)*
Interstate 95	Northbound at the New Hampshire State line	36,320 (2014)	<1%
	Southbound at the New Hampshire State line	37,500 (2014)	<1%
U.S. Route 1	At the New Hampshire State line (Memorial Bridge) (Northbound and Southbound)[1]	8,650 (2010)	1%
	Northbound north of State Route (S.R.)103 (Walker Street)	4,110 (2013)	2%
	Southbound south of S.R. 103 (Walker Street)	4,420 (2010)	2%
U.S. Route 1 Bypass	At the New Hampshire State line (Sarah Mildred Long Bridge) (Northbound and Southbound)[1]	15,670 (2011)	1%
	Northbound southwest of U.S. Route 1	4,110 (2010)	2%
	Southbound southwest of U.S. Route 1	2,640 (2010)	3%
S.R. 236 (Shapleigh Road)	Southeast of Rogers Road (Northbound and Southbound)[1]	12,070 (2013)	1%
S.R. 103 (Walker Street)	East of U.S. Route 1 (Eastbound and Westbound)[1]	8,460 (2013)	1%

Source: Maine Department of Transportation, 2015

[1] Where both directions are indicated, AADT indicates total number of vehicles traveling in both directions.

4.10 Hazardous Materials and Wastes

The hazardous materials and wastes analysis addresses issues related to the use and management of such materials and wastes.

4.10.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and there would be no change associated with hazardous materials and wastes. Routine Shipyard activities would continue to involve the use of hazardous materials, the generation of hazardous waste, and the proper handling of special hazards (asbestos-containing material [ACM], lead-based paint [LBP], and polychlorinated biphenyls [PCBs]). No significant impacts would occur with implementation of the No Action Alternative.

Hazardous Materials and Wastes Potential Impacts:

- No Action: No change associated with hazardous materials and wastes.
- Alternative 1: Negligible impacts would result from handling hazardous materials, generating and managing hazardous waste, and handling materials with special hazards.
- Alternative 2: Impacts would be the same as under Alternative 1.

4.10.2 Alternative 1 (Preferred Alternative)

The study area for defining potential impacts on the environment from hazardous materials and wastes encountered during or generated by Alternative 1 is the immediate Project area. Construction activities for the proposed waterfront improvement projects may involve using hazardous materials, generating hazardous waste, or handling materials with special hazards.

4.10.2.1 Potential Impacts

Hazardous Materials

Hazardous materials used to install the bulkheads and piles and replace the Dry Dock 3 caisson would be used in accordance with the Navy's Hazardous Material Control and Management Program. Following that program would ensure that only the hazardous materials essential to performing the work are used. Such hazardous materials would consist of construction adhesives, solvents, chemicals, sealants, paints, and welding gases, as well as oil and fuel to operate vehicles and equipment.

Work near the above-ground storage tanks that are currently in the Project area would be performed in accordance with the Shipyard's SPCC Plan to prevent the discharge of oil into the waters of the Piscataqua River. Similarly, work around any underground storage tanks in the Project area would be conducted in accordance with Resource Conservation and Recovery Act (RCRA) regulations (40 CFR parts 280 to 282) and state regulations to prevent and respond to any spills or releases.

Compliance with federal and state regulations and Navy procedures for working with hazardous materials would result in negligible impacts. Therefore, implementation of Alternative 1 would not result in significant impacts from the handling or presence of hazardous materials.

Hazardous Waste

Some RCRA hazardous wastes would be generated during installation of the bulkheads and piles and replacement of the Dry Dock 3 caisson under Alternative 1. Operation of heavy equipment and machinery and other demolition and construction tasks would result in the generation of hazardous wastes such as oils, chemicals, solvents, and paints, and universal wastes such as batteries. Construction personnel would be required to manage hazardous waste in accordance with federal and state requirements and with Shipyard Instruction 5090.30A, Hazardous Waste Generator Standards.

As discussed in Section 3.10.2.2, sediments in areas adjacent to Berths 11, 12, and 13 contain petroleum hydrocarbons and arsenic at concentrations exceeding Maine remedial action guideline standards. Sediments in certain areas near Berth 11 contain lead and arsenic at levels sufficiently above MEDEP Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418) that the sediment would not be able to be reused at the site and would require specialized disposal (MN-FST, 2015b). Other waste soil, sediments, and materials generated under Alternative 1 that similarly contain elevated levels of hazardous constituents above state standards would be subject to management under the same rules as well as applicable federal and state hazardous waste management regulations. Any mercury-containing light bulbs that are removed from fluorescent light fixtures at Dry Dock 3 during replacement of the caisson would be managed and properly disposed of as a hazardous waste. The Navy will require the construction contractor to prepare and implement a Health and Safety Plan to include detailed plans for the handling and storage of contaminated sediments before the start of construction.

Negligible impacts would result because only small quantities of hazardous waste would be generated, and the Navy and contractors would comply with a framework of federal and state regulations and Navy

procedures for the management of hazardous waste. Therefore, implementation of Alternative 1 would not result in significant impacts from the generation and management of hazardous waste.

Special Hazards (Asbestos-containing Material, Lead-based Paint, Polychlorinated Biphenyls)

Based on the age of the Shipyard, it can be assumed that ACM and LBP could be present in older structural components in the Project area. LBP has been reported to be present on Berths 11, 12, and 13 and on certain exterior surfaces of the Dry Dock 3 caisson. ACM and LBP would be removed, managed, and properly disposed of in accordance with federal and state requirements that ensure that human health and the environment are protected. Those requirements address ACM and LBP removal and disposal, worker safety, and air quality. ACM also would be managed in accordance with Shipyard Instruction 5100.92, Asbestos Operations & Maintenance Program Manual.

As discussed in Section 3.10.2.3, sediment in certain areas near Berth 13 contains PCBs at levels above MEDEP Solid Waste Management Rules for Beneficial Use of Solid Wastes (Chapter 418) but at levels sufficiently low that the sediment could be reused at the site (MN-FST, 2015b). Other waste soil, sediment, and materials generated under Alternative 1 that contain elevated levels of PCBs would be managed in accordance with federal and state requirements and with Shipyard Instruction 5090.30A, Hazardous Waste Generator Standards, which addresses the handling of waste PCBs.

Negligible impacts would result because only small quantities of wastes containing special hazards would be generated, and the Navy and contractors would comply with a framework of federal and state regulations and Navy procedures for the management of special hazards. Therefore, implementation of Alternative 1 would not result in significant impacts from the management of special hazards.

4.10.3 Alternative 2

The study area for defining potential impacts on the environment from hazardous materials and wastes encountered during or generated by Alternative 2 is the immediate Project area. Like Alternative 1, construction activities under Alternative 2 may involve using hazardous materials, generating hazardous waste, or handling materials with special hazards.

4.10.3.1 Potential Impacts

The potential impacts on the environment from using hazardous materials, generating and managing hazardous waste, and handling materials with special hazards would be the same for Alternative 2 as described for Alternative 1.

4.11 Summary of Potential Impacts on Resources and Impact Avoidance and Minimization

A summary of the potential impacts associated with each of the action alternatives and the No Action Alternative and impact avoidance and minimization measures are presented in Tables 4.11-1 and 4.11-2, respectively. Table 4.11-2 provides a comprehensive list of all mitigation requirements associated with the Proposed Action.

Table 4.11-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Air Quality	No change in emissions. No change in the vulnerability of Shipyard waterfront infrastructure to the impacts of climate change.	Annual direct emissions of criteria pollutants during construction and after implementation would not result in significant impacts on air quality. The temporary increase in greenhouse gas (GHG) emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region. The vulnerability of Shipyard waterfront infrastructure to the impacts of climate change would be reduced.	Annual direct emissions of criteria pollutants during construction and after implementation would not result in significant impacts on air quality. This temporary increase in GHG emissions from construction would not have an impact on GHG emission totals at the Shipyard or in the region. The vulnerability of Shipyard waterfront infrastructure to the impacts of climate change would be reduced.
Water Resources	No change in water resources.	Short-term minor impacts on surface water, wetlands, and marine sediments would result from disturbance and potential water quality impacts during construction. No impact on the floodplain would occur. Short-term impacts would be minimized through use of standard best management practices (BMPs) and compliance with applicable federal and state permits and regulations. Long-term, minor impacts on wetlands would result from permanent filling of approximately 95,400 square feet to 117,200 square feet (with Option 1) of the Piscataqua River. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the Maine Department of Environmental Protection (MEDEP) prior to the start of construction.	Greater short-term impacts during construction would result from additional pile driving and the construction of a temporary cofferdam under this alternative. No impact on the floodplain would occur. Short-term impacts would be minimized through use of standard BMPs and compliance with applicable permits and regulations and would be minor. Temporary and permanent fill would impact an area of approximately 106,258 square feet to 126,258 square feet (with Option 1) of the Piscataqua River. Compensatory mitigation for the loss of coastal habitat functions and values as a result of the proposed fill will occur in the form of an in lieu fee paid to the MEDEP prior to the start of construction.

Table 4.11-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Bathymetry	No changes to bathymetry in the Project area.	Long-term, minor impacts on bathymetry at Berths 11, 12, and 13 would result from permanent removal of river bottom. The Proposed Action would not affect navigation in the Piscataqua River.	Long-term, minor impacts on bathymetry at Berths 11, 12, and 13 would result from permanent removal of river bottom. Temporary and minor impacts on bathymetry at Dry Dock 3 would result from dredging and fill during construction. The Proposed Action would not affect navigation in the Piscataqua River.
Cultural Resources	No change to existing cultural resources in the Project area.	As evaluated under the National Environmental Policy Act (NEPA), no direct impacts on archaeological resources are anticipated, and direct and indirect impacts on architectural resources would be minimal to moderate. As evaluated under section 106, no effects on archaeological resources that are historic properties are expected. Replacement of the Dry Dock 3 caisson would result in an adverse effect on Dry Dock 3, a contributing resource within the Portsmouth Naval Shipyard Historic District. The Navy has determined that no other architectural resources that are historic properties in the areas of potential effect (APEs) for the waterfront improvement projects would be adversely affected. The Navy has consulted with the Maine State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation (ACHP), federally recognized tribes, and other interested parties regarding the finding of an adverse effect on Dry Dock 3, and a Memorandum of Agreement (MOA) between the Navy and Maine SHPO has been executed. No traditional cultural properties have been identified at the Shipyard. The Navy has consulted with federally recognized tribes regarding the Proposed Action under Alternative 1.	As evaluated under NEPA, no direct impacts on archaeological resources are anticipated, and direct and indirect impacts on architectural resources would be minimal to moderate. As evaluated under section 106, no effects on archaeological resources that are historic properties are expected. Replacement of the Dry Dock 3 caisson would result in an adverse effect on Dry Dock 3, a contributing resource within the Portsmouth Naval Shipyard Historic District. The Navy has determined that no other architectural resources that are historic properties in the APEs for the waterfront improvement projects would be adversely affected. A separate consultation with the Maine SHPO, the ACHP, federally recognized tribes, and other interested parties regarding the Dry Dock 3 caisson replacement would be required if this alternative is implemented due to the different in-water construction method. No traditional cultural properties have been identified at the Shipyard.

Table 4.11-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Biological Resources	No change to marine biological resources.	Minor impacts on marine vegetation, fish (including managed essential fish habitat [EFH] species), benthic habitat and species, would occur as a result of disturbance, including from turbidity and in-water noise, and limited mortality during construction and long-term loss of benthic and open water habitat. In-water noise would not result in long-term adverse effects or significant impacts on marine mammal populations. The Navy would implement various mitigation measures in accordance with the Incidental Harassment Authorizations (IHAs) issued for the Project to reduce the number of marine mammals potentially affected by in-water noise. The Navy has consulted with the National Oceanic and Atmospheric Administration NOAA National Marine Fisheries Service (NOAA Fisheries) regarding potential impacts on marine mammals under the Marine Mammal Protection Act (MMPA) under Alternative 1. Through consultation, the Navy and NOAA Fisheries have agreed on the maximum number of potential takes of marine mammals that would be allowed to occur during the first year of construction and the mitigation measures to minimize these impacts. The Navy will comply with the requirements and mitigation measures in the IHA that will be issued prior to the start of in-water construction. The Navy has consulted with NOAA Fisheries regarding potential impacts on EFH for federally managed species under Alternative 1. NOAA Fisheries has determined that Alternative 1 would have minimal adverse effects on EFH. Alternative 1 may affect, but is not likely to adversely affect, two species listed under the ESA, the Gulf of Maine	Impacts resulting from increased pile driving and construction of the temporary cofferdam at Dry Dock 3 would occur over a longer duration and affect a slightly larger area. Overall short- and long-term impacts would be similar to those under Alternative 1 and would be minor. Separate consultations with NOAA Fisheries under section 7 of the Endangered Species Act (ESA) and the MMPA would be required if Alternative 2 is implemented.

Table 4.11-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
		distinct population segment (DPS) of the Atlantic sturgeon and the shortnose sturgeon. The Navy has consulted with NOAA Fisheries regarding the potential effects on listed species under Alternative 1 and received concurrence that the Proposed Action is not likely to adversely affect any listed species that falls under NOAA Fisheries' jurisdiction. The Navy has determined, based on NOAA Fisheries' guidance, that effects on proposed critical habitat for the Gulf of Maine DPS of the Atlantic sturgeon would be insignificant or discountable and conferencing is not required for the Proposed Action under section 7(a)(4). NOAA Fisheries has indicated this determination is appropriate.	
Visual Resources	No change to existing visual resources.	Minor to moderate short-term visual impacts would occur during construction. Short-term impacts would cease once construction is complete. Long-term visual impacts would be minor. No significant impacts on visual resources would occur.	Minor to moderate short-term visual impacts would occur during construction. Short-term impacts would cease once construction is complete. Long-term visual impacts would be minor. No significant impacts on visual resources would occur.
Noise	No change in existing ambient noise levels. Continued noise from Shipyard operations.	Construction would result in a temporary and intermittent increase in ambient noise levels during daytime hours, and minor to moderate impacts at nearest sensitive receptors.	Construction would result in a temporary and intermittent increase in ambient noise levels during daytime hours, and moderate impacts at nearest sensitive receptors. Increases in ambient noise levels during construction would be greater than under Alternative 1 because of the increase in pile driving at Berths 11, 12, and 13 and construction/removal of the temporary cofferdam at Dry Dock 3.

Table 4.11-1 Summary of Potential Impacts on Resource Areas

Resource Area	*No Action Alternative*	*Alternative 1 (Preferred Alternative)*	*Alternative 2*
Infrastructure	No changes to existing infrastructure at the Shipyard.	There would be short- and long-term minor impacts on stormwater management during construction and as a result of expansion of the fitting-out pier deck. Short-term, minor impacts on solid waste management would result from disposal of dredge spoils. No long-term changes in utility demand would result.	There would be short- and long-term minor impacts on stormwater management during construction and as a result of expansion of the fitting-out pier deck. Greater but still short-term, minor impacts on solid waste management would result from disposal of dredge spoils from the berths and Dry Dock 3. No long-term changes in utility demand would result.
Transportation	No change to existing transportation conditions.	Temporary, minor increases in vehicle traffic would occur during construction but would result in no significant impact.	Average peak and daily vehicle trips during construction would be slightly higher under Alternative 2. No significant impact on transportation would result.
Hazardous Materials and Waste	No change associated with hazardous materials and wastes.	Negligible impacts would result from handling hazardous materials, generation and management of hazardous waste and handling materials with special hazards. Small quantities of materials and wastes would be handled. The Navy and contractors would comply with a framework of federal/state regulations and Navy procedures.	Negligible impacts would result from handling hazardous materials, generation and management of hazardous waste and handling materials with special hazards. Small quantities of materials and wastes would be handled. The Navy and contractors would comply with a framework of federal/state regulations and Navy procedures.

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Alternative 1 (Preferred Alternative)					
Compliance with the individual USACE Permit for in-water work at Berths 11, 12, and 13	Will reduce impacts on surface water quality during construction	Measures for evaluating effectiveness will be specified in the final individual USACE permit issued prior to construction.	Measures for implementation and monitoring will be specified in the final individual USACE permit issued prior to construction.	Construction contractor and Navy Public Works Department - Maine	October 2022
Compliance with MEDEP individual NRPA Permit for in-water work at Berths 11, 12, and 13.	Will reduce impacts on surface water quality during construction	Evaluation of effectiveness will be based upon compliance with this and other applicable permits and approvals.	▪ Erosion-control measures described in Department Order #L-21179-26-A-N and subsequent department orders issued for previous Shipyard projects ▪ Compliance with all applicable laws ▪ Compensatory mitigation (in lieu fee) under the Maine In lieu Fee Compensation Program for permanent fill at Berths 11, 12, and 13; would occur in three separate payments corresponding to the phases of the project and Option 1	Construction contractor and Navy Public Works Department - Maine	October 2022
Compliance with Maine General Permit for in-water work at Dry Dock 3	Will reduce impacts on surface water quality during construction	Measures for evaluating effectiveness will be specified in the final Maine General Permit issued prior to construction.	Measures for implementation and monitoring will be specified in the final Maine General Permit issued prior to construction.	Construction contractor and Navy Public Works Department - Maine	August 2018

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with individual NRPA permit for in-water work at Dry Dock 3	Will reduce impacts on surface water quality during construction	Evaluation of effectiveness is based upon compliance with this and other applicable permits and approvals.	▪ Erosion-control measures described in Department Order #L-21179-26-A-N and subsequent department orders issued for previous Shipyard projects ▪ Compliance with all applicable laws ▪	Construction contractor and Navy Public Works Department - Maine	August 2018
Compliance with the MEDEP Water Quality Certification, issued as part of the NRPA permitting process, for in-water work at Dry Dock 3	Will reduce impacts on surface water quality during dewatering operations	Evaluation of effectiveness is based on compliance with the State of Maine's water quality laws.	Implementing and monitoring measures will be the same as those specified for the Maine General Permit and individual NRPA permit issued for the project.	Construction contractor and Navy Public Works Department - Maine	October 2022
Compliance with the Shipyard's Site Location of Development Law permit for in-water work at Berths 11, 12, and 13 and Dry Dock 3	Will reduce impacts on surface water quality during construction	Submittal of reports and information demonstrating compliance as requested by the MEDEP	▪ Erosion control measures described in Department Order #L-21179-26-A-N and subsequent department orders issued for previous Shipyard projects ▪ Best management practices to ensure no noticeable erosion of soils or fugitive dust emissions	Construction contractor and Navy Public Works Department – Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Implementation of a Project-specific dewatering plan for the berth structural repairs	Will reduce the potential for sedimentation in compliance with the Maine Erosion and Sedimentation Control Law	Measures to evaluate effectiveness will be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine in accordance with the Shipyard's wastewater discharge permit (Maine Pollutant Discharge Elimination System Permit #ME 000868).	Discharges must comply with limitations stipulated in the Shipyard's wastewater discharge permit.	Construction contractor and Navy Public Works Department - Maine	October 2022
Implementation of a Stormwater Management/Erosion and Sedimentation Control Plan	Will reduce the potential for erosion and sedimentation in adjacent waters	Measures to evaluate effectiveness will be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine in compliance with applicable laws and permits.	Implementation and monitoring measures will be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine in compliance with applicable laws and permits.	Construction contractor and Navy Public Works Department - Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with requirements of the Memorandum of Agreement with the Maine SHPO	Will minimize adverse effects on Dry Dock 3 in accordance with section 106	Evaluation of effectiveness will be based upon compliance with the MOA, which includes the following: ▪ 100% design drawings to be submitted to the Maine SHPO for review to occur within 15 days and for which concurrence will be sought ▪ Incorporation of Maine SHPO comments in design (if needed) ▪ Acceptance of Level II Maine Historic Engineering Record (MHER) report and associated materials for Dry Dock #3 by the Maine SHPO ▪ Preparation of final MHER documentation for ME SHPO retention and archives at the Shipyard ▪ Adherence to inadvertent discoveries protocol if unanticipated finds occur (see below).	Measures for implementation and monitoring will be consistent with the requirements for the preparation of the MHER report and associated documentation and per the information outlined in the Schedule of Documentation provided by the Maine SHPO on January 26, 2016. Terms of the MOA must be carried out within 10 years from the date of its execution (August 11, 2016). The Navy Public Works Department – Maine Cultural Resources Manager will ensure submittal of appropriate documentation to the SHPO.	Navy Public Works Department - Maine	August 2018

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with ICRMP/MOA procedures for unanticipated discoveries of archaeological resources	Will reduce the risk of adverse effects on previously unidentified archaeological resources	Evaluation of effectiveness is based upon compliance with the procedures outlined within the ICRMP/MOA, which include the following: ▪ Notification within two working days of discovery ▪ Inspection of the work site within two days by a qualified archaeologist ▪ Consultation regarding the establishment of the site boundary ▪ Determination of a site's significance ▪ If needed, preparation of a report outlining appropriate mitigation measures	Measures for implementation and monitoring will consist of the provision of cultural resource policies for inadvertent discoveries to contractor(s) conducting work and, if needed, an archaeological monitor. If necessary, a monitoring report will be prepared for submittal to the Public Works Department – Maine Cultural Resources Manager	Navy Public Works Department – Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with ICRMP/MOA procedures for unanticipated discoveries of human remains	Will ensure proper handling of unanticipated discoveries of human remains	Evaluation of effectiveness is based upon compliance with the procedures outlined within the ICRMP/MOA and in accordance with the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the Archaeological Resources Protection Act (ARPA), and other guidance, including Navy OPNAV Instruction 11170.2A.	Measures for implementation and monitoring will consist of the provision of cultural resource policies for inadvertent discoveries to contractor(s) conducting work and if needed, employing an archaeological monitor. If necessary, a monitoring report will be prepared for submittal to the Public Works Department – Maine CRM.	Navy Public Works Department – Maine	October 2022
Mitigation measures under IHAs issued for each year of in-water construction	Will reduce risk of impacts on marine mammals as a result of pile driving during in-water construction at Berths 11, 12, and 13	A draft report will be submitted to NOAA Fisheries Service within 45 calendar days of the completion of acoustic measurements and marine mammal monitoring. The results will be summarized in graphical form and include summary statistics and time histories of sound values based upon the data from the piles monitored for this IHA period. A final report will be prepared and submitted to NOAA Fisheries within 30 days following receipt of comments on the draft report from NOAA Fisheries.	▪ The Navy will monitor the shutdown zone and safety zone before, during, and after pile-driving activities using marine mammal observers (MMOs). ▪ At a minimum, the following information will be collected on the sighting forms: date and time that pile driving or removal begins or ends, activities occurring during each observation period; weather parameters identified in the acoustic monitoring (e.g., wind, humidity, temperature); tide state	Construction contractor and Navy Public Works Department - Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
		Similar reports will be submitted during subsequent IHA periods.	and water currents; visibility; species, numbers, and, if possible, sex and age class of marine mammals; marine mammal behavior patterns observed, including bearing and direction of travel, and, if possible, the correlation to SPLs; distance from pile-driving activities to marine mammals and distance from the marine mammal to the observation point; locations of all marine mammal observations; other human activity in the area. ▪ Mitigation measures include stopping all pile driving if an animal is within or approaching the shutdown zones (180 feet [55 meters] for vibratory pile-driving and 246 feet [75 meters] for impact pile-driving), monitoring the Level A zones at all times (1,102 feet [336 meters] for harbor porpoises and		

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
			495 feet [151 meters] for seals), and dispersing monitors broadly enough around the project area for coverage of the Level A zones during all impact-pile driving and Level B zones during two-thirds of all pile-driving. ▪ The Navy will monitor the shutdown zone before, during, and after pile-driving activities using MMOs. ▪ The Navy will implement in situ acoustic monitoring efforts to measure SPL from in-water construction activities. The Navy will collect and evaluate acoustic sound record levels for 10 percent of the pile-driving activities conducted, sufficient to confirm measured contours associated with the acoustic ZOIs. Acoustic sound recordings will be collected sufficient to document sound source levels for 10 percent of		

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
			the proposed piles to be driven and extracted.		
Lobster relocation at Berths 11, 12, and 13	Will reduce risk of impacts on lobsters	Effectiveness will be determined according to measures stipulated in lobster relocation plans coordinated with the Maine Department of Marine Resources prior to implementation.	Before beginning in-water construction at Berths 11, 12, and 13 and the Dry Dock 3 caisson, lobsters within the in-water construction areas will be physically removed and relocated to mitigate possible injury or loss of individuals. Trapping via ventless traps will be completed at each Project site not more than two weeks prior to the start of in-water construction.	Navy Public Works Department – Maine	October 2022
Compliance with the proposed mitigation developed during ESA section 7 consultation for the Project	Will minimize noise-related impacts on the Atlantic sturgeon and shortnose sturgeon	The contractor is responsible for ensuring underwater noise does not exceed specified noise level limits. Excessive underwater noise will be mitigated through use of appropriate measures (i.e., changing hammer type, reducing driving duration, reducing force settings on the hammer, cushion blocks, etc.). The contractor shall employ all reasonable and prudent measures, including but not limited to those listed above.	▪ Temporary silt curtains and booms would be installed off of Berths 11 and 13 and Dry Dock 3 during construction. ▪ Noise levels shall not exceed sound level limits of 187 dB accumulated SEL and 206 dB peak. ▪ Noise levels greater than 150 dB rms shall not exceed 12 consecutive hours in a 24-hour period and a 12-hour recovery period (in-water noise below 150 dB rms or ambient levels) shall be provided	Construction contractor and Navy Public Works Department – Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
			in between work days. ▪ The contractor will prepare and submit a hydro-acoustic monitoring plan for government review/approval describing monitoring locations, equipment, protocols, and personnel that will be used to verify compliance with the noise level limits listed above.		
Preparation and implementation of a Health and Safety Plan to include detailed plans for handling and storage of contaminated sediments	Will include measures protecting worker safety and minimizing the potential for releases of contaminated sediments	Measures to evaluate effectiveness will be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine.	Implementation and monitoring measures will be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine.	Construction contractor and Navy Public Works Department – Maine	October 2022
Alternative 2					
Compliance with the individual USACE Permit for in-water work at Berths 11, 12, and 13	Would reduce impacts on surface water quality during construction	Measures for evaluating effectiveness would be specified in the final individual USACE permit issued prior to construction.	Measures for implementation and monitoring would be specified in the final individual USACE permit issued prior to construction.	Construction contractor and Navy Public Works Department - Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with MEDEP individual NRPA Permit for in-water work at Berths 11, 12, and 13.	Would reduce impacts on surface water quality during construction	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Construction contractor and Navy Public Works Department - Maine	October 2022
Compliance with the Shipyard's Site Location of Development Law permit for in-water work at Berths 11, 12, and 13 and Dry Dock 3	Will reduce impacts on surface water quality during construction	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Construction contractor and Navy Public Works Department – Maine	October 2022
Implementation of Project-specific dewatering plans	Will reduce the potential for sedimentation in compliance with the Maine Erosion and Sedimentation Control Law	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Construction contractor and Navy Public Works Department - Maine	October 2022
Implementation of a Stormwater Management/Erosion and Sedimentation Control Plan	Will reduce the potential for erosion and sedimentation in adjacent waters	Measures to evaluate effectiveness would be developed by the construction contractor and reviewed by Navy Public Works Department – Maine in compliance with applicable laws and permits.	Implementation and monitoring measures would be developed by the construction contractor and reviewed by Navy Public Works Department – Maine in compliance with applicable laws and permits.	Construction contractor and Navy Public Works Department - Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compensatory mitigation (in lieu fee) under Maine In lieu Fee Compensation Program for temporary and permanent fill at Dry Dock 3 and Berths 11, 12, and 13	Will increase the extent and quality of state-protected natural trust resources	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Navy Public Works Department - Maine	October 2016
Compliance with existing MPDES permit and Maine Waste Discharge License	Will reduce impacts on surface water resulting from dewatering operations for the temporary cofferdam	Measures to evaluate effectiveness would be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine in accordance with the Shipyard's wastewater discharge permit (Maine Pollutant Discharge Elimination System Permit #ME 000868).	Discharges would be required to comply with limitations stipulated in the Shipyard's wastewater discharge permit.	Construction contractor	August 2018
Compliance with Category II USACE general permit and MEDEP individual NRPA Permit for in-water work at Dry Dock 3	Will reduce impacts on surface water associated with the fill for the temporary cofferdam	Measures to evaluate effectiveness would be determined in consultation with the USACE.	Implementation and monitoring measures would be developed in consultation with the USACE.	Construction contractor and Navy Public Works Department - Maine	August 2018
Compliance with the Shipyard's joint USACE Maine General Permit and MEDEP NRPA permit for maintenance dredging, for work at Dry Dock 3	Will reduce impacts on surface water resulting from dredging	Effectiveness would be determined based upon the stipulations of the Shipyard's joint USACE Maine General Permit and MEDEP NRPA permit for maintenance dredging.	Implementation and monitoring measures would be developed in accordance with the appropriate permits.	Construction contractor and Navy Public Works Department - Maine	August 2018

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Compliance with requirements of the Memorandum of Agreement with the Maine SHPO	Will minimize adverse effects on Dry Dock 3 in accordance with section 106	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Navy Public Works Department - Maine	August 2018
Compliance with ICRMP procedures for unanticipated discoveries of archaeological resources	Will reduce the risk of adverse effects on previously unidentified archaeological resources	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Navy Public Works Department – Maine	October 2022
Compliance with ICRMP procedures for unanticipated discoveries of human remains	Will ensure proper handling of unanticipated discoveries of human remains	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Navy Public Works Department – Maine	October 2022
Mitigation measures under IHAs issued for each year of in-water construction	Will reduce risk of impacts on marine mammals as a result of pile driving during in-water construction at Berths 11, 12, and 13 and Dry Dock 3	Measures for evaluating effectiveness would be similar to those described for Alternative 1. Additional measures may be developed in consultation with NOAA Fisheries.	Implementing and monitoring measures would be similar to those described for Alternative 1. Additional measures may be developed in consultation with NOAA Fisheries.	Construction contractor and Navy Public Works Department - Maine	October 2022

Table 4.11-2 Impact Avoidance and Minimization Measures

Measure	*Anticipated Benefit*	*Evaluating Effectiveness*	*Implementing and Monitoring*	*Responsibility*	*Estimated Completion Date*
Lobster relocation at Berths 11, 12, and 13	Will reduce risk of impacts on lobsters	Effectiveness would be determined according to measures stipulated in lobster relocation plans coordinated with the Maine Department of Marine Resources prior to implementation.	Before beginning in-water construction at Berths 11, 12, and 13 and the Dry Dock 3 caisson, lobsters within the in-water construction areas would be physically removed and relocated to mitigate possible injury or loss of individuals. Trapping via ventless traps would be completed at each Project site not more than two weeks prior to the start of in-water construction.	Navy Public Works Department – Maine	October 2022
Compliance with the proposed mitigation developed during ESA section 7 consultation for the Project	Will minimize noise-related impacts on the Atlantic sturgeon and shortnose sturgeon	Measures for evaluating effectiveness would be similar to those described for Alternative 1.	Implementing and monitoring measures would be similar to those described for Alternative 1.	Construction contractor and Navy Public Works Department – Maine	October 2022
Preparation and implementation of a Health and Safety Plan to include detailed plans for handling and storage of contaminated sediments	Will include measures protecting worker safety and minimizing the potential for releases of contaminated sediments	Measures to evaluate effectiveness would be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine.	Implementation and monitoring measures would be developed by the construction contractor and reviewed by the Navy Public Works Department – Maine.	Construction contractor and Navy Public Works Department – Maine	October 2022

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5 Cumulative Impacts

This section 1) defines cumulative impacts, 2) describes past, present, and reasonably foreseeable future actions relevant to cumulative impacts, 3) analyzes the incremental interaction the Proposed Action may have with other actions, and 4) evaluates cumulative impacts potentially resulting from these interactions.

5.1 Definition of Cumulative Impacts

The approach taken in the analysis of cumulative impacts follows the objectives of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and CEQ guidance. Cumulative impacts are defined in 40 Code of Federal Regulations (CFR) section 1508.7.

Cumulative impacts refer to the impacts on the environment that result from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

To determine the scope of environmental impact statements and environmental assessments, agencies shall consider cumulative actions, which when viewed with other Proposed Actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

In addition, the CEQ and U.S. Environmental Protection Agency (USEPA) have published guidance addressing implementation of cumulative impact analyses: Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) and Consideration of Cumulative Impacts in EPA Review of NEPA Documents (USEPA, 1999). CEQ guidance entitled Considering Cumulative Impacts under NEPA (1997) states that cumulative impact analyses should:

> ". . . determine the magnitude and significance of the environmental consequences of the [Proposed Action] in the context of the cumulative impacts of other past, present, and future actions . . . identify significant cumulative impacts . . . [and] . . . focus on truly meaningful impacts."

Cumulative impacts are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or close to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, relatively concurrent actions would tend to offer a higher potential for cumulative impacts. To identify cumulative impacts, the analysis needs to address the following three fundamental questions.

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

5.2 Scope of Cumulative Impacts Analysis

The scope of the cumulative impacts analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this environmental assessment (EA), the study area delimits the geographic extent of the cumulative impacts analysis. In general, the study area will include those areas previously identified in Chapters 3 and 4 for the respective resource areas. The time frame for cumulative impacts centers on the timing of the Proposed Action, which would be implemented between October 2016 and October 2022.

Another factor influencing the scope of cumulative impacts analysis involves identifying other actions to consider. Beyond determining that the geographic scope and time frame for the actions interrelate to the Proposed Action, the analysis employs the measure of "reasonably foreseeable" to include or exclude other actions. For the purposes of this analysis, public documents prepared by federal, state, and local government agencies form the primary sources of information regarding reasonably foreseeable actions. Documents used to identify other actions include notices of intent for EISs and EAs, management plans, land use plans, and other planning-related studies.

5.3 Past, Present, and Reasonably Foreseeable Actions

This section will focus on past, present, and reasonably foreseeable future projects at and near Portsmouth Naval Shipyard. In determining which projects to include in the cumulative impacts analysis, a preliminary determination was made regarding the past, present, or reasonably foreseeable action. Specifically, using the first fundamental question included in Section 5.1, it was determined whether a relationship exists such that the affected resource areas of the Proposed Action (included in this EA) might interact with the affected resource area of a past, present, or reasonably foreseeable action. If no such potential relationship exists, the Project was not carried forward into the cumulative impacts analysis. In accordance with CEQ guidance (CEQ, 2005), these actions considered but excluded from further cumulative effects analysis are not catalogued here as the intent is to focus the analysis on the meaningful actions relevant to inform decision-making. Projects included in this cumulative impacts analysis are listed in Table 5.3-1 and briefly described in the following subsections. The locations of these projects are shown in Figures 5.3-1 and 5.3-2.

5.3.1 Past Actions

5.3.1.1 Portsmouth Naval Shipyard

Dry Dock 1 Improvements

This project replaced the deteriorated, exterior layer of concrete throughout the dry dock and removed other dry dock components, including the keel block track system. Several access staircases and utility galleries along the north and south walls were removed and replaced. Two pump gates on the outside face of the dry dock were removed and rebuilt, and the existing pumpwell was repaired. Mechanical utilities around the dry dock were replaced, and a permanent test power facility and 480-volt industrial load center were constructed. A temporary cofferdam was constructed outside of the dry dock, requiring dredging of the cofferdam footprint, to allow the repairs to be completed in a dry environment (Navy, 2011). Dry Dock 1 is eligible for listing on the National Register of Historic Places (NRHP). This project was awarded in 2011, and construction was completed in 2013.

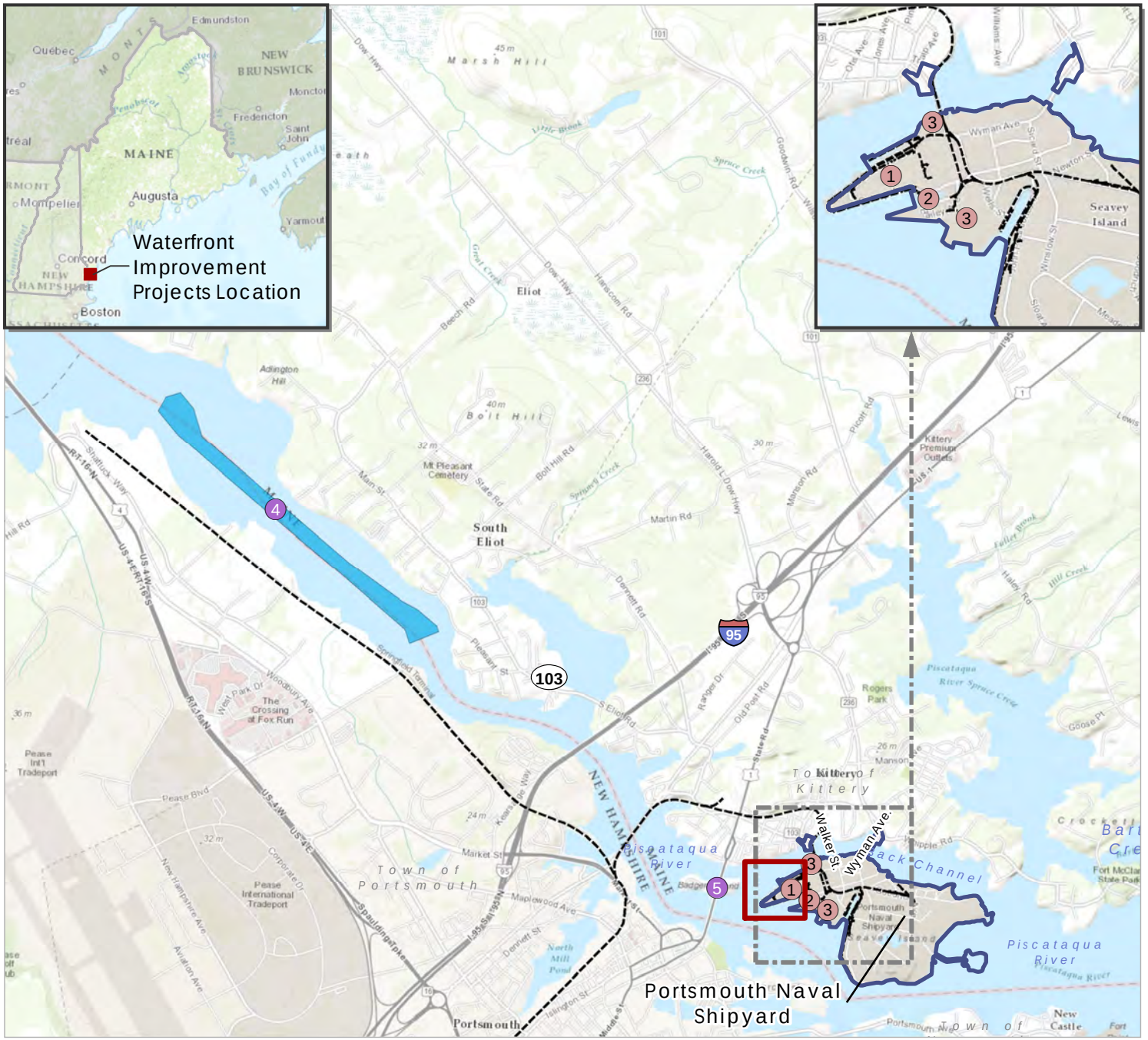

Figure 5.3-1
Past Actions
Portsmouth Naval Shipyard
York County, Maine

Legend

Project Area

Installation Area

Navigation Channel

Portsmouth Naval Shipyard

1 Construction of a Consolidated Waterfront Support Facility (Building 174)

2 Dry Dock 1 Improvements

3 Buildings 178 and 55 Energy and Structural Repairs

Other Federal and Non-Federal Actions

4 Federal Navigation Channel Maintenance Dredging

5 Memorial Bridge Replacement

Railroad

N

0 2,000 4,000 6,000 8,000 Feet

Source: ESRI 2013; Department of Defense 2014; Maine Department of Transportation 2011.

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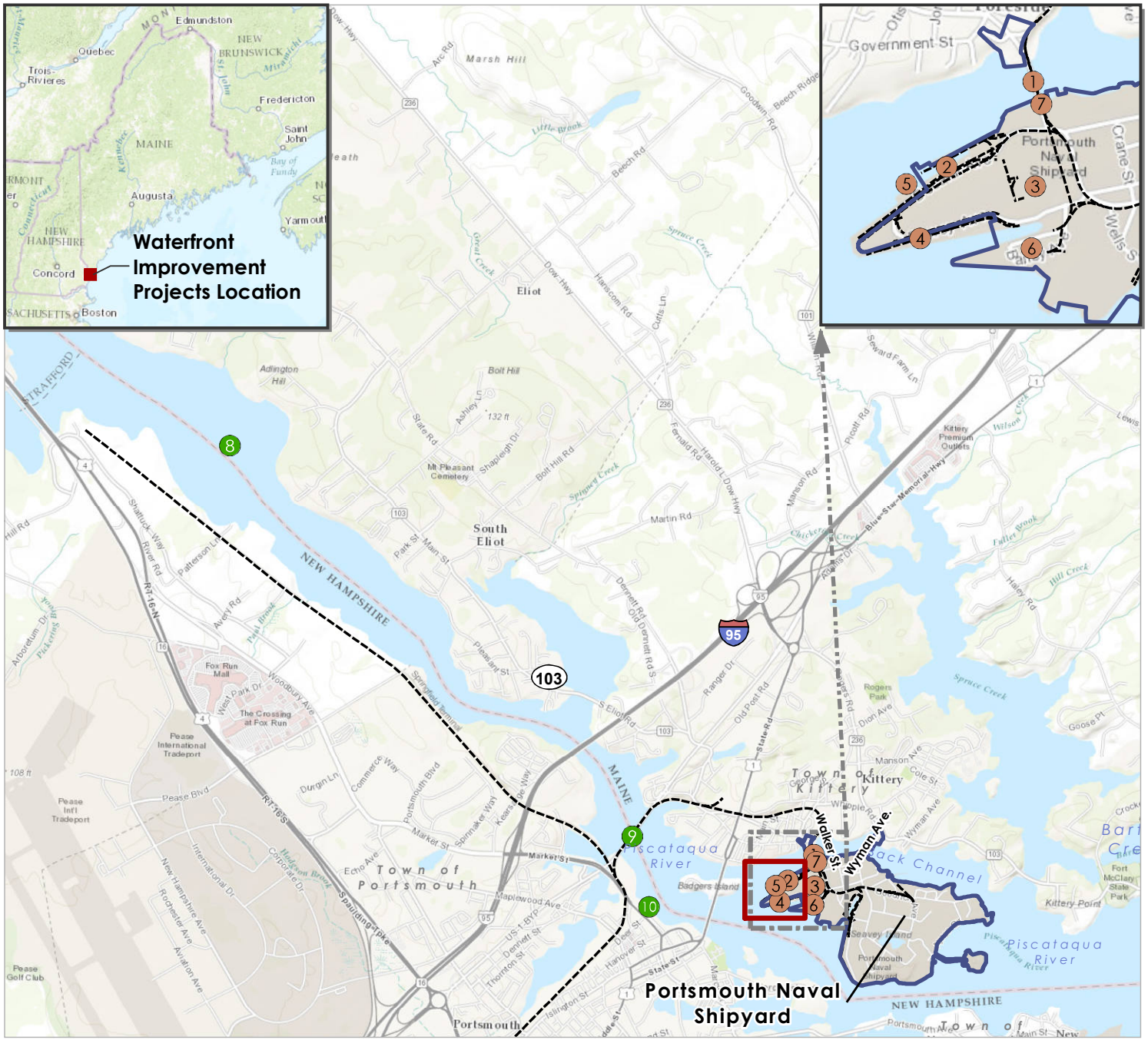

Figure 5.3-2
Present and Reasonably Foreseeable Future Actions
Portsmouth Naval Shipyard
York County, Maine

Legend

- Project Area
- Installation Area
- Railroad

Portsmouth Naval Shipyard

1. Bridge 1 Structural Repairs
2. Dry Dock 3 Pump Well Repairs
3. Consolidation of Structural Shops
4. Waterfront Utilities Improvements
5. Dry Dock 3 Maintenance Dredging
6. Dry Dock #3 Reactor Servicing Complex
7. Paint, Blast, and Rubber Facility Consolidation

Other Federal and Non-Federal Actions

8. Portsmouth Harbor Turning Basin Expansion
9. Sarah Mildred Long Bridge Replacement
10. New Hampshire Port Authority Main Wharf Expansion

N

0 2,000 4,000 6,000 8,000 Feet

Source: ESRI 2013; Department of Defense 2014.

Path: L:\Buffalo\Portsmouth_Railway\Maps\MXD\Reports\EA\Figure_5_3_2_FutureActions.mxd

Table 5.3-1 Cumulative Action Evaluation

Action	*Level of NEPA Analysis Completed*
Past Actions	
Portsmouth Naval Shipyard	
Construction of a Consolidated Waterfront Support Facility	EA
Dry Dock 1 Improvements	Categorical Exclusion (CATEX)
Buildings 178 and 55 Energy and Structural Repairs	EA
Other Federal and Non-federal Actions	
Federal Navigation Channel Maintenance Dredging	EA
Memorial Bridge Replacement	CATEX
Present and Reasonably Foreseeable Future Actions	
Portsmouth Naval Shipyard	
Bridge 1 Structural Repairs	EA
Dry Dock 3 Pumpwell Repairs	EA
Consolidation of Structural Shops	EA
Dry Dock 3 Maintenance Dredging	CATEX
Waterfront Utilities Improvements	CATEX (in progress)
Dry Dock 1 Reactor Servicing Complex	CATEX (in progress)
Paint, Blast, and Rubber Facility Consolidation	EA (in progress)
Other Federal and Non-federal Actions	
Portsmouth Harbor Turning Basin Expansion	EA
Sarah Mildred Long Bridge Replacement	CATEX
New Hampshire Port Authority Main Wharf Expansion	None

Sources: USACE February 21, 2012; Permitting Dashboard, n.d.

Buildings 178 and 55 Energy and Structural Repairs

Critical building renovations, energy-efficiency upgrades, and structural modernizations have been completed at Buildings 178 and 55. The Navy rehabilitated the exteriors of both buildings, repaired structurally unsafe areas, and implemented energy improvement measures so that the buildings could be adapted and reused. Building 178 was modernized to create a consolidated, state-of-the-art industrial-material-handling facility, and Building 55 was adapted into a consolidated tool crib and storage facility. The project included filling the inclined floor—an historic shipway—at the southern end of Building 178 to be level with the floor in the northern part of the building and installing a concrete seawall immediately inside the existing doors at the south end of the building. Part of the construction area was located below the mean high water mark, and a temporary small-diameter cofferdam constructed of sandbags was installed outside of Building 178 during construction (Navy, 2011).

Renovation of Building 178 began in 2012 and was completed in 2014. Renovation of Building 55 began in 2012 and was completed in 2013. Building 55 is listed in the NRHP, and Building 178 is eligible for listing in the NRHP (Navy, 2011).

Construction of a Consolidated Waterfront Support Facility

This project modernized the waterfront support facilities at Dry Dock 3 by improving Building 174, constructing an addition to Building 175, and demolishing excess facility space. Building 175 is eligible for listing on the NRHP (Navy, 2011). Construction began in 2011 and was completed in December 2012.

5.3.1.2 Other Federal and Non-Federal Actions

Federal Navigation Channel Maintenance Dredging

In 2013, the U.S. Army Corps of Engineers (USACE) dredged part of the navigation channel in the Piscataqua River known as the Simplex Shoals to maintain an adequate depth for safe navigation (USACE, North Atlantic Division, 2013.). The USACE prepared an EA to analyze alternatives for periodic and advance maintenance dredging of the shoals. Advance maintenance dredging of the channel was completed to a depth of 40 feet with 2 feet of allowable over-depth dredging. Advance maintenance dredging is used in areas where shoaling constricts navigation and can extend the time period between maintenance dredging projects. The USACE plans to complete future periodic maintenance dredging of the navigation channel on a schedule of every six to ten years (USACE New England District, 2012).

Memorial Bridge Replacement

The New Hampshire Department of Transportation (DOT), in cooperation with the Federal Highway Administration and the Maine DOT, recently replaced the Memorial Bridge over the Piscataqua River, including its components: the Memorial Bridge lift span and flanking spans, the Kittery approach spans, and the Scott Avenue bridge (Portsmouth approach). The replacement of the bridge created an adverse effect on numerous historic properties, including the Memorial Bridge itself (Three Spans, Portsmouth, and Kittery), the Memorial Bridge Historic District, Memorial Park, Scott Avenue Bridge, Portsmouth Historic District, and John Paul Jones Memorial Park. Mitigation was agreed upon through a Memorandum of Agreement (MOA), signed in March 2011.

In March 2011, the New Hampshire DOT completed a Class II categorical exclusion for complete replacement of the Memorial Bridge superstructure, pursuant to NEPA. Demolition of the existing Memorial Bridge and construction of the replacement bridge occurred between 2012 and 2013. The replacement bridge was completed and opened in August 2013 (New Hampshire DOT, 2011).

The replacement project included removing the north and south bridge piers of the Memorial Bridge lift span and replacing them with two new piers in the same locations as the existing piers. The new piers are wider in order to accommodate an increase in the width of the bridge from 28 feet to 32 feet. The two middle piers have been repaired, and four dolphins were installed in front of these piers. The nine piers of the Kittery approach spans have also been removed to a point below the river substrate or to bedrock. The north abutment of the Kittery approach spans was removed and replaced with a new, wider abutment near its existing location (New Hampshire DOT, 2011).

5.3.2 Present and Reasonably Foreseeable Actions

5.3.2.1 Portsmouth Naval Shipyard

Bridge 1 Structural Repairs

Recent inspections have confirmed that Bridge 1, the primary vehicular, bicycle, and pedestrian bridge and sole railway bridge to Seavey's Island, is deteriorating. The structural integrity of the bridge must be restored to maintain the sole rail access to the Shipyard and ensure that the Shipyard can continue to achieve its mission to service the Navy's submarine fleet. The structural repairs to the bridge entail removing the entire bridge superstructure, including the deck and deck supports; reinforcing the bridge foundations; and constructing a new superstructure with improved sight lines and approaches, wider lanes, and safety features. The existing bridge foundations would be reinforced with micropiles installed in the bedrock beneath the bridge, through cores removed from the existing foundations, and cladding.

A small amount of fill in the Back Channel will be required to install the cladding. Use of the existing foundations would minimize the amount of in-water work required for this project.

Bridge 1 is eligible for listing in the NRHP. The repairs began in fiscal year 2015 and are expected to take approximately two years to complete (Navy, 2014).

Dry Dock 3 Pump Well Repairs

Repair or replacement of the pumpwell at Dry Dock 3 is necessary to secure worker safety and preserve the dry dock's operations and certification. The structure is deteriorating, and salt water intrusion has caused acute damage to dewatering pumps, motors, and heating, ventilation, and dehumidification systems, and failure of electric actuators and motor controls in rarer instances. Dry Dock 3 is eligible for listing in the NRHP (Navy, 2014). Repairs to the interior of the dry dock began in the fall of 2015.

Consolidation of Structural Shops

This project will repair and modernize Buildings 75 and 76 and demolish Building 155, all contributing resources to the Portsmouth Naval Shipyard (PNSY) Historic District, in order to consolidate structural shop functions to one centralized location (Navy, 2013c). Construction is expected to be complete in 2018.

Dry Dock 3 Maintenance Dredging

If funding is available, previously authorized maintenance dredging may occur at Dry Dock 3 at the same time as the proposed caisson replacement evaluated under the Proposed Action. Maintenance dredging of an estimated 29,106 cubic feet (1,078 cubic yards) of sediment from the entrance to the dry dock was previously approved in 2013 but was not funded. The proposed dredging would be completed using a barge-mounted crane with a mechanical clamshell bucket. Dredge spoils would be dewatered, amended with cement as needed to allow transportation, and disposed of at a permitted upland disposal facility based on sediment testing and characterization (Navy 2013d). This dredging is not part of the Proposed Action but is part of the Shipyard's ongoing maintenance dredging program. A categorical exclusion was prepared for the proposed maintenance dredging in 2013 (Navy 2013d).

Waterfront Utilities Improvements

This project would improve utilities on the fitting-out and flat-iron piers to support operations at Dry Docks 1 and 3; Berths 1, 2, 11, 12, and 13; and associated waterfront facilities. This would require removing and replacing old underground utility lines in existing conduits, repairing associated utility infrastructure, constructing electrical substations to support operations at Dry Dock 3, and constructing a utility tunnel at Berth 11. Construction would begin in June 2017 and be completed by May 2019.

Dry Dock 1 Reactor Servicing Complex

A reactor servicing complex would be constructed to support operations at Dry Dock 1. The reactor servicing complex would consist of prefabricated equipment that would be installed and interconnected on-site to provide enclosed industrial work space in a steel-framed structure. The Dry Dock 1 reactor servicing complex would encompass approximately 19,900 square feet and would be constructed almost entirely on the concrete slab foundation of Building 155, which is scheduled to be demolished under a separate project. Construction of the reactor servicing complex would enable Dry Dock 1 to serve as a second defueling dry dock for the Shipyard. Construction would begin in May 2017 and be completed by August 2019.

Paint, Blast, and Rubber Facility Consolidation

The project would consolidate paint, blast, and rubber manufacturing with plastic molding operations in one location within the Shipyard's controlled industrial area (CIA) by constructing a new facility, converting existing buildings, and demolishing excess building footprint. The new facility would consist of high- and low-bay industrial shop areas, as well as offices, break rooms, locker rooms, and training and support spaces. Buildings 55, 60, and 74 would be converted to support industrial, maintenance, and administrative functions. The project would relocate and consolidate Shop 06 into Building 60. Buildings 285, 362, 400, 151, the west addition of Building 74, and the east addition of Building 60 would be demolished.

5.3.2.2 Other Federal and Non-federal Actions

Portsmouth Harbor Turning Basin Expansion (Portsmouth Harbor and Piscataqua River Navigation Improvement Project)

The Pease Development Authority and the USACE are proposing to expand the turning basin in Portsmouth Harbor from a width of 800 feet to a width of 1,200 feet (McMenemy, 2014). The turning basin is located approximately 4 miles upriver from the Shipyard. The project would increase navigational safety, reduce costs for turning vessels and freeing grounded vessels, and allow large bulk carriers to access the port's upper terminals (USACE, 2014b). The USACE has completed a draft EA for the project and expects to complete design plans and specifications for the project by September 2016 (McMenemy, 2014; Keegan, 2015). Construction could begin as early as 2017 and is expected to take less than one year to complete (Keegan, 2015).

Sarah Mildred Long Bridge Replacement

The Maine DOT and New Hampshire DOT are proposing to replace the Sarah Mildred Long Bridge in conjunction with replacement of the Memorial Bridge. Construction of the new bridge began in January 2015 and is expected to be complete in late 2017 (Scardina, 2015). The new, 2,631-foot-long bridge will be constructed with two levels, one for vehicle traffic and one for rail traffic. The bridge will be constructed on piers supported by spread footings or drilled shafts. Fender protection systems, consisting of cell-filled cofferdams supported on pilings, will be constructed around the piers (States of Maine and New Hampshire, n.d.).

The project includes removing the existing Sarah Mildred Long Bridge and abutment. The piers supporting the existing bridge will be removed to various depths depending on their locations (States of Maine and New Hampshire, n.d.)

Constructing the new bridge and demolishing the existing bridge will require constructing temporary causeways and trestles in some locations. The temporary causeways will be constructed of washed riprap placed on geotextile fabric. The temporary trestles will be constructed on driven piles (States of Maine and New Hampshire, n.d.).

New Hampshire Port Authority Main Wharf Expansion

The New Hampshire Port Authority Main Wharf is located between the Memorial Bridge and the Sarah Mildred Long Bridge in Portsmouth (off Market Street). The New Hampshire Port Authority is proposing to expand the wharf by rehabilitating and lengthening it by 125 feet to increase its capacity and enable it to accommodate larger vessels and constructing a 24-square-foot offshore mooring dolphin (Pease Development Authority, 2014). The expansion project also would replace the deteriorating bridges that

provide access to the wharf from the shoreline by expanding the wharf deck over the open water area between the shoreline and shore side of the existing wharf. The shore side wharf expansion will consist of "concrete framing members supported by steel caissons and a pile supported concrete curtain wall with riprap along the shore" (Pease Development Authority, 2014).

The 95-percent design for the wharf expansion is completed, and all the necessary permits for the project have been obtained. The Pease Development Authority applied for Transportation Investment Generating Economic Recovery (TIGER) grant funding in 2015 for the project but was unsuccessful (Pease International Division of Ports and Harbors, 2015). If funding is obtained for the project, the Pease Development Authority would prepare an EA to analyze potential environmental impacts (Elwood, 2015).

5.4 Cumulative Impact Analysis

Where feasible, cumulative impacts were assessed using quantifiable data; however, quantifiable data for many of the resources included for analysis are not available, and a qualitative analysis was therefore undertaken. In addition, where an analysis of potential environmental effects for future actions has not been completed, assumptions were made regarding cumulative impacts related to this EA where possible. The analytical methodology presented in Chapter 4, which was used to determine potential impacts on the various resources analyzed in this document, was also used to determine cumulative impacts.

5.4.1 Air Quality

5.4.1.1 Description of Geographic Study Area

The region of influence (ROI) for cumulative air quality impacts is the Metropolitan Portland (MP) Intrastate Air Quality Control Region (MPIAQCR). This area is in attainment for all criteria pollutants (USEPA, 2015b). The MPIAQCR had previously been designated nonattainment for the 1997 ozone standard and has been subject to a maintenance plan under that standard; however, on March 6, 2015, USEPA revoked the 1997 8-hour ozone National Ambient Air Quality Standard (FR 80 [44]: 12264).

5.4.1.2 Relevant Past, Present, and Future Actions

Each of the construction projects listed in Section 5.3 would result in temporary emission increases. Because the emissions of these projects and the Proposed Action itself would be dispersed over time and area, they are not likely to contribute to cumulative significant impacts on air quality within the ROI.

5.4.1.3 Cumulative Impact Analysis

Cumulative air quality impacts from past, present, and future construction actions within the ROI would be less than significant because these emissions would be local and temporary. None of the other projects identified in Section 5.3 would result in significant new sources of long-term emissions. Therefore, implementation of the Proposed Action combined with the past, present, and reasonably foreseeable future projects would not result in significant impacts on air quality within the ROI.

Greenhouse gas (GHG) emissions occur locally, but GHG impacts and climate change are both global in scale and cumulative over time. The Navy has established GHG-reduction goals, described in Chapter 3. GHG emissions from the Proposed Action would be minimal and temporary, and implementation of the Proposed Action would reduce the risk of damage to the Shipyard from increased sea-level rise and

storm surges. Therefore, the Proposed Action would not contribute to cumulative negative impacts from GHG emissions or climate change.

5.4.2 Water Resources

5.4.2.1 Description of Geographic Study Area

The ROI for cumulative impacts on water resources, including surface water, wetlands, floodplains, and marine sediments, encompasses the Great Bay estuary and lower Piscataqua River from the Great Bay to the mouth of the Piscataqua River. Although the Proposed Action would result only in localized, temporary impacts on water resources during construction, a larger ROI was considered to account for projects that would potentially result in more widespread impacts.

5.4.2.2 Relevant Past, Present, and Future Actions

The present and reasonably foreseeable projects identified in Section 5.3, with the exception of the Portsmouth Harbor turning basin expansion, could have cumulative impacts on water resources with the Proposed Action. The past projects identified in Section 5.3 would not cause cumulative impacts because impacts on water resources as a result of these projects were temporary and ended before the start of the construction period for the Proposed Action.

Dredging and improvements to the Piscataqua River federal navigation channel at the Simplex Shoals, approximately 2 miles upriver of the Project area, and the turning basin approximately 4 miles upriver, would not result in cumulative impacts on water resources because of the distance of these sites from the Project area. While these dredging projects would have water quality impacts similar to the proposed in-water projects i.e., resulting in increased turbidity and decreased dissolved oxygen concentrations near the dredging operations, turbidity and re-suspended sediments would be expected to quickly settle out of the water column or return to background levels within a short distance of the dredging operations. Dredge spoils from the turning basin expansion would be placed at the Isles of Shoals North placement site, approximately 10 miles offshore of the Maine coast (USACE New England District, 2014). Dredge spoils may also be used for shoreline improvement projects at Wells, Maine, approximately 20 miles northeast of the Shipyard, and several towns in New Hampshire (Department of the Army, Chief of Engineers February 8, 2015). Placement of dredged sediments at these sites also would not result in cumulative impacts. Periodic maintenance dredging of the Simplex Shoals in the Piscataqua River federal navigation channel, if this dredging occurs at the same time as in-water construction at the Shipyard, would not result in cumulative impacts for the reasons noted above. The Simplex Shoals and in-river disposal site historically used as the placement site for dredge spoils from the shoals are both located more than 2 miles upriver from the Project area (USACE New England District, 2012).

5.4.2.3 Cumulative Impact Analysis

The Navy and non-Navy projects listed above would result in similar impacts on surface water as those of the Proposed Action. In-water projects occurring outside of the Project area, such as the Sarah Mildred Long Bridge replacement and New Hampshire Port Authority Main Wharf Expansion, would temporarily re-suspend sediments in the vicinity of in-water construction activities, resulting in localized increases in turbidity and decreased dissolved oxygen concentrations. These impacts on water quality would be localized, and turbidity and dissolved oxygen levels would be expected to return to background levels within a short distance of the in-water construction areas as a result of the strong

tidally influenced river currents and riverine transport. In addition, turbidity controls would be used during construction at the Sarah Mildred Long Bridge, reducing the area potentially impacted (Maine Department of Transportation, n.d.). Therefore, the two non-Navy projects would not cumulatively impact surface water quality when considered in relationship to the Proposed Action.

The ongoing Bridge 1 structural repairs at the Shipyard would occur near the Project area for the Proposed Action. However, the structural repairs would not disturb bottom sediments in the Back Channel of the Piscataqua River and therefore would not be expected to result in cumulative impacts on water quality with the proposed in-water work at Berths 11, 12, and 13 or the Dry Dock 3 caisson (Navy, 2014). This project, furthermore, is expected to be complete before the start of the Proposed Action.

The proposed maintenance dredging at Dry Dock 3 would occur during the same timeframe as the Proposed Action and would result in cumulative temporary, localized impacts on water quality in the Project area. Impacts would include increased turbidity and decreased dissolved oxygen levels and would be expected to be temporary for the reasons discussed above. The proposed dredging would comply with the conditions of the General Permit from the USACE issued for the Shipyard's maintenance dredging pursuant to section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. Impacts on surrounding waters would be reduced through use of turbidity curtains, where water velocities and dredge depths make the use of turbidity curtains practicable. Cumulative impacts on water quality would be temporary and would be expected to dissipate quickly once in-water work is complete.

The upland construction projects noted above that are ongoing or planned at the Shipyard could result in cumulative, minor, and temporary impacts on surface water quality with the Proposed Action as a result of sedimentation, spills, or release of construction debris into the river. These impacts would be avoided or minimized through use of standard best management practices (BMPs); implementation of project-specific Spill Prevention, Control, and Countermeasures (SPCC) plans; and compliance with the Shipyard's existing MPDES permit; the Maine Erosion and Sedimentation Control Law; and project-specific Natural Resources Protection Act permits, as required.

The proposed in-water projects would result in temporary, localized impacts on wetlands in the vicinity of the Project area. The structural repairs to Bridge 1 could result in cumulative impacts on these wetlands as a result of temporary impacts on water quality, if in-water construction at Bridge 1 occurs at the same time as in-water construction at Berth 11 or the Dry Dock 3 caisson. The Proposed Action is not expected to result in cumulative impacts on wetlands with the other non-Navy in-water projects noted above. Although the Sarah Mildred Long Bridge replacement project would permanently impact approximately 46,000 square feet of tidal wetlands and their buffers in the lower Piscataqua River (Maine Department of Transportation, n.d.), the Proposed Action would not substantially contribute cumulatively to this impact because of the temporary and indirect nature of potential wetland impacts resulting from the Proposed Action.

Because the Proposed Action would not result in impacts on the floodplain in the Project area, the Proposed Action would not contribute to cumulative impacts on floodplains.

The in-water projects that would result in temporary and permanent impacts on marine sediments as a result of pile driving, temporary and permanent filling, or dredging include the Sarah Mildred Long Bridge replacement and the New Hampshire Port Authority Main Wharf expansion. The Proposed Action would not contribute substantially to short-term impacts of marine sediments as a result of disturbance during construction because marine sediments adjacent to in-water construction areas would return to

pre-construction conditions within a short time following the end of construction. Marine sediments next to Berths 11, 12, and 13 are periodically disturbed by maintenance dredging of these berths, and short-term impacts resulting from the Proposed Action would be similar to these periodic disturbances.

The Proposed Action would result in permanent loss of marine sediments in an area of up to approximately 118,800 square feet if Option 1 for the Berths 11, 12, and 13 structural repairs is implemented. The Sarah Mildred Long Bridge replacement and New Hampshire Port Authority Main Wharf expansion also would result in permanent loss of marine sediments. Up to approximately 29,000 square feet of marine sediments would be permanently filled during construction of the New Hampshire Port Authority Main Wharf expansion (Pease Development Authority, 2014). The area of marine sediments potentially impacted by the Sarah Mildred Long Bridge replacement is not publicly available. The Proposed Action with the two other in-water construction projects would contribute to long-term cumulative impacts on marine sediments in the lower Piscataqua River as a result of fill; however, these impacts would be minor given the abundance of similar marine substrates in the lower estuary that are of similar or better quality.

5.4.3 Bathymetry

5.4.3.1 Description of Geographic Study Area

The ROI for cumulative impacts on geologic resources is Portsmouth Harbor.

5.4.3.2 Relevant Past, Present, and Future Actions

Each of the past, present, or reasonably foreseeable in-water construction projects identified in Section 5.3 could result in temporary cumulative impacts on bathymetry with the Proposed Action.

5.4.3.3 Cumulative Impact Analysis

Cumulative impacts on bathymetry from past, present, and future actions within the ROI would be less than significant because impacts would be localized and similar to the level of temporary disturbance of bathymetry occurring regularly within the ROI. The in-water construction projects identified in Section 5.3 have or would result in changes to bathymetry in Portsmouth Harbor. In some cases, these changes would be localized, i.e., as a result of the Proposed Action and other construction projects at the Shipyard or replacement of the Memorial and Sarah Mildred Long bridges. Changes to bathymetry have occurred or would occur over a larger area as a result of the channel dredging and turning basin expansion projects. Portsmouth Harbor is a busy commercial port, and the federal navigation channel is periodically dredged and improved to maintain safe navigational depths. Similarly, berths and the entrances to the dry docks at the Shipyard are regularly dredged to allow safe vessel operations. Most of the identified in-water projects would result in changes to bathymetry that are within USACE-permitted design specifications. The proposed turning basin expansion, while resulting in long-term changes to bathymetry, would be subject to federal permitting and design review prior to construction and is expected to result in long-term benefits for navigation. The bridge replacement projects may result in long-term, localized changes in bathymetry as a result of construction of new infrastructure in the river. Any changes relevant to navigation would be communicated on navigational charts. Because of the distance of these projects from in-water construction areas adjacent to Berths 11, 12, and 13 and Dry Dock 3 and because these areas adjacent to the Shipyard are not open to general navigation, the Proposed Action, combined with the past, present, and reasonably foreseeable future projects discussed above, would not result in significant cumulative impacts within the ROI.

5.4.4 Cultural Resources

5.4.4.1 Description of Geographic Study Area

The ROI assessed for cumulative impacts on cultural resources is the Portsmouth Naval Shipyard (PNSY) Historic District.

5.4.4.2 Relevant Past, Present, and Future Actions

Each of the past, present, or reasonably foreseeable Navy projects described in Section 5.3.2, with the exception of the proposed Dry Dock 3 maintenance dredging, would have the potential to affect NRHP-listed or NRHP-eligible buildings within the historic district, including Bridge 1, Dry Docks 1 and 3, Buildings 7, 55, 60, 74, 92, and 151, and Berths 1, 2, 11, 12, and 13. Therefore, these actions could result in cumulative impacts with the Proposed Action.

Projects located outside the Shipyard, such as the Memorial Bridge Replacement, would not contribute to cumulative impacts on cultural resources in the PNSY Historic District, and, therefore, they are not considered as part of this evaluation.

5.4.4.3 Cumulative Impact Analysis

The Proposed Action would have an adverse effect on Dry Dock 3. An MOA has been developed for the proposed Dry Dock 3 caisson replacement, which will include mitigation measures to address the adverse effect(s) on this resource. Recordation and any other mitigation required by the Maine SHPO will reduce the potential adverse effect of the Proposed Action to a less-than-significant level. However, this mitigation does not eliminate the potential cumulative impact with projects that affect the appearance or existence of various historic buildings on the Shipyard.

Consultation with the Maine State Historic Preservation Office (SHPO) has been completed or is ongoing for each of the other Navy projects identified in Section 5.3; mitigation measures have been or would be addressed in stipulations in the MOA or as part of the findings for the individual projects. In order to mitigate adverse effects on Bridge 1, an MOA was signed between the Navy and the Maine SHPO in May 2014. This MOA outlined procedures to provide design oversight, a level II Maine Historic Engineering Record and other documentation, and review of unanticipated discoveries of artifacts and potential human remains (Navy, 2014). The MOA was intended to help offset the anticipated damage to the bridge itself and to the PNSY Historic District.

Repairs associated with the Dry Dock 3 pumpwell would not have an adverse effect on historic properties. The repairs and replacements associated with this project were designed so as to not alter the character of Dry Dock 3 for which it had been determined eligible for listing on the NRHP (Crosby, n.d.). No specific mitigation measures were suggested in the Navy's findings for this project, as the potential effect was not anticipated to be adverse.

An MOA was also signed between the Navy and Maine SHPO in November 2013 for the consolidation of the structural shops. This MOA outlined procedures to provide design review and documentation of Buildings 75, 76, and 155; incinerator equipment in Building 46; and Constitution Square. The MOA also provided stipulations for archaeological monitoring and unanticipated discovery of artifacts and potential human remains (Navy, 2013c). The measures were developed to offset any adverse effects.

Improvements associated with the waterfront utilities project at the Shipyard would not be anticipated to have an adverse effect on historic properties. While construction may occur within the vicinity of Dry

Dock 1 and Berths 1, 2, 11, 12, and 13, ground disturbance would be limited, and existing underground utility conduits would be used where possible. As the plans for this project develop, additional structures within the Shipyard may be directly or indirectly affected by the removal and replacement of old utility lines, as well as by the repair or construction of associated utility infrastructure. As these changes would minimally alter the character, visual setting, and/or fabric of the structures, no adverse effect would be anticipated. The Navy will consult with the Maine SHPO regarding the potential effects of the waterfront utilities improvements on historic properties and the PNSY Historic District as a whole.

Similarly, construction of a reactor servicing complex at the location of Building 155, which is scheduled to be demolished, would not be anticipated to have an adverse effect on historic properties. Ground disturbance within the footprint of Building 155 may affect potential remnants of Building 1, as well as the original shoreline, which may be present below the foundation slab. However, the Navy would minimize potential ground disturbance within this area of the Shipyard and would plan to monitor construction and, if needed, provide recordation of previously undocumented archaeological sites or features such as quay walls. As the plans for this project develop, additional structures may be directly or indirectly affected. However, as construction of the reactor servicing complex would only minimally alter the character, visual setting, and/or fabric of the structures, no adverse effect would be anticipated. The Navy will consult with the Maine SHPO regarding the potential effects of the reactor servicing complex on historic properties and the PNSY Historic District as a whole.

The consolidation of paint, blast, and rubber fabrication operations to newly constructed and converted facilities, as well as the demolition of excess building footprint, may have an adverse effect on historic properties. This would result from the complete or partial demolition of Buildings 60, 74, 149, and 151. The conversion of Buildings 55, 60, and 74 may also result in an adverse effect on historic properties. The Navy will consult with the Maine SHPO regarding the potential effects of this proposed project on historic properties and the PNSY Historic District as a whole, and project-specific mitigation measures will be developed during consultation.

Viewed as individual actions, the modification of one structure or building may not necessarily diminish the historic and architectural character of the PNSY Historic District. However, the continued modification or, in some cases, demolition of historic structures on the Shipyard could cumulatively impact the overall integrity of the PNSY Historic District. When combined with the past, present, and reasonably foreseeable future actions identified in Section 5.3, it is expected that the Proposed Action would contribute to cumulative adverse effects on historic architectural properties in the PNSY Historic District. These potential cumulative impacts would be offset by consultation with the Maine SHPO and incorporation of mitigation measures described in each of the individual MOAs or documentation of findings. With impact-minimization measures stipulated in the MOAs for each project, the cumulative impact is expected to be less than significant.

5.4.5 Biological Resources

5.4.5.1 Description of Geographic Study Area

For the purposes of evaluating cumulative impacts on biological resources, the ROI is defined as the Project area (see Section 4.5) as well as the marine and estuarine habitats 1 mile upstream and downstream of the Project area. Due to the transport of suspended sediment, propagation of underwater noise, and displacement of biological organisms beyond the Project area, marine and estuarine habitats up to approximately 1 mile upstream and downstream of the Shipyard have the

potential to be cumulatively impacted in an adverse way by the Proposed Action when considered in relation to past, present, and future actions.

5.4.5.2 Relevant Past, Present, and Future Actions

One recently completed in-water project at the Shipyard, the Dry Dock 1 improvements, occurred within the Project area and two ongoing or proposed projects, the Dry Dock 3 pumpwell repairs and Dry Dock 3 maintenance dredging, also are located within the Project area. Several additional Navy and non-Navy projects have been identified within the broader geographic study area. These projects have been evaluated for potential cumulative impacts on biological resources because the biological resources analyzed are not exclusive to the Project area. In particular, marine species may spend only a portion of their time within the Project area, using other areas and habitats within the region throughout their life history.

Buildings 178 and 55 energy and structural repairs, Bridge 1 structural repairs, Memorial and Sarah Mildred Long Bridge replacement projects, and New Hampshire Port Authority Main Wharf expansion could cumulatively impact species and habitat in the localized area surrounding the Shipyard through the transport of sediment, propagation of underwater noise, and displacement of organisms. The cumulative impacts analysis also considers the potential cumulative impacts of underwater noise generated by baseline vessel traffic in the ROI and the Proposed Action.

5.4.5.3 Cumulative Impact Analysis

The past projects identified in Section 5.4.5.2 that required in-water work (Dry Dock 1 improvements, Memorial Bridge Replacement, and Buildings 178 and 55 Energy and Structural Repairs) would have resulted in temporary disturbances of the marine environment in areas near the project locations. Based on the localized and temporary nature of impacts of these past actions; the rapid natural recovery of benthic habitats; and the continued use of this area by marine mammals, fish, and benthic invertebrates, these past actions would have no cumulative impacts on biological resources with the Proposed Action.

The present and future projects described in Section 5.4.5.2 include several projects that overlap with the geographic study area for the Proposed Action, including replacement of the Sarah Mildred Long Bridge, structural repairs to Bridge 1, repairs to the Dry Dock 3 pumpwell, Dry Dock 3 maintenance dredging, and expansion of the New Hampshire Port Authority wharf. The Dry Dock 3 pumpwell repairs would involve minimal in-water work and are not expected to contribute substantially to cumulative impacts on marine biological resources with the Proposed Action.

The four remaining projects listed above would create localized disturbance or alteration and/or loss of marine vegetation and benthic habitat within their respective area of impact. Localized disturbance associated with each project would temporarily increase turbidity and may affect fish foraging behaviors. Increased turbidity would be localized and is expected to be rapidly ameliorated by local currents and riverine transport. In addition, juvenile and adult fish are expected to avoid areas of disturbance. Fish are highly mobile and are expected to use similar nearby habitat for feeding and foraging during periods of disturbance. Habitat and prey are abundant in the region, and displaced species are expected to forage in other available nearby habitat such as the Great Bay estuary or lower Piscataqua River estuaries. In addition, marine vegetation and benthic species would quickly recolonize disturbed areas, and mobile species temporarily displaced would return. The potential loss of egg and larval stages of finfish during construction of the present and future actions would be minor when

considered on a population level. Therefore, water quality impacts, disturbance of benthic habitat, fish displacement, and direct mortality resulting from present and future projects that do overlap with the Proposed Action's geographic study area have the potential to cumulatively and adversely impact biological resources, including managed EFH species and threatened and endangered species, when considered in relationship with the Proposed Action. However, these impacts would be short-term and localized. Species displaced by construction would rapidly return to disturbed areas, benthic habitat would naturally recover to pre-construction conditions within two years, direct mortality would not have a significant, population-level impact, and the permanent loss of approximately 4.0 acres (175,000 square feet) of benthic habitat would have a negligible impact on the larger Great Bay estuarine system.

The present and reasonably foreseeable in-water projects described in Section 5.4.5.2 include projects that do not overlap with the geographic study area for the Proposed Action, including navigation channel maintenance dredging and expansion of the Portsmouth Harbor turning basin. Each of these projects, if executed, is expected to create only localized disturbance, alteration, and/or loss of marine vegetation and benthic habitat within its respective area of impact. Localized disturbance associated with each project would temporarily disturb the seafloor and increase turbidity; however, heightened turbidity would be localized and is expected to be rapidly ameliorated by local currents and riverine transport. Juvenile and adult fish are expected to avoid areas of disturbance and use nearby habitat for feeding and foraging. Habitat and prey are abundant in the region, and species that would be temporarily displaced by these present and future actions are expected to forage in nearby habitat such as the Great Bay estuary or lower Piscataqua River rather than the lower quality habitat present at the Shipyard. Therefore, turbidity increases and fish displacement resulting from present and future projects that do not overlap with the Project area would not cumulatively and adversely impact biological resources, including managed EFH species and threatened and endangered species, when considered in relationship with the Proposed Action.

Marine Mammals

Present and future projects may result in an increase in anthropogenic sound (both airborne and underwater), increased human presence, increased boat movements, and other associated activities. These actions could result in behavioral impacts on local populations of marine mammals, such as temporary avoidance of habitat, decreased time spent foraging, increased or decreased time spent hauled out (depending on the activity), and other minor behavioral impacts. Most impacts would likely be short-term and temporary and unlikely to affect the overall fitness of the animals. Projects should not result in more moderate impacts because no other projects have longer construction timelines (three to five years). Additionally, proposed projects in the harbor, such as the Portsmouth Harbor turning basin expansion, would occur in an area of industrial uses with higher than normal activity and noise levels. Thus, marine mammals in the area may be habituated to these higher levels of ongoing activity and less impacted by ongoing waterfront development.

For projects that overlap with the geographic study area for the Proposed Action, cumulative impacts on marine mammals have the greatest potential to occur during simultaneous pile-driving exposure events. Of greatest concern to marine mammal safety would be the potential for the acoustic injury zones to overlap spatially and temporally. Behavioral disturbance zones from vibratory pile driving have the potential to overlap as a result of concurrent vibratory pile driving that may occur as part of the Sarah Mildred Long Bridge replacement project and the New Hampshire Port Authority Main Wharf expansion project. While these projects do not geographically overlap the Project area, the areas of noise exposure associated with pile driving for the bridge replacement and wharf expansion projects could overlap the

ZOI for the Proposed Action at one or more of the Project sites if pile driving occurs concurrently. When two closely located pile-driving projects occur at the same time, noise levels could increase by as much as 3 dB at sites roughly equidistant between the multiple pile-driving rigs. However, because topographic features along the Piscataqua River constrain the geographical extent of the marine mammal behavioral zone, the area affected by vibratory pile driving would not increase cumulatively. Any behavioral impacts would be temporary. With BMPs and mitigation in place (i.e., visual surveillance and the use of shutdown zones), cumulative impacts would not significantly affect marine mammal populations. Nevertheless, the Proposed Action and other future actions would contribute incrementally to cumulative marine mammal disturbance impacts in the Piscataqua River overall. The Navy's continued adherence to the requirements of the Endangered Species Act and Marine Mammal Protection Act would limit disturbance to marine mammals and ensure that important habitats do not become degraded. Furthermore, existing regulatory mechanisms and mitigation measures would protect marine mammals (see Chapter 3) and further decrease the likelihood of potential cumulative impacts on these species.

Indirect impacts on marine mammals may occur as a result of impacts on their prey base (fish) during construction as a result of habitat disturbance during construction. Impacts during construction and dredging are expected to be temporary, and the reduction in forage fish habitat would be minimal compared with the total habitat available in the Piscataqua River. Therefore, any reduction in forage fish populations would not be expected to have an adverse impact on marine mammals or their overall fitness.

Because marine mammals are highly mobile, the noise impacts of the Proposed Action could be cumulative with underwater and airborne noise impacts on marine mammals from other non-geographically overlapping activities in the region. However, because the expected impacts of the Proposed Action on marine mammals in general would be temporary, cumulative impacts on marine mammals would be minor.

5.4.6 Visual Resources

5.4.6.1 Description of Geographic Study Area

The ROI assessed for cumulative impacts on visual resources includes the Shipyard and those areas along the New Hampshire and Maine shorelines that provide views of the Shipyard. Each of the Navy and non-Navy projects described in Section 5.3 may result in cumulative impacts with the Proposed Action, except for the Portsmouth Harbor turning basin expansion, Sarah Mildred Long Bridge replacement, and New Hampshire Port Authority Main Wharf Expansion projects; these projects are not in the vicinity of the Shipyard and do not provide views of the Project area.

5.4.6.2 Relevant Past, Present, and Future Actions

The past, present, and reasonably foreseeable Navy projects identified in Section 5.3 may contribute to temporary and/or permanent cumulative changes in the visual character of the Shipyard. The recent Memorial Bridge replacement also may contribute to cumulative impacts on visual resources.

The remaining non-Navy projects identified in Section 5.3 would not contribute to cumulative changes in the visual setting of the Shipyard. The locations of these projects provide no or limited views of the Shipyard and the Project area. While the Sarah Mildred Long Bridge replacement and New Hampshire Port Authority Main Wharf expansion would result in visual changes at their project locations,

cumulative impacts on visual resources with the Proposed Action are not likely because the Project area for the Proposed Action would seldom be in the same view as the Sarah Mildred Long Bridge or the New Hampshire Port Authority Main Wharf. Maintenance dredging of the federal navigation channel and expansion of the Portsmouth Harbor turning basin would not result in cumulative visual impacts because of these projects' distance from the Project area and because they would not result in long-term visual changes at their respective locations.

5.4.6.3 Cumulative Impact Analysis

The Shipyard has been subject to numerous changes in its appearance and composition due to the construction, modification, and demolition of various structures. Recent visual changes have resulted from the replacement, repair, and construction of features at Dry Dock 1; building renovations, upgrades, and structural modernizations at Buildings 178 and 55; and improvements and additions to Building 174. These changes have affected the appearance of the Shipyard in and near the Project area for the Proposed Action within views from surrounding areas outside the Shipyard.

Six present or reasonably foreseeable Navy projects may contribute to temporary and/or permanent, cumulative changes to the visual setting associated with the Shipyard when considered in conjunction with the Proposed Action. They include the Bridge 1 structural repairs; Dry Dock 3 pumpwell repairs; the consolidation of structural shops, including demolition of Building 155; Dry Dock 3 maintenance dredging; the waterfront utilities improvement project; and the Dry Dock 1 reactor servicing complex. Temporary visual changes would result primarily from the presence of construction and dredging equipment and activities that would be visible in views of the Shipyard and the Project area; however, these impacts would be temporary and would be most noticeable at times when construction overlaps.

Long-term visual changes would result from construction of a new superstructure of different design for Bridge 1, alteration of Buildings 75 and 76, demolition of Building 155, and the addition of above-ground utility improvements associated with the waterfront utilities improvement project and the Dry Dock 1 reactor servicing complex. These changes may affect the overall appearance of the Shipyard as seen from scenic areas at and surrounding the installation. The pumpwell at Dry Dock 3 is not visible from other areas within or outside of the Shipyard, so replacing the pumpwell would not contribute to long-term cumulative changes in the visual setting.

Replacement of Memorial Bridge resulted in long-term visual changes in the bridge and surrounding views, including views of the Shipyard and the Project area. The design of the new bridge was carefully considered to minimize changes in its appearance. The new Memorial Bridge was constructed at the site of the old bridge and incorporates similar design and materials, thereby minimizing visual impacts. While the visual changes associated with this project and the Proposed Action would result in long-term impacts on visual resources in the ROI, these impacts are expected to be minor.

Cumulative visual impacts from past, present, and future actions within the ROI would be less than significant because the new structures and infrastructure constructed by many of these projects would be consistent in appearance with existing buildings and infrastructure in the area and consistent with the overall character of the ROI, which includes a constantly changing industrial Shipyard and commercial port. Many of the visual impacts would result from the presence of construction equipment and would be temporary and minor. Long-term impacts are anticipated to be minor as the cumulative visual changes would be consistent with the Shipyard's industrial setting and many adaptations to allow continued operations. Therefore, implementation of the Proposed Action combined with the past,

present, and reasonably foreseeable future projects would not result in significant impacts within the ROI.

5.4.7 Noise

5.4.7.1 Description of Geographic Study Area

The ROI for cumulative noise impacts is a 0.5-mile radius from the Proposed Action components. Existing noise-sensitive uses within this area include areas of low-density residential and commercial/recreational development and land uses.

5.4.7.2 Relevant Past, Present, and Future Actions

The construction and dredging projects listed in Section 5.3.2.1 and 5.3.2.2 would result in temporary increases in ambient noise levels at nearby sensitive receptors. Past actions would not have impacts on noise with the Proposed Action; however, present and reasonably foreseeable projects that could overlap in time and geographic location with the Proposed Action would result in an increase in ambient noise levels that may contribute to cumulative impacts at the closest sensitive receptors. Present and reasonably foreseeable projects within the ROI that could result in a cumulative impact include the Bridge 1 structural repairs, Dry Dock 3 pumpwell repairs, Dry Dock 3 maintenance dredging, waterfront utilities improvements, and construction of the Dry Dock 1 reactor servicing complex.

5.4.7.3 Cumulative Impact Analysis

Potential cumulative impacts on ambient noise would result from simultaneous operation of equipment at construction sites and an increase in vehicle traffic along routes that would be used during implementation of the Proposed Action. The ongoing and reasonably foreseeable Navy projects listed above would occur within a 0.5-mile radius of, and would overlap in timeframe with, the proposed Berth 11 structural repairs and Dry Dock 3 caisson replacement. In addition, potential temporary cumulative impacts on local traffic would result in intermittent increases in traffic noise at sensitive receptors located near the transportation routes used for the Proposed Action.

Concurrent construction of the Berth 11 structural repairs and Dry Dock 3 caisson replacement, the Bridge 1 structural repairs, Dry Dock 3 pumpwell repairs, Dry Dock 3 maintenance dredging, waterfront utilities improvements, and construction of the Dry Dock 1 reactor servicing complex would result in a moderate increase in ambient noise levels at residential receptors located within 1,500 feet of Dry Dock 3 and Berth 11. Assuming these projects would result in similar construction noise levels as those predicted for in-water projects under the Proposed Action, the estimated worst-case composite noise from concurrent activities would be 80 to 83 dBA DNL at 50 feet[5], with a potential increase of 2 to 5 dBA over the existing ambient noise levels at the closest residential receptors located in the Town of Kittery and on Badgers Island. Noise impacts from concurrent construction activities and heavy-duty truck traffic would be temporary, intermittent, and localized during daytime hours.

[5] Composite noise is calculated as a logarithmic function. When two noise sources have decibel values that differ by 0 to 1 dB and are located at the same distance from a receptor, the composite noise is determined by adding 3 dB to the higher value. For the purposes of this analysis, it has been assumed as a worst-case scenario that the Bridge 1 structural repairs project would add 3 dB to the construction noise levels predicted for the proposed Dry Dock 3 caisson replacement.

Therefore, implementation of the Proposed Action combined with the Bridge 1 structural repairs and Dry Dock 3 pumpwell repairs would result in moderate, temporary cumulative impacts on ambient noise within the ROI.

5.4.8 Infrastructure

5.4.8.1 Description of Geographic Study Area

The ROI for potential impacts on utility infrastructure includes the Shipyard. The Proposed Action would not result in an increase in demand for utility services. Therefore, the Proposed Action would not impact regional utility infrastructure or services, and no cumulative impacts with the other projects identified in Section 5.3 would result.

The ROI for potential impacts on solid waste management includes the Shipyard and the federal navigation channel in the Piscataqua River.

5.4.8.2 Relevant Past, Present, and Future Actions

The recently completed project to construct a consolidated waterfront support facility at the Shipyard, the Buildings 178 and 55 energy and structural repairs project, and the consolidation of structural shops could potentially result in cumulative impacts on infrastructure with the Proposed Action. The other identified past, present, and reasonably foreseeable projects at the Shipyard would not result in any changes in operations at the Shipyard that would change the installation's utility use, and any utility work involved in these projects would be localized at the project sites. Therefore, no cumulative impacts with the Proposed Action and these projects would result.

The Navy and non-Navy construction and dredging projects identified in Section 5.3 would result in cumulative impacts on solid waste management. The federal navigation channel maintenance dredging, expansion of the Portsmouth Harbor turning basin, and Dry Dock 3 maintenance dredging may result in cumulative impacts with the Proposed Action because each of these projects would generate dredge spoils that would require disposal.

5.4.8.3 Cumulative Impact Analysis

Recently completed construction projects at the Shipyard, including the Buildings 178 and 55 energy and structural repairs and construction of the waterfront support facility at Dry Dock 3, resulted in changes to the Shipyard's utility infrastructure at the project locations and generated a short-term increase in construction and demolition (C&D) debris during the construction period. Utility work was contained within the immediate project sites and is completed; therefore, no cumulative impacts with the Proposed Action on the Shipyard's utility infrastructure would result. Neither one of these projects resulted in increases in the number of Shipyard personnel or substantial changes to Shipyard operations; therefore, no long-term increases in utility demand resulted. The energy and structural repairs at Buildings 178 and 55 may result in a long-term decrease in the amount of electrical power used at the Shipyard as a result of measures to improve building energy efficiencies and incorporate renewable energy technology sufficient to obtain Leadership in Energy and Environmental Design Silver certification (Navy, 2010; Navy, 2011).

Neither of the two recently completed construction projects resulted in long-term impacts on stormwater management. Site hydrology in most cases was not altered by these projects. The work at Building 55 improved site hydrology by removing areas of impervious surface. The Proposed Action

likewise would not result in changes in site hydrology at any of the project sites, which are currently paved. Therefore, no cumulative impacts on stormwater management would result. Each of these projects was or would be exempt from the requirements of the Energy Independence and Security Act and the Navy's Low-Impact Development policy.

Potential impacts on infrastructure as a result of the planned projects to consolidate structural shops and paint, blast, and rubber facilities and the project to construct a Dry Dock 1 reactor servicing complex on the Shipyard will be assessed in the EA or CATEX for each project. It is expected that these impacts would be short-term and negligible or minor, similar to the Shipyard projects discussed above, and would not result in significant cumulative impacts with the Proposed Action. While the proposed waterfront utilities improvements project likewise would result in temporary impacts during construction, completion of this project is expected to improve utility service to various waterfront facilities at the Shipyard. None of these planned projects would result in changes in personnel loading or operations at the Shipyard that would result in substantial changes in utility demand.

Past, present, and reasonably foreseeable construction projects on the Shipyard have or would generate C&D debris requiring recycling or disposal at approved facilities. In addition, dredging projects in the Piscataqua River would result in dredge spoils that would need to be disposed of at authorized disposal sites. Navy construction contractors are required to comply with Navy requirements for solid waste management that conform to applicable federal, state, and local regulations intended to protect the environment through management of solid waste. The requirements address work practices that would be implemented to ensure that the amount of solid waste generated is minimized and is recycled to the extent practicable, and any that cannot be salvaged or recycled is disposed of in an environmentally responsible manner at permitted and approved C&D debris landfills. Multiple authorized landfills are available to accept C&D debris generated by Shipyard construction projects; therefore, significant cumulative impacts are not expected to result.

Dredge spoils removed from the entrance to Dry Dock 3 would be tested and characterized for toxicity, amended with cement, and disposed of at a permitted upland disposal facility in accordance with the Maine Solid Waste Management rules and regulations. Dredge spoils are not expected to exceed the capacities of regional landfill facilities.

Dredge spoils removed from the site of the federal navigation channel turning basin expansion, including approximately 19,659,000 cubic feet (728,100 cubic yards) of sediments and 683,100 cubic feet (25,300 cubic yards) of rock, would be disposed of at the Isles of Shoals North ocean placement site, located approximately 10 miles offshore of the mouth of the river, or reused for shoreline stabilization projects along the coasts of Maine and Massachusetts (Bostick, 2015). Maintenance dredging of the Simplex Shoals reach of the federal navigation channel would result in removal of up to 1,350,000 cubic feet (50,000 cubic yards) of clean sand and gravel during each recurring dredging operation. This material is disposed of at an authorized disposal site in the Piscataqua River (USACE New England District, 2012). Dredge spoils removed during the Berths 11, 12, and 13 structural repairs under either Alternatives 1 or 2 and found to be contaminated would be disposed of at an authorized landfill in accordance with the requirements of the Maine Solid Waste Management rules and regulations. Dredge spoils resulting from the Dry Dock 3 caisson replacement project under Alternative 2 would be disposed of at an upland facility. Because of the different disposal sites that would be used and measures taken to reduce the amount of dredged material requiring disposal, the federal navigation channel dredging projects would not result in cumulative impacts on solid waste management with the Proposed Action.

Therefore, the other Navy and non-Navy projects identified above are not expected to result in significant cumulative impacts with the Proposed Action on infrastructure.

5.4.9 Transportation

5.4.9.1 Description of Geographic Study Area

The geographic area considered for cumulative impacts on transportation includes the three major roadways that run north-south between Maine and New Hampshire—I-95, U.S. Route 1, and the U.S. Route 1 Bypass—and local roads that travel between these major roadways and the Shipyard. Access to the Shipyard is provided by State Route 103 (Walker Street) and Wyman Avenue.

5.4.9.2 Relevant Past, Present, and Future Actions

Past, present, and reasonably foreseeable transportation projects that affect the flow of traffic in the vicinity of and into the Shipyard may contribute to cumulative impacts on the operation of the transportation network during implementation of the Proposed Action.

The Memorial Bridge carrying U.S. Route 1 over the Piscataqua River was replaced between 2012 and 2013, and the Sarah Mildred Long Bridge carrying the U.S. Route 1 Bypass is currently being replaced, with completion expected in late 2017. Traffic on Memorial Bridge is expected to increase during the closure of the Sarah Mildred Long Bridge.

Bridge 1, the primary vehicular, bicycle, and pedestrian bridge and sole railway bridge providing access to Seavey's Island, is undergoing structural repairs that began in FY 2015 and will be completed prior to start of construction for the Project.

5.4.9.3 Cumulative Impact Analysis

The Proposed Action would result in a minor increase in traffic on roads in the study area during construction. During the period when the U.S. Route 1 Bypass is closed at the Sarah Mildred Long Bridge, construction traffic may contribute to cumulative traffic impacts on Memorial Bridge and U.S. Route 1. However, as shown in Tables 4.9-2 and 4.9-3, the volume of trips that would be generated as a result of implementation of the project represents only a small amount of the AADT of Memorial Bridge/U.S. Route 1 and Interstate 95. Most construction traffic coming from the south would be expected to use I-95 to cross the river into Maine and thereby avoid the narrow local roadways through Portsmouth; therefore, cumulative traffic impacts on the Memorial Bridge and on U.S. Route 1 during construction are expected to be minor.

Multiple construction projects are regularly ongoing at the Shipyard, and the traffic generated by any concurrent Navy projects would not be expected to create a noticeable increase in the traffic to and from Seavey's Island. It is not unusual for construction traffic to enter the Shipyard via Bridge 2 because heavy and oversize trucks were being diverted to Bridge 2 due to structural limitations of Bridge 1 even before the repairs to Bridge 1 began. Cumulative transportation impacts caused by the addition of construction traffic generated by the Proposed Action could result in short-term, minor impacts on traffic in the vicinity of the Shipyard during peak traffic periods. This cumulative impact could be lessened by encouraging or requiring some construction traffic to enter and exit the Shipyard during off-peak hours to mitigate impacts as needed. The Proposed Action would not result in any change in local or regional transportation networks after construction and would not affect traffic traveling to and from

the Shipyard over the long term. Therefore, the Proposed Action would not result in long-term cumulative impacts on transportation.

5.4.10 Hazardous Materials and Wastes

Cumulative impacts associated with hazardous materials and wastes were not analyzed in detail for this EA. The Proposed Action would result in only negligible impacts from the handling of hazardous materials, the generation and management of hazardous waste, and the handling of materials with special hazards. The Navy and contractors would comply with a framework of federal/state regulations and Navy procedures for handling such materials and wastes. Accordingly, cumulative impacts associated with hazardous materials and wastes from past, present, and future actions within the ROI are not expected.

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6 Other Considerations Required by NEPA

6.1 Consistency with other Federal, State, and Local Laws, Plans, Policies, and Regulations

In accordance with 40 CFR section 1502.16(c), analysis of environmental consequences shall include discussion of possible conflicts between the Proposed Action and the objectives of federal, regional, state, and local land use plans, policies, and controls. Table 6.1-1 identifies the principal federal and state laws and regulations that are applicable to the Proposed Action and describes briefly how compliance with these laws and regulations would be accomplished.

Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal and State Laws	*Regulatory Authority*	*Status of Compliance*	*Section of the EA*
National Environmental Policy Act (NEPA) (42 U.S.C. section 4321 et seq.); Council on Environmental Quality (CEQ) NEPA implementing regulations (40 CFR parts 1500-1508; Navy procedures for Implementing NEPA (32 CFR part 775 and OPNAVINST 5090.1D)	Navy	This Environmental Assessment (EA) has been prepared in accordance with NEPA, CEQ regulations implementing NEPA, and Navy NEPA procedures. Public participation and review are being conducted in compliance with NEPA.	Entire EA
Clean Air Act (CAA) (42 U.S.C. section 7401 et seq.)	U.S. Environmental Protection Agency (USEPA)	The air quality analysis in the EA concludes that proposed emissions would not create a major regional source of air pollutants or affect the current attainment status, and would comply with all applicable state and regional air agency rules and regulations.	3.1 and 4.1, Air Quality Appendix C
Clean Water Act (CWA) (33 U.S.C. section 1251 et seq.)	USEPA, U.S. Army Corps of Engineers (USACE) Maine Department of Environmental Protection (MEDEP)	The EA considers impacts on water quality. The Navy is applying for both an individual USACE permit and a Maine General Permit under section 404 of the Clean Water Act (CWA) and section 10 of the Rivers and Harbors Act. In accordance with permit requirements, the Navy will pay an in lieu fee to the MEDEP in compensation for the loss of wetland functions and values resulting from the proposed permanent fill at Berths 11, 12, and 13.	3.2 and 4.2, Water Resources; 3.8 and 4.8, Infrastructure Appendix B

Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal and State Laws	*Regulatory Authority*	*Status of Compliance*	*Section of the EA*
Rivers and Harbors Act (33 U.S.C. section 403 et seq.)	USEPA, U.S. Army Corps of Engineers (USACE)	The EA addresses proposed fill in the Piscataqua River. The Navy has obtained both an individual USACE permit and a Maine General Permit under section 404 of the Clean Water Act (CWA) and section 10 of the Rivers and Harbors Act for the Proposed Action under Alternative 1.	3.2 and 4.2, Water Resources Appendix B
Coastal Zone Management Act (CZMA) (16 U.S.C. section 1451 et seq.)	National Oceanic and Atmospheric Administration (NOAA)	The coastal consistency determinations for the waterfront improvement projects under Alternative 1 consider impacts on land uses, water uses, and natural resources of the coastal zone. The Maine Coastal Program conditionally concurred with the Navy's determinations that the projects would be consistent, to the maximum extent practicable, with the Maine Coastal Zone Management Program and applicable federal and state laws. This concurrence is dependent upon the Navy meeting the terms and conditions of the MEDEP's Orders dated May 25, 2016 (DEP # L-21179-26-BN-B/L-21179-4E-BO-N) and July 18, 2016 (DEP #L-21179-26-BP-B/L-21179-4E-BQ-N).	Appendix B
National Historic Preservation Act (NHPA) (54 U.S.C. section 306108 et seq.)	Advisory Council on Historic Preservation (ACHP) Maine Historic Preservation Commission	This EA considers impacts on cultural resources. The Navy has consulted with the Maine State Historic Preservation Officer and other interested parties pursuant to section 106 of the NHPA. A Memorandum of Agreement with the Maine State Historic Preservation Officer has been executed for the Dry Dock 3 caisson replacement.	3.4 and 4.4, Cultural Resources Appendix D

Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal and State Laws	*Regulatory Authority*	*Status of Compliance*	*Section of the EA*
Endangered Species Act (ESA) (16 U.S.C. section 1531 et seq.)	U.S. Fish and Wildlife Service (USFWS) National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries)	This EA considers impacts on species listed as threatened or endangered pursuant to this act. The Navy has consulted with NOAA Fisheries pursuant to section 7 of the ESA and received concurrence that the Proposed Action under Alternative 1 would have no impact on protected species. Additionally, the Navy has determined that Alternative 1 would have insignificant or discountable effects on proposed critical habitat for the Atlantic sturgeon, and conferencing is not required under section 7(a)(4) of the ESA.	3.5 and 4.5, Biological Resources Appendix H
Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (16 U.S.C. section 1801 et seq.)	NOAA Fisheries	The EA considers impacts on fish and essential fish habitat. Pursuant to this act, the Navy consulted with NOAA Fisheries and received concurrence that the Proposed Action under Alternative 1 would have no adverse impacts on essential fish habitat.	3.5 and 4.5, Biological Resources Appendix G
Marine Mammal Protection Act (MMPA) (16 U.S.C. section 1361 et seq.)	NOAA Fisheries	The EA considers impacts on protected marine mammal species pursuant to this act. The Navy is applying for phased Incidental Harassment Authorizations to cover each year of the proposed in-water work under Alternative 1. The Navy has consulted with NOAA Fisheries regarding potential impacts on marine mammals under the MMPA under Alternative 1. The Navy will comply with the requirements and mitigation measures in the Incidental Harassment Authorization that will be issued prior to the start of in-water construction.	3.5 and 4.5, Biological Resources Appendix F

Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal and State Laws	*Regulatory Authority*	*Status of Compliance*	*Section of the EA*
Bald and Golden Eagle Protection Act (16 U.S.C. section 668-668d)	USFWS	The EA considers potential impacts on eagles protected under this act.	Chapter 3 introduction
Executive Order 11988, Floodplain Management	Navy	The EA considers potential impacts on floodplains and floodplain management.	3.2 and 4.2, Water Resources
Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	Navy	The EA considers the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations.	Chapter 3 introduction
EO 13045, Environmental Health Risks and Safety Risks to Children	Navy	The EA considers the potential for disproportionate effects on children.	Chapter 3 introduction
EO 13175, Consultation and Coordination with Indian Tribal Governments	Navy	The EA considers potential impacts on traditional cultural properties. The Navy has consulted with federally recognized tribes pursuant to this EO.	3.4 and 4.4, Cultural Resources Appendix E
EO 13693, Planning for Federal Sustainability in the Next Decade	Navy	The EA considers greenhouse gas emissions resulting from the Proposed Action.	3.1 and 4.1, Air Quality
Maine Natural Resources Protection Act (38 Maine Revised Statutes [M.R.S.] sections 480-A to 480-BB)	MEDEP	The EA considers impacts on the Piscataqua River. The Navy has obtained Natural Resources Protection Act individual permits from MEDEP for the waterfront improvement projects under Alternative 1. In accordance with permit requirements, the Navy will pay an in lieu fee to the MEDEP in compensation for the loss of wetland functions and values resulting from the proposed permanent fill at Berths 11, 12, and 13.	3.2 and 4.2, Water Resources Appendix B
Maine Site Location of Development Act (38 M.R.S. section 481)	MEDEP	The EA considers impacts on resources protected under the Maine Site Location of Development Act and permitting requirements. The Navy has obtained minor amendments to the Shipyard's Site Location of Development Law permit for both waterfront improvement projects under Alternative 1.	3.2 and 4.2, Water Resources Appendix B

Table 6.1-1 Principal Federal and State Laws Applicable to the Proposed Action

Federal and State Laws	*Regulatory Authority*	*Status of Compliance*	*Section of the EA*
Maine Stormwater Management Law (38 M.R.S. section 420-D)	MEDEP	The EA considers compliance requirements under the Maine Stormwater Management Law.	3.2 and 4.2, Water Resources
Maine Erosion and Sedimentation Control Law (38 M.R.S. section 420-C)	MEDEP	The EA considers potential impacts on water quality.	3.2 and 4.2, Water Resources

Coastal Zone Management

The federal Coastal Zone Management Act (CZMA) of 1972 establishes a federal-state partnership to provide for the comprehensive management of coastal resources. Coastal states and territories develop site-specific coastal management programs based on enforceable policies and mechanisms to balance resource protection and coastal development needs. The Maine Coastal Program lays out the policy to guide the use, protection, and development of land and ocean resources within the state's coastal zone. Under the act, federal activity in, or affecting, a coastal zone requires preparation of a Coastal Zone Consistency Determination or a Negative Determination. In other words, any federal agency proposing to conduct or support an activity within or outside the coastal zone that will affect any land or water use or natural resource of the coastal zone is required to do so in a manner consistent with the CZMA or applicable state coastal zone program to the maximum extent practicable. However, federal lands, which are "lands the use of which is by law subject solely to the discretion of . . . the Federal Government, its officers, or agents," are statutorily excluded from the state's "coastal zone." If, however, the proposed federal activity affects coastal resources or uses beyond the boundaries of the federal property (i.e., has spillover effects), the CZMA section 307 federal consistency requirement applies. As a federal agency, the Navy is required to determine whether its proposed activities would affect the coastal zone. This takes the form of either a Negative Determination or a Consistency Determination.

Potential impacts on applicable resources that are subject to the state's program have been addressed in the respective environmental consequences sections of this document. The Navy submitted Maine Coastal Zone Management Consistency Determinations for the Berths 11, 12, and 13 structural repairs and the Dry Dock 3 caisson replacement to the Maine Coastal Program. The Maine Coastal Program conditionally concurred with the Navy's determinations that the projects would be consistent, to the maximum extent practicable, with the Maine Coastal Zone Management Program and applicable federal and state laws in letters dated May 26, 2016 (Berths 11, 12, and 13) and July 18, 2016 (Dry Dock 3) (see Appendix B). Agency concurrence is dependent upon the Navy meeting the terms and conditions of the MEDEP's Orders dated May 25, 2016 (DEP # L-21179-26-BN-B/L-21179-4E-BO-N) and July 18, 2016 (DEP # L-21179-26-BP-B/L-21179-4E-BQ-N).

6.2 Irreversible or Irretrievable Commitments of Resources

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel and natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an

irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Implementation of the Proposed Action would involve human labor; the consumption of fuel, oil, and lubricants for construction vehicles; and loss of natural resources, including marine sediments and benthic habitat across an area of up to approximately 117,200 square feet (the footprint of the proposed bulkheads at Berths 11, 12, and 13, excluding areas of previous fill below the pier), and immobile benthic organisms or marine vegetation and less mobile benthic invertebrates or fish in in-water areas affected by the berths' structural repairs and Dry Dock 3 caisson replacement. The Proposed Action would result in replacement of the Dry Dock 3 caisson, resulting in irreversible changes to Dry Dock 3, a contributing resource within the Portsmouth Naval Shipyard Historic District. Implementation of the Proposed Action would not result in significant irreversible or irretrievable commitment of resources.

6.3 Unavoidable Adverse Impacts

This EA has determined that the alternatives considered would not result in any significant impacts. Implementing either action alternative would result in the following unavoidable environmental impacts:

- Temporary and minor increases in emissions of criteria air pollutants during construction.
- Short-term, minor impacts on surface water, wetlands, and marine sediments resulting from disturbance and water quality impacts (turbidity) during construction.
- Under Alternative 1 or 2, dredging and fill of between approximately 95,400 square feet and approximately 117,200 square feet (with implementation of Option 1) of the Piscataqua River adjacent to Berths 11, 12, and 13, resulting in permanent removal of marine sediments and benthic habitat, including designated EFH and loss of wetland functions, individual benthic organisms, marine vegetation, and less mobile fish.
- Dredging and temporary fill of approximately 7,458 square feet of the Piscataqua River adjacent to the Dry Dock 3 caisson under Alternative 2, resulting in removal of marine sediments; disruption of benthic habitat; and loss of individual benthic organisms, marine vegetation, and less mobile fish.
- Temporary increases in underwater sound pressure levels above NOAA Fisheries' Level A Injury Thresholds for marine mammals protected under the Marine Mammal Protection Act within a radius of approximately 1,102 feet (336 meters) for porpoises or 495 feet (151 meters) for seals during impact pile driving.
- Temporary increases in underwater sound pressure levels above NOAA Fisheries' Level B Disturbance Thresholds for marine mammals within a 0.48 square mile area in the lower Piscataqua River.
- Temporary increases in underwater noise levels above established criteria for physical injury and behavioral changes in fish. Pathological or physiological impacts on fish are expected to be localized; areas in which potential behavioral impacts, including temporary displacement, could occur would extent up to 315 feet from the in-water construction areas.
- Temporary, moderate increases in ambient airborne noise levels at the nearest sensitive receptors during construction.

6.4 Relationship between Short-term Use of the Environment and Long-term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development site reduces future flexibility in pursuing other options, or that using a parcel of land or other resources often eliminates the possibility of other uses at that site.

In the short-term, construction of the waterfront improvement projects would result in temporary impacts on air quality, surface water quality, soils, and marine biological resources. The Proposed Action also would result in short-term impacts on human communities near the Project area resulting from construction noise and traffic. Construction of the waterfront improvement projects would result in the long-term impacts noted in Sections 6.2 and 6.3 but would not significantly impact the long-term natural resource productivity of the Project area or the lower Piscataqua River estuary. The Proposed Action would not result in any impacts that would significantly reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

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