Final

Environmental Assessment for the Repair and Restoration of the North Severn Shoreline

Naval Support Activity Annapolis, Annapolis, Maryland

August 2015

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August 2015

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Point of Contact:	Anna Lubetski NAVFAC Washington 1314 Harwood Street SE, Building 212 Washington Navy Yard, DC 20374-5018

Abstract

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. NSA Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay using four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization with natural untreated hardwood logs, and 4) living shoreline. The Department of the Navy has prepared this EA in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 *et seq*.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10 (DoN 2014). This EA concludes that long-term impacts from the proposed action would be beneficial. The Navy has determined the preparation of an Environmental Impact Statement is not required.

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) evaluates the potential direct, indirect, and cumulative environmental impacts that may result from the Navy's proposal to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay at Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. The proposal includes repair and restoration of approximately 28,000 linear feet of shoreline at the North Severn Complex. The North Severn Complex shoreline has been experiencing shoreline erosion for decades. Shoreline erosion has been caused by a number of factors, including wave energy, fetch, storms, slope saturation, and longshore drift. Beginning in the 1930s, extensive shoreline protection efforts, including the construction of rock seawalls, wooden bulkheads (vertical structure at shoreline), and earthen berms have resulted in the hardening of portions of the shoreline at the North Severn Complex, and only about 12,500 feet of the shoreline remains in a natural condition. In an effort to improve shoreline condition and enhance shoreline habitat, approximately 3,300 feet of shoreline have been protected through a combination of nonstructural and structural methods. However, emergency shoreline stabilization efforts are only temporary. Permanent erosion control measures are needed to help protect the loss of mission-critical areas along the shoreline of the North Severn Complex.

ES.1 Purpose and Need for the Proposed Action

The purpose of the proposed action is to repair and restore 28,000 linear feet of the North Severn Complex shoreline that have been severely damaged or made vulnerable by erosion. Shoreline erosion control measures would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion along Carr Creek, Mill Creek, the Severn River, and Chesapeake Bay shorelines of the North Severn Complex.

The proposed action is needed because significant shoreline areas are eroding, resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The eastern, southern, and southwestern portions of Greenbury Point are exposed to long fetch distances in the Severn River and the Chesapeake Bay, allowing for excessive wind and high wave energy along the shorelines leading to erosion of the banks. In addition, one shoreline area of concern is a berm (former dredge spoil lagoon) at Greenbury Point constructed of soil and fortified with large concrete debris and other disposed materials. This constructed berm, which holds dredge disposal material, has been rehabilitated with a water control structure to relieve head pressure within the dredged material area during storm events, and a small breakwater (trapezoidal riprap structures) along portions of the berm. The water control structure, which was installed in 1998, regulates the water flow from the berm across the west side of Greenbury Point during storm events. Emergency stabilization measures have been implemented to prevent the outer berm from failing and releasing contaminants contained in the dredged materials into the river. However, the berm is under threat of failure if permanent stabilization measures on the berm are not implemented. Furthermore, the proposed action is needed to maintain the safety and usefulness of the North Severn Complex mission-critical areas. The NSA Annapolis wastewater treatment plant (WWTP) is located near Carr Creek and sections of the wastewater collection system and the treated wastewater outfall are in proximity to the degrading shoreline.

ES.2 Proposed Action and Alternatives

NSA Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. The proposal includes repair to approximately 28,000 linear feet of shoreline. Construction would likely begin in late 2015, and would be phased over a five-year period. NSA Annapolis has identified four alternative repair and restoration methods that are potentially feasible for the proposed action. The alternative method deemed most

feasible would be based on site conditions, environmental impact, and practicability of implementing the repair and restoration. The project area for this EA has been divided into reaches (see Figure ES-1 and Table ES-1).

These areas have been defined geographically, as well as based on the extent of erosion and potential repair and restoration methods applicable.

Table ES-1. Description of Reaches in the Project Area

Reach		Length (linear feet)	Description
A		9,160	Reach A includes the majority of the eastern and southern areas of Greenbury Point and is subject to some of the highest wave action, storm energy, and fetch in the project area, leading to extensive erosion. Portions of the eastern side of Greenbury Point included in Reach A have had some armoring placed at the toe of slope.
B		1,160	Reach B is located on the southwestern portion of Greenbury Point, which also exhibits extensive erosion; however, the wave energy and fetch is not as great as Reach A.
C		1,140	Reach C includes the shoreline outboard (on the creek side) of the berm (former dredge spoil lagoon). Reach C has been the subject of two investigations, the 2010 *Berm Rehabilitation Plan* and the 2012 *Berm Stabilization and Living Shoreline Project, Final Emergency Stabilization Work Plan*. Both reports provided plans for emergency stabilization measures to address the erosion of the berm in this reach.
D	**D1**	7,530	Reach D includes the shoreline of Carr Creek and has been divided into D1 and D2. Reach D1 was the subject of the *Carr Creek Shoreline Survey, Riparian Habitat Conceptual Restoration Design Report* in 2013, and Reach D2 includes the remainder of the Carr Creek shoreline adjacent and similar to D1, but not included in the survey. Carr Creek areas are experiencing erosion due to wave and storm energy and slope saturation.
	D2	1,600	
E		1,400	Reach E includes the area on the east side of the Carr Creek Marina and is also subject to high wave action, storm energy, and fetch.
F		3,510	Reach F includes Possum Point and the small boat launch and marina area in Mill Creek, which is experiencing erosion of the banks.
G		2,500	Reach G includes the remainder of the Mill Creek shoreline areas, which is experiencing erosion of the banks.
TOTAL		28,000	

Three action alternatives are evaluated in this EA along with the No Action Alternative. The three alternatives for implementing the proposed action include four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization with natural untreated hardwood logs, and 4) living shoreline. The shoreline reaches are the same under the three action alternatives. The three alternatives are described in the following sections and are summarized in Table ES-2. The table includes the proposed repair and restoration alternative for each reach.

Table ES-2. Summary of Action Alternatives

Alternative	Repair and Restoration Method by Reach
Alternative 1 – Hardened Structure/Revetment	Reaches A, B, C, D, E, F, and G – Hardened Structure/Revetment
Alternative 2 – Log Toe Stabilization	Reaches B, D, and G – Log Toe Stabilization Reaches A, E, and F – Alternative 1 Reach C – Sheet Pile
Alternative 3 – Living Shoreline (Preferred)	Reaches B, D, F, and G – Living Shoreline Reaches A and E – Alternative 1 Reach C – Alternative 2

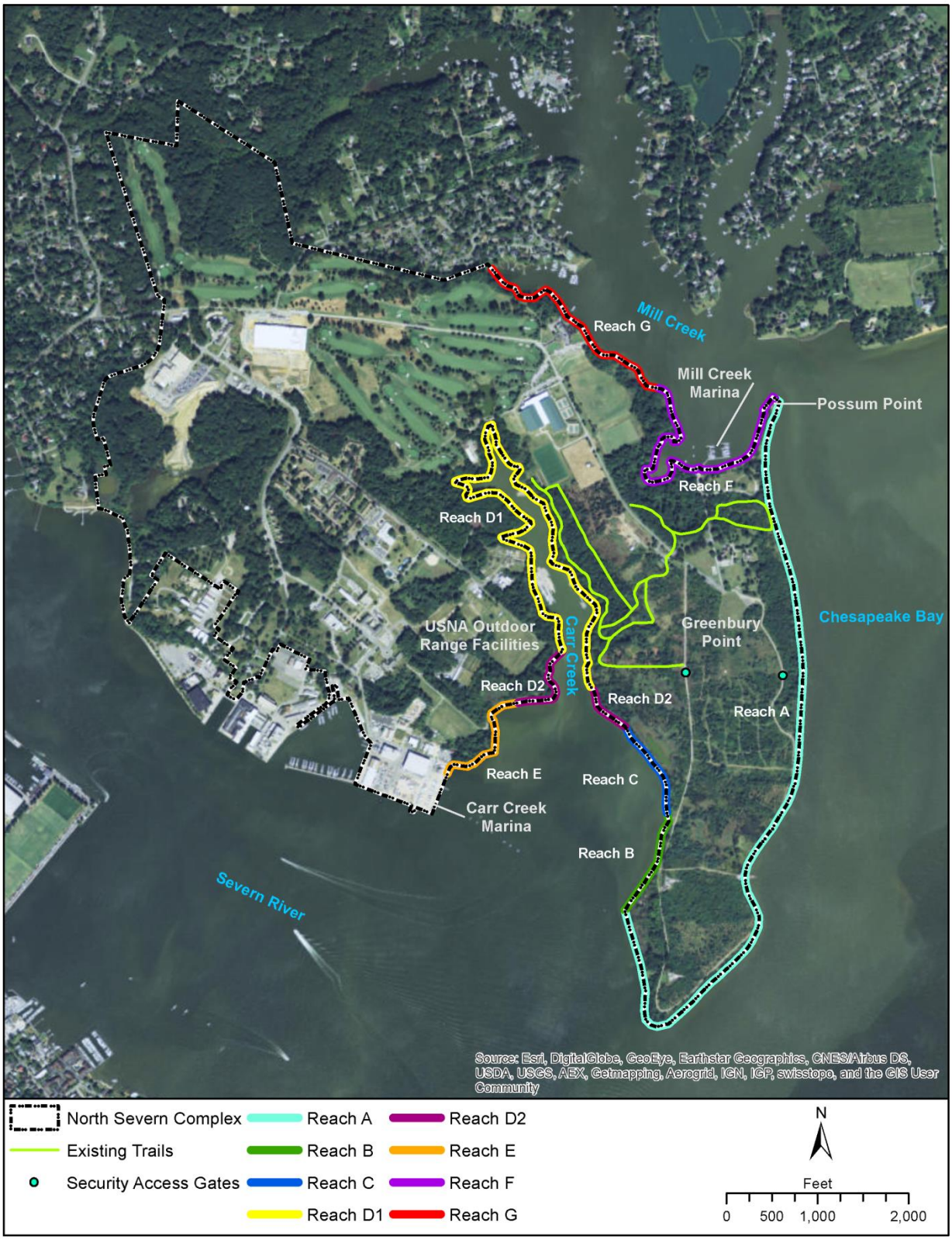

Figure ES-1. Location of Reaches in the Project Area

ES.2.1 Alternative 1 – Hardened Structure/Revetment

Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, C, D, E, F, and G. The hardened structure/revetment for this alternative includes 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope.

The work for the hardened structure/revetment would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.

ES.2.2 Alternative 2 – Log Toe Stabilization

Alternative 2 would employ log toe stabilization along Reaches B, D, and G where potential wave energy is lower. Under Alternative 2, Reaches A, E, and F would be repaired using the hardened structure/revetment method, as described under Alternative 1. Reach C would be repaired using the sheet pile method.

The log toe stabilization method includes the placement of natural untreated hardwood logs at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. This measure would also include potential grading of the upper portions of the embankment to a less erosive slope, where slope erosion is occurring.

A detailed engineering analysis conducted for Reach C, which is adjacent to the berm (former dredge spoil lagoon), determined a sheet pile structure to be the most feasible measure for this site. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. The berm would be back-filled using suitable fill material.

The work for log toe stabilization and the sheet pile structure would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints of the various work areas.

ES.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method as described under Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2.

Living shoreline techniques include the use of sills, groins, or breakwaters in combination with sand, and other natural materials. Living shoreline restoration includes the installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed, consisting of a trapezoidal stone structure, for the purpose of dissipating wave energy before waves reach the shore. This alternative would be utilized in areas with lower wave energy along portions of the Carr Creek and Mill Creek reaches where installation of this type of restoration measure would be most successful. This technique would also include potential grading of the upper portions of the embankment to a less erosive slope, where appropriate. This work would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.

ES.2.4 No Action Alternative

The No Action Alternative would maintain the status quo. Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex mission-critical areas would decrease. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist.

The No Action Alternative fails to meet the purpose and need of the proposed action. However, it does provide a baseline against which to measure the potential impacts of the proposed action. Therefore, the No Action Alternative is evaluated in subsequent sections of this EA.

ES.3 Summary of Environmental Consequences

A summary of environmental consequences for the alternatives analyzed in this EA is provided in Table ES-3. Temporary impacts to soils, water resources, biological resources, air quality, noise, and transportation would occur as a result of the proposed action during the construction phase, regardless of the alternative that may be implemented. Beneficial impacts would occur to the economy during the construction phase. The proposed action alternatives would have long-term beneficial impacts to soils, water resources, biological resources, transportation, and infrastructure and utilities by reducing shoreline erosion and sedimentation, and by reducing the potential safety risks from unstable bluffs along the shorelines. With the use of Best Management Practices (BMPs), and avoidance, minimization, and mitigation measures, none of the impacts associated with any of the alternatives for the proposed action would be significant.

Under the No Action Alternative, NSA Annapolis would maintain the status quo. Under the No Action Alternative, the proposed repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex mission-critical areas would decrease. There would be potential adverse impacts to soils, water resources, biological resources, land use, transportation, and infrastructure and utilities. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist.

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Geology, Topography, and Soils	• No impacts to geology • Soils in construction staging areas would be compacted, but restored post-construction • Appropriate BMPs would be identified in a soil erosion and sediment control plan (SESCP) and implemented during construction activities • Beneficial impacts to shoreline soils would occur; protection from future erosion and the risk of release of the disposed dredge sediments reduced	• Impacts to geology and topography would be minimal • Minor impacts to soils • Appropriate BMPs would be implemented during construction activities • Beneficial impacts as toe of slope topography would be stabilized and soil erosion and sedimentation would be reduced	• Impacts to geology and topography would be minimal • Minor impacts to soils; temporary soil disturbance during construction • Appropriate BMPs would be identified in a SESCP and implemented during construction activities • Beneficial impacts and reduction in erosion potential by created marsh	• Existing shoreline conditions would continue to decline and erosion would continue to take place resulting in continued bank sloughing and sedimentation
Water Resources	• Impacts to water quality during construction as a result of increased sedimentation and turbidity from ground disturbance during construction • Long-term beneficial impacts to water quality by reduction of sediments entering the watershed • Potential impact to approximately 4.1 acres of wetlands • Impacts to the 100-year floodplain would be minimized through implementation of BMPs in accordance with the Memorandum of Understanding (MOU) between the State of Maryland and Department of Defense (DoD) (May 2013) • No impacts to groundwater • The Navy determined the proposed action is consistent to the maximum extent practicable with Maryland's Coastal Zone Management Program (CZMP) and would not result in	• Impacts to water resources would be minimal and less than those described for Alternative 1 • Adverse impacts to wetlands during installation of living shoreline would be minimized and avoided through compliance with permit requirements and BMPs • Long-term, beneficial impacts to water resources by reducing shoreline erosion and sedimentation	• Impacts to water resources would be minimal and less than those described for Alternative 1 • Adverse impacts to wetlands during installation of living shoreline would be minimized and avoided through compliance with permit requirements and BMPs • Long-term, beneficial impacts to water resources by reducing shoreline erosion and sedimentation	• Water quality would continue to decline as a result of sedimentation • Potential for unknown contaminants from the former dredge spoil lagoon along Reach C to enter water resources could cause significant impacts to the Chesapeake Bay • The area and quality of existing wetlands may be adversely impacted over time

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Water Resources (Continued)	significant impacts to coastal zone resources (refer to Appendix A, *Federal Coastal Consistency Determination*). In accordance with Section 307 of the Coastal Zone Management Act (CZMA), the Navy submitted the Federal Coastal Consistency Determination for the proposed action to the Maryland Department of the Environment (MDE). On March, 25, 2015, the MDE concurred with the Navy's finding, specifically review finding "R1 Consistent with Qualifying Comments (MD20150112-0024)" (refer to Appendix B, *Agency Correspondence*).Impacts to water resources from construction would be avoided and minimized through the identification (i.e., preparation of a SESCP and stormwater management plan) and implementation of appropriate BMPs			

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Biological Resources	• Adverse impacts to vegetation during construction; long-term beneficial impacts to vegetation as shoreline erosion and sedimentation would be reduced • BMPs would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation; long-term beneficial impacts to submerged aquatic vegetation from improved water quality • Compliance with applicable regulations, permits, and BMPs, would minimize localized impacts to biological resources during construction activities; temporary disturbance to Essential Fish Habitat (EFH); long-term beneficial impacts to terrestrial and marine biological resources and EFH would occur following completion of repair and restoration activities • No adverse impacts to federally-listed or state-listed species are anticipated.	• Impacts to biological resources for Reaches A, C, E, and F would be the same as for Alternative 1 • Potential impacts to biological resources along Reaches B, D, and G would be less than those described under Alternative 1 because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope • Compliance with applicable regulations, permits, and BMPs would further minimize and avoid impacts to biological resources • Long-term beneficial impacts to terrestrial and marine biological resources would occur following completion of repair and restoration • No adverse impacts to federally-listed or state-listed species are anticipated.	• Impacts to biological resources for Reaches A, C, and E would be the same as for Alternative 1 • Impacts to biological resources for Reaches B, D, F, and G would be less than Alternative 2, except for potential short-term impacts to vegetation and EFH • Compliance with applicable regulations, permits, and BMPs would further minimize and avoid impacts to vegetation • Long-term beneficial impacts to terrestrial and marine biological resources would occur following completion of repair and restoration • No adverse impacts to federally-listed or state-listed species are anticipated. In a June 29, 2015 letter, the USFWS concurred with the preferred alternative (see Appendix B, *Agency Correspondence*). In response to a February 26, 2015 letter from NMFS regarding impacts to EFH, the Navy will comply with the EFH conservation recommendations. Once design plans are finalized, the Navy anticipates reinitiating consultation with NMFS with respect to EFH (refer to Appendix B, *Agency Correspondence*)	• Impacts to submerged aquatic vegetation, fish, and EFH from declining water quality due to sedimentation and the potential for unknown contaminants from the former dredge spoil lagoon along Reach C • Significant adverse impacts to biological resources within the Severn River watershed

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Land Use	• Consistent with existing land use • Short-term impacts to land use for the duration of construction	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact the installation mission and its capital assets from continued shoreline erosion
Air Quality	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds (refer to Appendix C, *Air Quality*) • No long-term emission sources would be constructed • No impacts	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds • No long-term emission sources would be constructed • No impacts	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds • No long-term emission sources would be constructed • No impacts	• No impact
Noise	• Temporary increases in noise during construction phase from construction equipment operating at the site, and construction/delivery vehicles • Implementation of noise attenuation measures would reduce potential for disturbance from noise • No long-term increase in noise	• Impacts would be the same as those described for Alternative 1, with additional temporary increased noise from sheet pile driving activities	• Impacts would be the same as those described for Alternative 1, with additional temporary increased noise from sheet pile driving activities	• No impact
Transportation	• Minor impacts to vehicular and recreational boat traffic in the vicinity of the reaches during construction activities • No permanent impact to transportation • Long-term, beneficial impacts to the North Severn Complex perimeter roads	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact transportation from continued shoreline erosion, threatening some of the road infrastructure and the ability to navigate around the outer limits of the North Severn Complex

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Infrastructure and Utilities	• Minimal to no impacts to utilities and infrastructure during construction • No permanent impacts to utilities and infrastructure	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact transportation from continued shoreline erosion, threatening some of the road infrastructure and the ability to navigate around the outer limits of the North Severn Complex • Potential to impact utilities; the NSA Annapolis wastewater treatment plant is located near Carr Creek and sections of the wastewater collection system and the treated wastewater outfall are in proximity to the degrading shoreline
Cultural Resources	• Ten previously recorded and unevaluated archaeological sites and one site eligible for listing on the National Register of Historic Places (NRHP) are in the vicinity of Reaches D1, F, and G • No eligible or unevaluated archaeological sites in the vicinity of the other Reaches • The Navy would prepare Archaeological Site Protection Requirements plans for review and concurrence by the Maryland Historical Trust (MHT) to ensure no construction activities occur within	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential adverse effects to cultural resources, as shoreline erosion would continue, which could lead to the deterioration of archaeological sites near the shoreline

Table ES-3. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Cultural Resources (Continued)	areas of known archaeological sites • With the provision of the Archaeological Site Protection Requirements plans, there would be No Adverse Effect to NRHP-eligible archaeological resources. MHT concurred with the finding of No Adverse Effect in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*) • No adverse effect on NRHP-listed and eligible architectural resources.			
Human Health and Safety	• No impacts to human health and safety	• Impacts would be similar to those described for Alternative 1 • Completion of construction of the sheet pile structure at the berm along Reach C would result in a beneficial impact to human health and the environment by preventing release of contaminants into the Severn River	• Impacts would be similar to those described for Alternative 1 • Completion of construction of the sheet pile structure at the berm along Reach C would result in a beneficial impact to human health and the environment by preventing release of contaminants into the Severn River	• Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality • Adverse impacts from potential release of contaminated sediments
Socioeconomic Resources	• Short-term beneficial impacts to economy during construction	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• No impact

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TABLE OF CONTENTS

Executive Summary **ES-1**
ES.1 Purpose and Need for the Proposed Action **1**
ES.2 Proposed Action and Alternatives **1**
ES.2.1 Alternative 1 – Hardened Structure/Revetment **4**
ES.2.2 Alternative 2 – Log Toe Stabilization **4**
ES.2.3 Alternative 3 – Living Shoreline (Preferred) **4**
ES.2.4 No Action Alternative **5**
ES.3 Summary of Environmental Consequences **5**
1.0 Purpose and Need **1-1**
1.1 Introduction **1-1**
1.2 Background **1-1**
1.2.1 North Severn Complex **1-1**
1.2.2 Current Shoreline Erosion and Stabilization Efforts **1-3**
1.3 Purpose And Need For The Proposed Action **1-3**
1.4 The Environmental Review Process **1-8**
1.4.1 Public Involvement **1-9**
1.4.2 Agency Coordination and Permit Requirements **1-12**
2.0 Proposed Action and Alternatives **2-1**
2.1 Proposed Action **2-1**
2.2 Alternatives **2-4**
2.2.1 Alternative 1 – Hardened Structure/Revetment **2-4**
2.2.2 Alternative 2 – Log Toe Stabilization **2-5**
2.2.3 Alternative 3 – Living Shoreline (Preferred) **2-7**
2.2.4 No Action Alternative **2-8**
2.3 Alternatives Considered but Eliminated from Further Analysis **2-8**
2.3.1 Offshore Breakwater Alternative **2-8**
2.3.2 Seawall/Bulkhead Alternative **2-9**
2.4 Summary of Environmental Consequences of the Action Alternatives **2-9**
2.5 Summary of Environmental Consequences of the No Action Alternative **2-16**
3.0 Affected Environment and Environmental Consequences **3-1**
3.1 Geology, Topography, and Soils **3-1**
3.1.1 Affected Environment **3-1**
3.1.1.1 Geology 3-1
3.1.1.2 Topography 3-1

3.1.1.3 Soils ... 3-1
3.1.2 Environmental Consequences ... 3-4
3.1.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-4
3.1.2.2 Alternative 2 – Log Toe Stabilization ... 3-5
3.1.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-5
3.1.2.4 No Action Alternative ... 3-6
3.2 Water Resources ... 3-6
3.2.1 Affected Environment ... 3-6
3.2.1.1 Surface Water ... 3-6
3.2.1.2 Wetlands ... 3-7
3.2.1.3 Floodplains ... 3-10
3.2.1.4 Groundwater ... 3-10
3.2.1.5 Coastal Zone ... 3-12
3.2.2 Environmental Consequences ... 3-12
3.2.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-12
3.2.2.2 Alternative 2 – Log Toe Stabilization ... 3-15
3.2.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-15
3.2.2.4 No Action Alternative ... 3-16
3.3 Biological Resources ... 3-16
3.3.1 Affected Environment ... 3-16
3.3.1.1 Vegetation ... 3-16
3.3.1.2 Wildlife ... 3-20
3.3.1.3 Special-Status Species ... 3-28
3.3.2 Environmental Consequences ... 3-30
3.3.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-30
3.3.2.2 Alternative 2 – Log Toe Stabilization ... 3-34
3.3.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-35
3.3.2.4 No Action Alternative ... 3-36
3.4 Land Use ... 3-36
3.4.1 Affected Environment ... 3-36
3.4.2 Environmental Consequences ... 3-39
3.4.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-39
3.4.2.2 Alternative 2 – Log Toe Stabilization ... 3-39
3.4.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-39
3.4.2.4 No Action Alternative ... 3-39
3.5 Air Quality ... 3-40

3.5.1 Affected Environment 3-40
3.5.1.1 Ambient Air Quality 3-40
3.5.1.2 General Conformity Rule 3-42
3.5.2 Environmental Consequences 3-42
3.5.2.1 Construction Emissions from Shoreline Construction Activities 3-42
3.5.2.2 No Action Alternative 3-43
3.6 Noise 3-43
3.6.1 Affected Environment 3-44
3.6.1.1 Airborne Noise 3-44
3.6.1.2 Underwater Noise 3-45
3.6.2 Environmental Consequences 3-45
3.6.2.1 Alternative 1 – Hardened Structure/Revetment 3-45
3.6.2.2 Alternative 2 – Log Toe Stabilization 3-47
3.6.2.3 Alternative 3 – Living Shoreline (Preferred) 3-48
3.6.2.4 No Action Alternative 3-48
3.7 Transportation 3-48
3.7.1 Affected Environment 3-48
3.7.2 Environmental Consequences 3-49
3.7.2.1 Alternative 1 – Hardened Structure/Revetment 3-49
3.7.2.2 Alternative 2 – Log Toe Stabilization 3-49
3.7.2.3 Alternative 3 – Living Shoreline (Preferred) 3-49
3.7.2.4 No Action Alternative 3-49
3.8 Infrastructure and Utilities 3-50
3.8.1 Affected Environment 3-50
3.8.1.1 Roads 3-50
3.8.1.2 Water Supply 3-50
3.8.1.3 Wastewater 3-50
3.8.1.4 Stormwater 3-50
3.8.1.5 Electricity 3-51
3.8.1.6 Fiber Optic/Telecommunications 3-51
3.8.1.7 Natural Gas 3-51
3.8.2 Environmental Consequences 3-51
3.8.2.1 Alternative 1 – Hardened Structure/Revetment 3-51
3.8.2.2 Alternative 2 – Log Toe Stabilization 3-52
3.8.2.3 Alternative 3 – Living Shoreline (Preferred) 3-52
3.8.2.4 No Action Alternative 3-52

3.9 Cultural Resources ... 3-52
3.9.1 Affected Environment ... 3-52
3.9.1.1 Archaeological Resources ... 3-52
3.9.1.2 Built Environment ... 3-54
3.9.2 Environmental Consequences ... 3-56
3.9.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-56
3.9.2.2 Alternative 2 – Log Toe Stabilization ... 3-56
3.9.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-56
3.9.2.4 No Action Alternative ... 3-57
3.10 Human Health and Safety ... 3-57
3.10.1 Affected Environment ... 3-57
3.10.1.1 Worker and Public Safety Hazards ... 3-57
3.10.1.2 Hazardous Materials/Hazardous Wastes ... 3-57
3.10.1.3 UXO ... 3-60
3.10.2 Environmental Consequences ... 3-61
3.10.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-61
3.10.2.2 Alternative 2 – Log Toe Stabilization ... 3-63
3.10.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-63
3.10.2.4 No Action Alternative ... 3-63
3.11 Socioeconomic Resources ... 3-63
3.11.1 Affected Environment ... 3-63
3.11.2 Environmental Consequences ... 3-66
3.11.2.1 Alternative 1 – Hardened Structure/Revetment ... 3-66
3.11.2.2 Alternative 2 – Log Toe Stabilization ... 3-66
3.11.2.3 Alternative 3 – Living Shoreline (Preferred) ... 3-66
3.11.2.4 No Action Alternative ... 3-66
4.0 Cumulative Impacts ... 4-1
4.1 Past, Present and Reasonably Foreseeable Future Actions ... 4-1
4.2 Potential Cumulative Impacts by Environmental Resource Area ... 4-2
4.2.1 Geology, Topography, and Soils ... 4-3
4.2.2 Water Resources ... 4-3
4.2.3 Biological Resources ... 4-4
4.2.4 Land Use ... 4-5
4.2.5 Air Quality ... 4-5
4.2.6 Noise ... 4-6
4.2.7 Transportation ... 4-6

4.2.8 Infrastructure and Utilities 4-7
4.2.9 Cultural Resources 4-7
4.2.10 Human Health and Safety 4-8
4.2.11 Socioeconomic Resources 4-9
5.0 Other NEPA Considerations 5-1
5.1 Consistency and Compliance with Federal, State, and Local Plans, Policies, and Regulations 5-1
5.2 Irreversible and Irretrievable Commitments of Resources 5-3
5.3 Relationship Between Short-term Uses of the Environment and Enhancement of Long-term Productivity 5-3
6.0 References 6-1
7.0 List of Preparers 7-1

List of Figures

Figure ES-1. Location of Reaches in the Project Area 3
Figure 1-1. Location of the North Severn Complex 1-2
Figure 1-2. Proposed Extent of the North Severn Complex Shoreline Repair and Restoration 1-4
Figure 1-3. North Severn Complex Shoreline - 1847 to Present 1-5
Figure 1-4. North Severn Complex and Public Access 1-10
Figure 2-1. Location of Reaches in the Project Area 2-3
Figure 2-2. Typical Cross Section of Revetment 2-5
Figure 2-3. Typical Detail of Log Toe Stabilization 2-6
Figure 2-4. Typical Sheet Pile Structure 2-7
Figure 2-5. Typical Living Shoreline Treatment 2-8
Figure 3.1-1. Soil Types within the Project Area 3-2
Figure 3.2-1. Wetlands within the Project Area 3-9
Figure 3.2-2. Floodplains (100-year and 500-year) within the Project Area 3-11
Figure 3.2-3. Impacted Wetlands 3-13
Figure 3.3-1. Forest Stands within the Project Area 3-17
Figure 3.3-2. Scrub-Shrub Communities within the Project Area 3-19
Figure 3.4-1. Surface Danger Zone at North Severn Complex 3-38
Figure 3.9-1. Historic Properties in the Project Vicinity 3-55

List of Photos

Photo 1. Severe Bank Erosion and Slope Failure along Mill Creek 1-6
Photo 2. Severe Bank Erosion and Slope Failure along Possum Point 1-6
Photo 3. Failing Bulkhead along Greenbury Point 1-7

Photo 4. Former Dredge Spoil Lagoon (view west toward Severn River) 1-7

Photo 5. Severe Bank Erosion along Carr Creek.....1-8

List of Tables

Table ES-1. Description of Reaches in the Project Area 2

Table ES-2. Summary of Action Alternatives 2

Table ES-3. Summary of Environmental Consequences.....6

Table 1.1-1. Reaches and Shoreline Access Issues 1-11

Table 2.1-1. Description of Reaches in the Project Area 2-2

Table 2.2-1. Summary of Action Alternatives 2-4

Table 2.4-1. Summary of Environmental Consequences.....2-10

Table 3.1-1. Description of the Soils within the Project Area 3-3

Table 3.2-1. Watersheds of Shoreline Repair and Restoration Reaches.....3-6

Table 3.2-2. Wetland Classifications of the Shoreline Repair and Restoration Reaches.....3-8

Table 3.2-3. Preliminary Calculations of Potential Wetland Impacts.....3-14

Table 3.3-1. Summary of Species and EFH in the Proposed Project Area 3-23

Table 3.3-2. Threatened and Endangered Species Known to Occur or Potentially Occur on NSA Annapolis or within the Nearshore Waters, Anne Arundel County, Maryland 3-29

Table 3.5-1. Maximum Estimated Emissions for Shoreline Repair and Restoration Alternatives 3-43

Table 3.6-1. Sound Levels Estimated by Population Density.....3-43

Table 3.6-2. OSHA Permissible Noise Exposures 3-44

Table 3.6-4. Airborne Construction Related Noise Emissions.....3-46

Table 3.9-1. Archaeological Sites and Potential Site Locations at North Severn Complex 3-53

Table 3.11-1. Population Characteristics.....3-64

Table 3.11-3. Percent of Population under the Age of 18, 2010 3-65

Table 4.1-1. Summary of Projects and Resources for Cumulative Impacts Analysis.....4-1

ACRONYMS AND ABBREVIATIONS

ACM	asbestos containing material
APE	area of potential effects
AQCR	Air Quality Control Region
BGE	Baltimore Gas and Electric
BMPs	best management practices
BRAC	Base Realignment and Closure
BTAG	Region III Freshwater Sediment Screening Benchmarks
C.	century
CAA	Clean Air Act
CCMA	Center for Coastal Monitoring and Assessment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	decibel
dBA	A-weighted decibel
d.b.h.	diameter of breast height
DoD	Department of Defense
DoN	Department of the Navy
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
ELMR	Estuarine Living Marine Resources
EO	Executive Order
ESA	Endangered Species Act
F	Fahrenheit
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GMFMC	Gulf of Mexico Fishery Management Council
GPD	gallons per day
HAPC	Habitat Area of Particular Concern
HAPs	hazardous air pollutants
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
IT	information technology
LBP	lead based paint
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
MD	Maryland
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
mg/kg	milligrams per kilograms
MHHW	mean higher high water
MHT	Maryland Historical Trust
MHW	mean high water
MLW	mean low water
MMR	Military Munition Rule
MOU	Memorandum of Understanding
MSAT(s)	Mobile Source Air Toxic(s)
MWR	Moral, Welfare, and Recreation
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NEX	Navy Exchange
NHP	Natural Heritage Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Naval Support Activity
NSR	New Source Review
NWI	National Wetland Inventory
OPNAVINST	Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PAH(s)	polycyclic aromatic hydrocarbon(s)
PCB(s)	polychlorinated biphenyl(s)
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
ppt	parts per thousand
PSD	Prevention of Significant Deterioration
PWD	Public Works Department
RCRA	Resource Conservation and Recovery Act
RMS	root mean square
ROI	region of influence
SAFMC	South Atlantic Fishery Management Council
SAV	submerged aquatic vegetation
SDZ	surface danger zone
SEL	sound exposure level
SEL_{cum}	cumulative sound exposure level
SESCP	soil erosion and sediment control plan
SF	square feet
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPL_{PEAK}	peak sound pressure level
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USEPA	United States Environment Protection Agency
USFWS	U.S. Fish and Wildlife Service
USNA	U.S. Naval Academy
UXO	unexploded ordnance
VOCs	volatile organic compounds
WWTP	wastewater treatment plant

GLOSSARY

Breakwater – A barrier that protects a harbor or shore from the full impact of wind and wave energy.

Fetch – Area of ocean or lake surface over which the wind blows in an essentially constant direction, thus generating waves.

Floodplains – Areas likely to be inundated by a particular flood.

Groin – A small jetty extending from a shore to protect a beach against erosion or to trap shifting sands.

Hibernaculum - a location where bats (e.g., northern long-eared bat) or other animals spend the winter, typically caves, trees, buildings, and mines; plural = hibernacula.

Hydric Soil – A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part, as found in wetlands.

Hydrology – Permanent or periodic inundation or soil saturation to the surface for sufficient duration during the growing season to support hydrophytic vegetation.

Hydrophytic Vegetation – Community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present.

Living Shoreline – Treatments that utilize a suite of bank stabilization and habitat restoration techniques to reinforce the shoreline, minimize coastal erosion, and maintain coastal processes, while protecting, restoring, and enhancing benefits to wildlife and water quality, and creating natural habitats.

Longshore Drift – The process whereby beach material is gradually shifted laterally as a result of waves meeting the shore at an oblique angle.

Mean High Water – The average of all the high water heights observed over the National Tidal Datum Epoch (19-year period), established by the National Oceanic and Atmospheric Administration (NOAA)/National Ocean Service.

Mean Higher High Water – The average height of higher high waters at a place over a 19-year period.

Mean Low Water – The average height of the low water over a 19-year period.

Mean Sea Level – The average height of the surface of the sea at a particular location for all stages of the tide.

Revetment – A shoreline armoring structure placed on banks or bluffs to absorb the energy of incoming waves. It is built to preserve existing uses of the shoreline and protect the slope.

Saturation – The condition of a substance when it has taken into solution the maximum possible quantity of a given substance at a given temperature and pressure.

Shoreline Outboard – The water side of the shoreline.

Sill – A low, submerged dam-like structure built to control riverbed or shoreline scour and current speeds.

Silt or Turbidity Curtains – A temporary permeable fabric installed in a waterway or waterbody to minimize sediment transport. A silt curtain does not extend to the bottom of the channel and is placed parallel or perpendicular to the direction of flow.

Slope – The side of a hill or mountain, the inclined face of a cutting, canal or embankment, or an inclination from the horizontal. In the United States (U.S.), it is measured as the ratio of the number of units of horizontal distance to the number of corresponding units of vertical distance. The term is expressed as a percent when the slope is gentle, in which case the term gradient is also used.

Submerged Aquatic Vegetation – Grasses that grow to the surface of—but do not emerge from—shallow water.

Surface Danger Zone - A surface danger zone is a ground designated area associated with a training range that is designed to protect people during weapons training. When a range is in active use, the surface danger zone is an exclusion area that is strictly controlled and could contain projectiles, fragments, debris, and components resulting from firing weapons systems.

Wetlands – Those areas that are inundated or saturated by surface or groundwater 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 (hydric) soil conditions.

1.0 PURPOSE AND NEED

1.1 INTRODUCTION

Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland, is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. The proposal includes repair and restoration of approximately 28,000 linear feet of shoreline at the North Severn Complex. This Environmental Assessment (EA) evaluates the potential environmental impacts of implementing proposed shoreline repair and restoration measures at the North Severn Complex. The Department of the Navy (DoN or Navy) has prepared this EA in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 *et seq*.), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the *Environmental Readiness Program Manual*, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10 (DoN 2014).

1.2 BACKGROUND

1.2.1 North Severn Complex

The North Severn Complex of NSA Annapolis is located on the north shore of the Severn River at its confluence with the Chesapeake Bay, across from the United States Naval Academy (USNA) and the City of Annapolis in Anne Arundel County, Maryland (Figure 1-1). The North Severn Complex encompasses 852.8 acres and includes Greenbury Point (Naval Facilities Engineering Command [NAVFAC] Washington 2012a).

Much of the North Severn Complex was purchased by the Navy in 1909 for use as a dairy farm in order to provide safe dairy products to midshipmen at the USNA during a time when tuberculosis was common. Dairy farm operations at North Severn ended in 1913, when the USNA Dairy Farm was established in Gambrills, Maryland. From 1911 to 1914, part of the site was also used for the first Naval Air Station (NAVFAC Washington 2011a, 2012a). From 1918 to 1996, the Naval Radio Transmitter Facility operated on Greenbury Point. During the Cold War, Greenbury Point was a key communications center for the Navy's submarine fleet. The antennas transmitted Very Low Frequency signals capable of penetrating the ocean, allowing communications with submarines. By the early 1990s, advances in satellite communications made the antennas obsolete. A 1991 base realignment and closure (BRAC) decision lead to the decommissioning of the radio towers. The final demolition of 16 of the 19 former Navy radio towers on Greenbury Point took place in 1999 (though the concrete footings are still on-site). Three towers remain and were turned over to Anne Arundel County for telecommunications or training purposes (NAVFAC Washington 2012a). The undeveloped area of Greenbury Point is being managed by NSA Annapolis as a resource conservation area and is the surface danger zone (SDZ)[1] for the USNA Outdoor Range Facilities (see Section 3.4.1, *Land Use*).

The primary mission of NSA Annapolis is to provide general support, including underway seamanship and sail training; small arms weapons familiarization; and navigation and engineering professional development, for midshipmen enrolled at USNA.

[1] A SDZ is a ground designated area associated with a training range that is designed to protect people during weapons training. When a range is in active use, the SDZ is an exclusion area that is strictly controlled and could contain projectiles, fragments, debris, and components resulting from firing weapons systems.

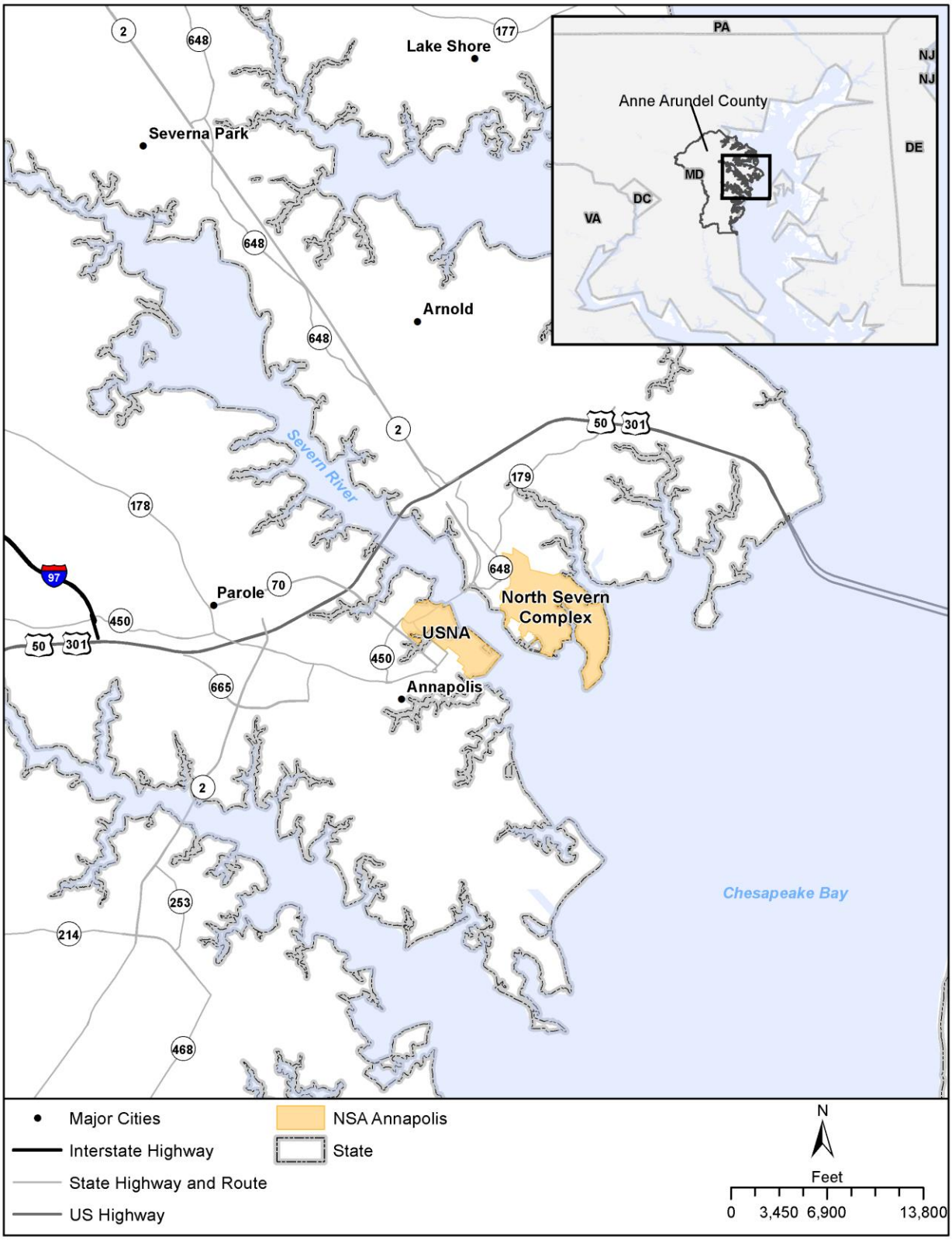


Figure 1-1. Location of the North Severn Complex

This mission depends on the continued availability of a functional, attractive campus with extensive parade grounds and athletic fields; training facilities including access to open waters, unimpeded firing ranges, and a healthy natural environment; and access to community support facilities including medical and recreational areas. NSA Annapolis maintains a fleet of more than 250 Yard Patrol and sail craft; operates an Industrial Repair Department; employs divers to ensure the underwater integrity of all operations; and operates various competitive, combat, and general use pistol and rifle ranges at the North Severn Complex in support of the USNA and other entities (NAVFAC Washington 2011a).

The major facilities located at the North Severn Complex include the Navy Exchange, Commissary, Child Development Center, Family Service Center, family camp grounds, Public-Private Venture housing Bachelor Enlisted Quarters, USNA Golf Course, athletic (rugby) field, marinas, firing range, and Greenbury Point Nature Center.

1.2.2 Current Shoreline Erosion and Stabilization Efforts

The North Severn Complex shoreline has been experiencing shoreline erosion for decades. Shoreline erosion has been caused by a number of factors, including wave energy, fetch, storms, slope saturation, and longshore drift. Beginning in the late 1930s, extensive shoreline protection efforts, including the construction of rock seawalls, wooden bulkheads (vertical structure at shoreline), and earthen berms have resulted in the hardening of portions of the shoreline at the North Severn Complex, and only about 12,500 feet of the shoreline remains in a natural condition. In an effort to improve shoreline condition and enhance shoreline habitat, approximately 3,300 feet of shoreline have been protected through a combination of nonstructural and structural methods. In some areas, smooth cordgrass (*Spartina alterniflora*) has been planted behind rock breakwaters, creating small marshlands. Continued monitoring and evaluation of shoreline condition are required to ensure shoreline stability (NAVFAC Washington 2011a).

1.3 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to repair and restore 28,000 linear feet of the North Severn Complex shoreline (refer to Figure 1-2) that have been severely damaged or made vulnerable by erosion, as shown in Photos 1 through 5. Shoreline erosion control measures would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion along Carr Creek, Mill Creek, the Severn River, and Chesapeake Bay shorelines of the North Severn Complex.

The proposed action is needed because significant shoreline areas are eroding, resulting in vertical embankments, threats to infrastructure, and degradation of water quality. As shown in Figure 1-3, the shoreline has been degrading since 1847. The eastern, southern, and southwestern portions of Greenbury Point are exposed to long fetch distances in the Severn River and the Chesapeake Bay, allowing for excessive wind and high wave energy along the shorelines leading to erosion of the banks. In addition, one shoreline area of concern is a berm (former dredge spoil lagoon) at Greenbury Point constructed of soil and fortified with large concrete debris and other disposed materials. This constructed berm (Photo 4), which holds dredge disposal material, has been rehabilitated with a water control structure to relieve head pressure within the dredged material area during storm events, and a small breakwater (trapezoidal riprap structures) along portions of the berm. The water control structure, which was installed in 1998, regulates the water flow from the berm across the west side of Greenbury Point during storm events (NAVFAC Washington 2010; NSA Annapolis 2014a). Emergency stabilization measures have been implemented to prevent the outer berm from failing and releasing contaminants contained in the dredged materials into the river. However, the berm is under threat of failure if the next phase to construct a permanent berm is not implemented (NAVFAC Washington 2010).

Figure 1-2. Proposed Extent of the North Severn Complex Shoreline Repair and Restoration

Figure 1-3. North Severn Complex Shoreline - 1847 to Present

Photo 1. Severe Bank Erosion and Slope Failure along Mill Creek

Photo 2. Severe Bank Erosion and Slope Failure along Possum Point

Photo 3. Failing Bulkhead along Greenbury Point

Photo 4. Former Dredge Spoil Lagoon (view west toward Severn River)

Photo 5. Severe Bank Erosion along Carr Creek

Furthermore, the proposed action is needed to maintain the safety and usefulness of the North Severn Complex mission-critical areas. The NSA Annapolis wastewater treatment plant (WWTP) is located near Carr Creek and sections of the wastewater collection system and the treated wastewater outfall are in proximity to the degrading shoreline.

1.4 THE ENVIRONMENTAL REVIEW PROCESS

NEPA requires consideration of environmental issues in federal agency planning and decision making. Under NEPA, federal agencies must prepare an EA or Environmental Impact Statement (EIS) for certain federal actions, except those actions that are determined to be "categorically excluded" from further analysis.

An EA is a concise public document that provides sufficient analysis for determining whether the potential environmental impacts of a proposed action are significant, resulting in the preparation of an EIS, or not significant, resulting in the preparation of a Finding of No Significant Impact (FONSI). An EIS is prepared for those federal actions that may significantly affect the quality of the human environment. Thus, if the Navy were to determine that the proposed action would have a significant impact on the quality of the human environment, an EIS would be prepared.

The intent of this EA is to assess the potential environmental effects of the proposed repair and restoration of approximately 28,000 linear feet of the North Severn Complex shoreline. This EA provides an analysis of the direct, indirect, and cumulative environmental impacts that have the potential to occur as a result of the proposed action and reasonable alternatives, including the No Action Alternative.

1.4.1 Public Involvement

NSA Annapolis held a public scoping meeting for the North Severn shoreline repair and restoration project on July 30, 2014. A notice of the scoping meeting was published in *The Capital* for three consecutive days, with the first day of publication being 15 days in advance of the scheduled meeting. The scoping meeting was conducted in an open house format designed to inform the public about the proposed action and NEPA process, and allow the public to identify to Navy representatives issues and concerns they would like to see addressed in the EA.

The public had three ways to provide comments during the scoping period: 1) submit written comments during the public scoping meeting; 2) submit comments electronically to anna.lubetski@navy.mil; or 3) mail written comments to Anna Lubetski, Environmental, 1314 Hardwood Street, SE, Building 212, Washington, DC 20374. No comments were received during the scoping period from July 14, 2014 to August 14, 2014.

On January 11, 2015, the Navy released the Draft EA for a 45-day public comment period. The public comment period provides members of the community an opportunity to review the Draft EA and provide comments on the findings in the document. The Navy published a Notice of Availability of the Draft EA and public meeting in *The Capital* for three consecutive days, beginning on January 11, 2015. *The Capital* also interviewed the NAVFAC Washington Project Manager, Anna Lubetski, and published an article regarding the project on January 27, 2015. A copy of the Draft EA was made available at the Annapolis Regional Library at 1410 West Street in Annapolis, Maryland.

The public meeting was held on January 28, 2015 and was conducted in an open house format designed to provide the public an opportunity to ask questions or discuss concerns they might have after their review of the Draft EA with Navy representatives. A total of nine individuals signed in at the meeting.

During the public meeting, attendees were encouraged to submit written comments. During the public comment period, which began on January 11, 2015 and ended on February 27, 2015, written comments could be submitted electronically to anna.lubetski@navy.mil or mail written comments to Anna Lubetski, Environmental, 1314 Hardwood Street, SE, Building 212, Washington, DC 20374. A total of 38 comments were received during the public comment period. One comment expressed concern regarding traffic impacts to the Naval Academy Golf Course during the construction phases. Two comments expressed interest in being involved in the design, construction, and management of the shoreline repair and restoration. The majority of public comments pertained to the possibility of providing public shoreline access points as part of the shoreline repair and restoration. The comments referenced Executive Order (EO) 13508, *Chesapeake Bay Protection and Restoration*, specifically Section 202(e), to "expand public access to waters and open spaces of the Chesapeake Bay and its tributaries from Federal lands." In accordance with EO 13508, the National Park Service (NPS) prepared a *Final Chesapeake Bay Watershed Public Access Plan*, with a goal to increase public access to the Bay and its tributaries by adding 300 new public access sites by 2025.

NSA Annapolis currently provides a variety of ways for the public and/or DoD members/employees/dependents to access the shoreline of the Chesapeake Bay and its tributaries:

- Walking trails on Greenbury Point – several walking trails have been developed on and around Greenbury Point that include scenic vistas or viewing blinds for the Bay or its tributaries (see Figure 1-4). These areas are open to the public and DoD members/ employees/dependents from sunrise to sunset, as range operations (see Section 3.4-1, *Land Use* for further discussion) allow and force protection conditions allow.

Figure 1-4. North Severn Complex and Public Access

- Fishing on Possum Point – a designated fishing area is located on Possum Point (see Figure 1-4). This area is open to DoD members/employees/dependents from sunrise to sunset, as force protection conditions allow. Fisherman must follow all the Maryland Department of Natural Resources (MDNR) regulations and are required to obtain their own fishing license(s) through MDNR.

- Morale, Welfare, and Recreation (MWR) marinas and boat rentals – MWR operates two marinas for DoD members/employees/dependents, one located on Mill Creek and one located on Carr Creek (Figure 1-4). These marinas are used to dock, store, or launch privately-owned boats. MWR also rents boats and canoes/kayaks to DoD members/employees/ dependents. Larger rental boats are launched from the Carr Creek Marina and its associated boat ramp. Larger, privately-owned vessels are docked at the Mill Creek Marina. Smaller canoes and kayaks are launched from either the Carr Creek Marina or the Mill Creek Marina.

Table 1.1-1 discusses each reach[2] being evaluated in this EA, and the shoreline access issues relating to each reach.

Table 1.1-1. Reaches and Shoreline Access Issues

Reach	Shoreline Access Issues
A	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access • Wind and wave action typically too severe to allow small boat operations • Depth of water is charted at 2 to 3 feet and incompatible with most boating activities
B	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
C	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
D	D1 • Leads to/in close proximity of the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access D2 • Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
E	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
F	• In direct conflict with existing MWR operations
G	• No existing roads, parking or infrastructure to support boat access • Public water access is incompatible with existing golf and Primary School operations

In addition to the specific issues noted above, there are security concerns associated with unregulated public access to installation shoreline. Therefore, construction or permitting of additional access points (above what already exists) is neither planned nor appropriate.

[2]The project area for this EA has been divided into reaches, as depicted in Figure 2-1 and described in Table 2.1-1. These areas have been defined geographically, as well as based on the extent of erosion and potential restoration measures applicable.

The Navy mailed copies of the Draft EA to federal, state, and local agencies for their review and comment. The Navy also submitted copies of the Draft EA to the Maryland State Clearinghouse for distribution to additional state agencies for review and comment. Comments were received from the following agencies: MDNR, Maryland Department of the Environment (MDE), Maryland Department of Transportation (MDOT), Maryland Department of Planning (MDP), Maryland Historical Trust (MHT), National Marine Fisheries Services (NMFS), NPS, U.S. Environmental Protection Agency (USEPA) Chesapeake Bay Program, the Chesapeake Conservancy, the Alliance for the Chesapeake Bay, the National Parks Conservation Association, the Severn River Commission, the Anne Arundel County Executive, and Congressman John Sarbanes. These agencies also commented on the need for public access and compliance with EO 13508. Several agencies were pleased that living shoreline is being considered as an alternative. MDE and MDNR agreed to work with the Navy to develop sustainable, cost-effective solutions that ensure the shoreline project is consistent with Maryland's enforceable policies. MHT and the Navy will complete Section 106 consultation and review of proposed actions as planning proceeds for individual Reaches of the project area. The MDNR, Wildlife Heritage Service, determined there are no State or Federal records of rare, threatened or endangered species within the boundaries of the project site as delineated. NMFS identified several EFH conservation recommendations. Revisions have been made to Section 3.3, *Biological Resources,* with regard to EFH.

1.4.2 Agency Coordination and Permit Requirements

In addition to NEPA, other laws, regulations, permits, and licenses may be applicable to the proposed action.

Specifically, the proposed action would require the following agency coordination and permits:

- Consultation with the U.S. Fish and Wildlife Service (USFWS) concerning potential impacts to threatened or endangered species and any critical habitat designations in compliance with Section 7 of the Endangered Species Act (ESA)
- Consultation with the NMFS concerning potential impacts to threatened or endangered species in compliance with Section 7 of the ESA, the Marine Mammal Protection Act, and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act
- Consultation with the MDNR concerning potential impacts to natural resources in compliance with the installation's Integrated Natural Resources Management Plan (INRMP)
- Federal Coastal Consistency Determination in compliance with the Coastal Zone Management Act (CZMA) (16 U.S.C. §§ 1451–1564] and the Memorandum of Understanding between the State of Maryland and the DoD concerning the application and implementation of Maryland's Coastal Zone Management Program (CZMP)
- Consultation with the MDE concerning the issuance of a National Pollutant Discharge Elimination System (NPDES) stormwater permit
- Consultation with the U.S. Army Corps of Engineers (USACE) concerning the discharge of materials into waters of the U.S. including wetlands (Section 404 Clean Water Act and Section 10 Rivers and Harbors Act).
- Coordination with the USEPA concerning water quality (Section 401 Clean Water Act)
- Applicability Analysis pursuant to the General Conformity Rule of the Clean Air Act (CAA) and its corresponding federal regulations (40 CFR Parts 51 and 93 as amended)
- Consultation with the MHT regarding effects to historic properties in compliance with Section 106 of the National Historic Preservation Act (NHPA)

2.0 PROPOSED ACTION AND ALTERNATIVES

The CEQ *Regulations for Implementing the Procedural Provisions of NEPA* establish a number of policies for federal agencies, including "…using the NEPA process to identify and assess reasonable alternatives to the proposed action that will avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR §1500.2 [e]). The repair and restoration of approximately 28,000 linear feet of the North Severn Complex shoreline is needed because the shoreline has been severely damaged or made vulnerable by erosion. Potential shoreline erosion control measures have been identified, and establish a reasonable range of alternatives for fulfilling the purpose of, and need for, the proposed action.

2.1 PROPOSED ACTION

NSA Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. The proposal includes repair and restoration to approximately 28,000 linear feet of shoreline (Figure 1-2). Construction would likely begin in late 2015, and would be phased over a five-year period. Shoreline repair and restoration activities would not extend beyond the 1972 mapped shoreline boundary to prevent encroachment into Maryland's waters.

NSA Annapolis has identified four alternative repair and restoration methods that are potentially feasible for the proposed action. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair and restoration. The project area for this EA has been divided into reaches, as depicted in Figure 2-1 and identified in Table 2.1-1. These areas have been defined geographically, as well as based on the extent of erosion and potential restoration measures applicable.

Table 2.1-1. Description of Reaches in the Project Area

Reach		Length (linear feet)	Description
A		9,160	Reach A includes the majority of the eastern and southern areas of Greenbury Point and is subject to some of the highest wave action, storm energy, and fetch in the project area, leading to extensive erosion. Portions of the eastern side of Greenbury Point included in Reach A have had some armoring placed at the toe of slope.
B		1,160	Reach B is located on the southwestern portion of Greenbury Point, which also exhibits extensive erosion; however, the wave energy and fetch is not as great as Reach A.
C		1,140	Reach C includes the shoreline outboard (on the creek side) of the berm (former dredge spoil lagoon). Reach C has been the subject of two investigations, the 2010 *Berm Rehabilitation Plan* and the 2012 *Berm Stabilization and Living Shoreline Project, Final Emergency Stabilization Work Plan* (NAVFAC Washington 2010 and 2012b). Both reports provided plans for emergency stabilization measures to address the erosion of the berm in this reach.
D	**D1**	7,530	Reach D includes the shoreline of Carr Creek and has been divided into D1 and D2. Reach D1 was the subject of the *Carr Creek Shoreline Survey, Riparian Habitat Conceptual Restoration Design Report* in 2013, and Reach D2 includes the remainder of the Carr Creek shoreline adjacent and similar to D1, but not included in the survey. Carr Creek areas are experiencing erosion due to wave and storm energy and slope saturation (NAVFAC Washington 2013a).
	D2	1,600	
E		1,400	Reach E includes the area on the east side of the Carr Creek Marina and is also subject to high wave action, storm energy, and fetch.
F		3,510	Reach F includes Possum Point and the small boat launch and marina area in Mill Creek, which is experiencing erosion of the banks.
G		2,500	Reach G includes the remainder of the Mill Creek shoreline areas, which is experiencing erosion of the banks.
TOTAL		28,000	

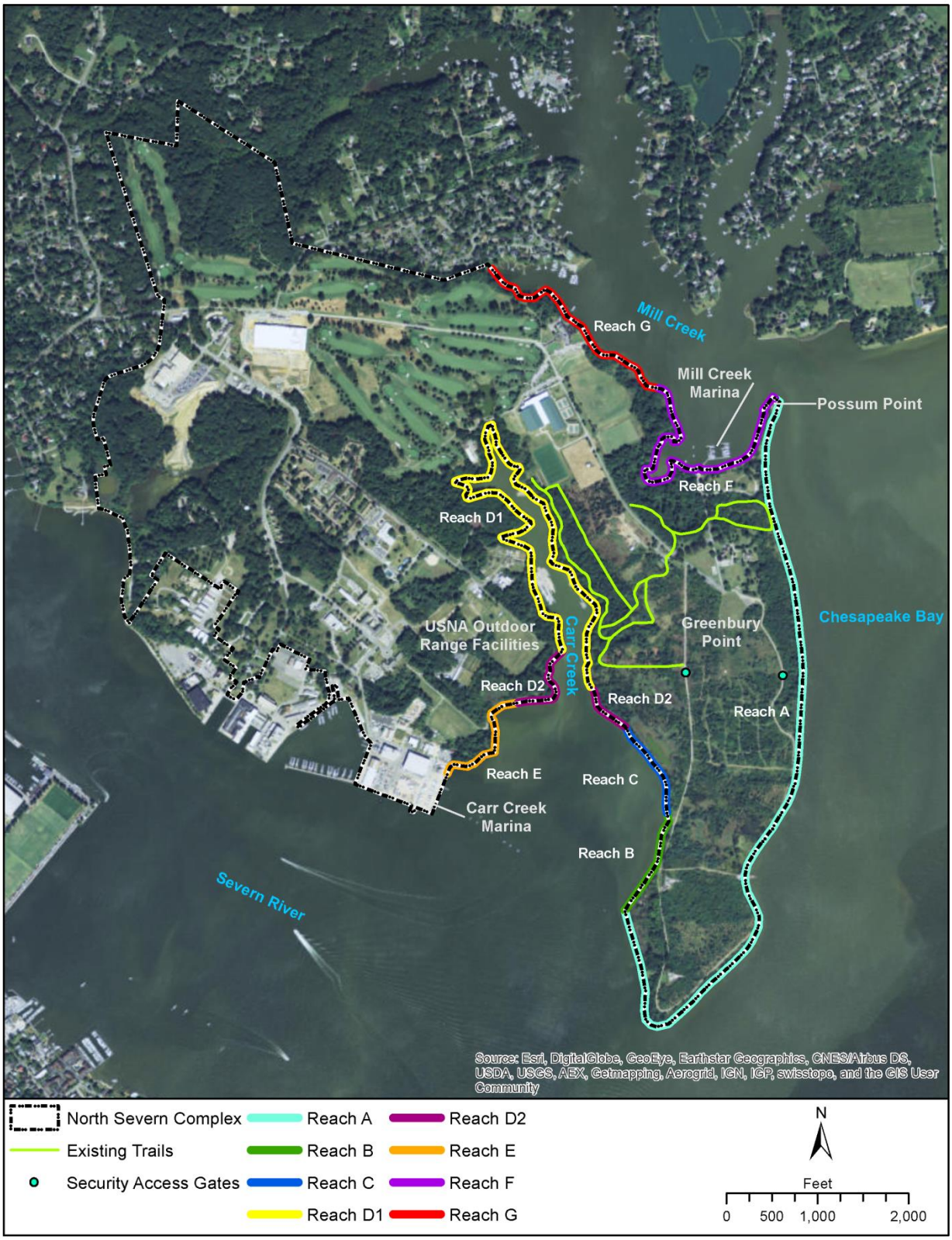


Figure 2-1. Location of Reaches in the Project Area

2.2 ALTERNATIVES

Three action alternatives are evaluated in this EA along with the No Action Alternative. The three alternatives for implementing the proposed action include four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization with natural untreated hardwood logs, and 4) living shoreline. The shoreline reaches are the same under the three action alternatives. The three alternatives are described in the following sections and are summarized in Table 2.2-1. The table includes the proposed repair and restoration alternative for each reach.

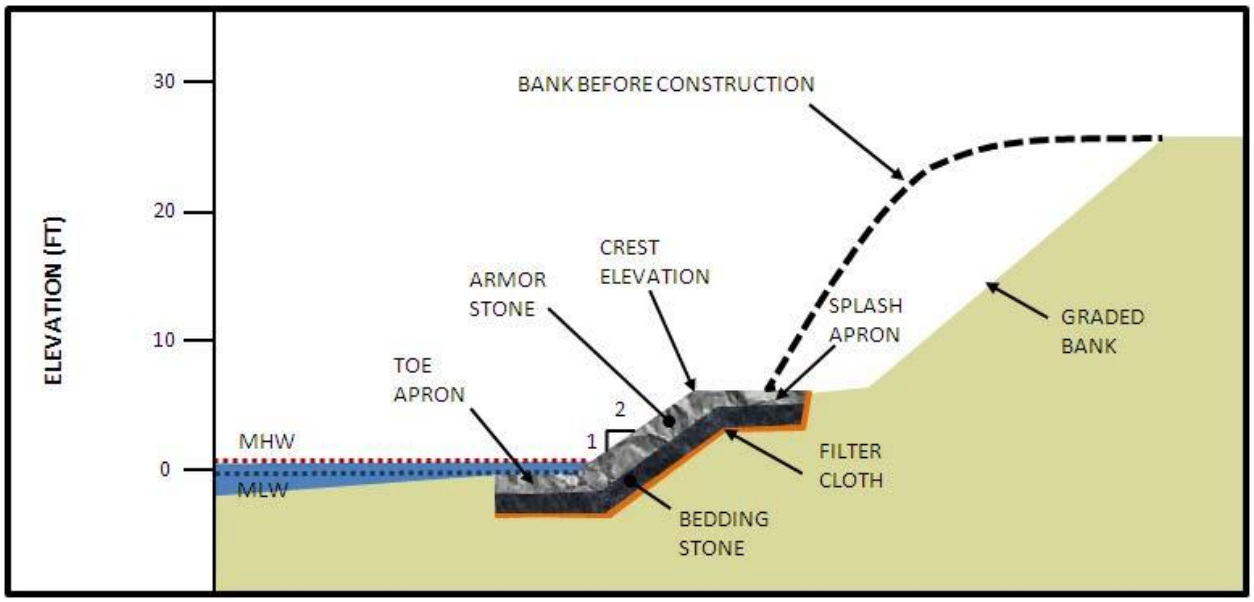
Table 2.2-1. Summary of Action Alternatives

Alternative	Repair and Restoration Method by Reach
Alternative 1 – Hardened Structure/Revetment	Reaches A, B, C, D, E, F, and G – Hardened Structure/Revetment
Alternative 2 – Log Toe Stabilization	Reaches B, D, and G – Log Toe Stabilization Reaches A, E, and F – Alternative 1 Reach C – Sheet Pile
Alternative 3 – Living Shoreline (Preferred)	Reaches B, D, F, and G – Living Shoreline Reaches A and E – Alternative 1 Reach C – Alternative 2

2.2.1 Alternative 1 – Hardened Structure/Revetment

Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, C, D, E, F, and G. The hardened structure/revetment for this alternative includes 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope (Figure 2-2).

The work for the hardened structure/revetment would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.



Source: NAVFAC Washington 2014.
Notes: MHW = mean high water; MLW = mean low water.

Figure 2-2. Typical Cross Section of Revetment

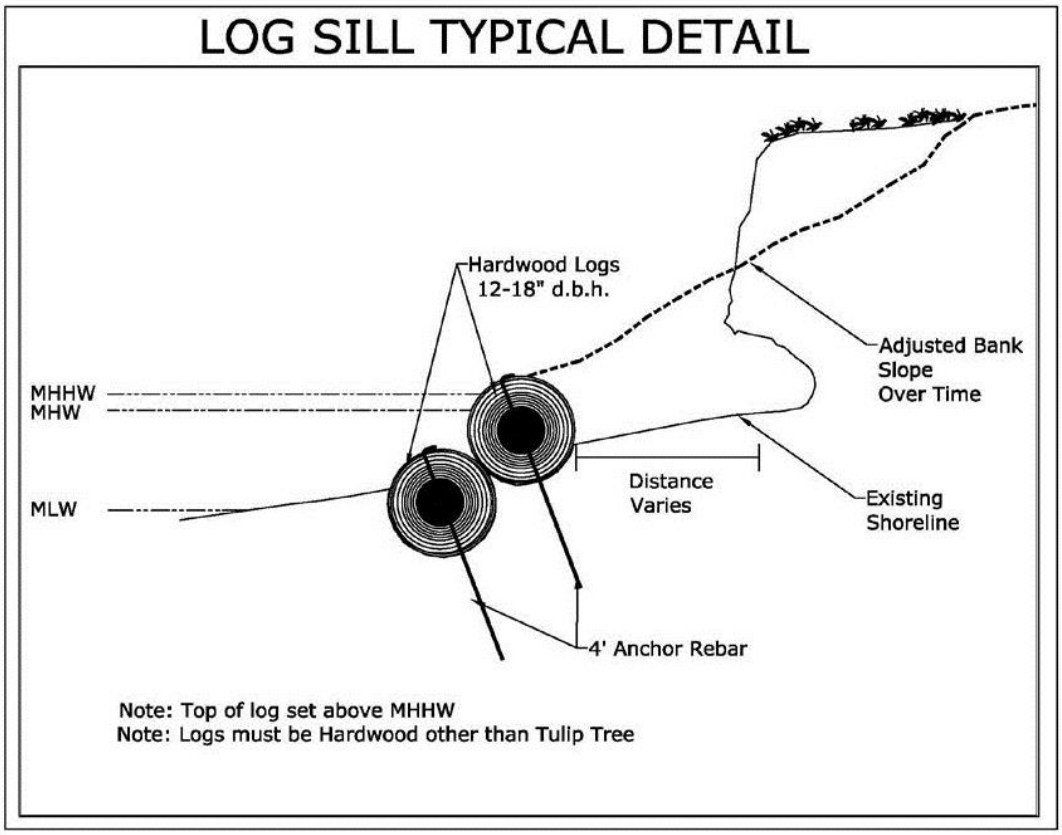
2.2.2 Alternative 2 – Log Toe Stabilization

Alternative 2 would employ log toe stabilization along Reaches B, D, and G where potential wave energy is lower. Under Alternative 2, Reaches A, E, and F would be repaired using the hardened structure/revetment method as described under Alternative 1, and Reach C would be repaired using the sheet pile method.

The log toe stabilization method includes the placement of natural untreated hardwood logs at the undercut toe of slope to repair the slope toe (Figure 2-3). The logs would be anchored with rebar. This measure would also include potential grading of the upper portions of the embankment to a less erosive slope, where slope erosion is occurring. The method would focus on using evergreen tree species and larger hardwood species to maximize the lifespan of the structure. In addition, if the final engineering design requires additional anchoring of the logs with a more structural component then the rebar, such a small concrete anchors then they would be utilized to ensure stability. One of the goals of this alternative is to keep the structure as natural as possible in the prescribed locations.

A detailed engineering analysis conducted for Reach C, which is adjacent to the berm (former dredge spoil lagoon), determined a sheet pile structure to be the most feasible measure for this site (NAVFAC Washington 2012b). Alternative 2 would include installing a sheet pile structure similar to the example shown in Figure 2-4 on the Severn River side of the berm. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. The berm would be back-filled using suitable fill material.

The log toe stabilization and sheet pile structure would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints of the various work areas.



Source: NAVFAC Washington 2013a.
Notes: MHHW = mean higher high water; MHW = mean high water; MLW = mean low water; d.b.h. = diameter at breast height.

Figure 2-3. Typical Detail of Log Toe Stabilization

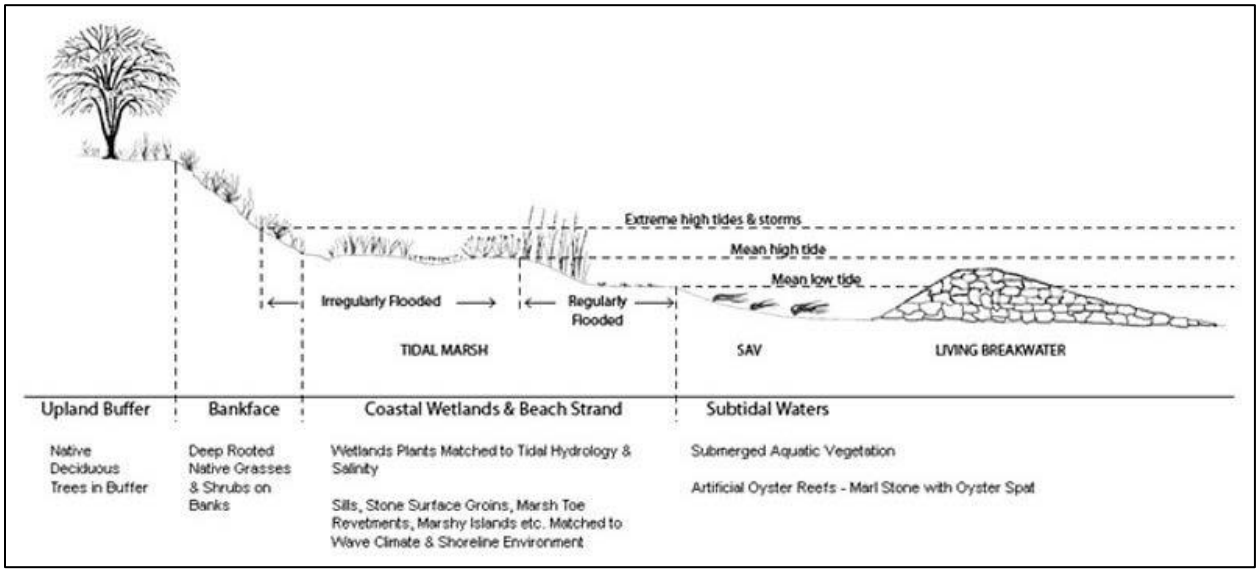
Source: NAVFAC Washington 2012b.
Note: Sheet pile can be seen at the top of the berm.

Figure 2-4. Typical Sheet Pile Structure

2.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2.

Living shoreline techniques include the use of sills, groins, or breakwaters in combination with sand, and other natural materials. Living shoreline restoration includes the installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat (Figure 2-5). A breakwater may be installed, consisting of a trapezoidal stone structure, for the purpose of dissipating wave energy before waves reach the shore. This alternative would be utilized in areas with lower wave energy along portions of the Carr Creek and Mill Creek reaches where installation of this type of restoration measure would be most successful. This technique would also include potential grading of the upper portions of the embankment to a less erosive slope, where appropriate. This work would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.



Source: NAVFAC Washington 2014.
Note: SAV = submerged aquatic vegetation.

Figure 2-5. Typical Living Shoreline Treatment

2.2.4 No Action Alternative

The No Action Alternative would maintain the status quo. Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex mission-critical areas would decrease. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist.

The No Action Alternative fails to meet the purpose and need of the proposed action as stated in Section 1.3. However, it does provide a baseline against which to measure the potential impacts of the proposed action. Therefore, the No Action Alternative is evaluated in subsequent sections of this EA.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The Navy considered a range of alternatives for stabilizing and restoring the shoreline along the North Severn Complex. The following paragraphs summarize the alternatives that were considered and dismissed because they did not fully satisfy the purpose and need, or were not practicable, for the proposed action.

2.3.1 Offshore Breakwater Alternative

This alternative would involve the construction of breakwaters offshore along the entire shoreline of the North Severn Complex. The breakwaters would control the tidal wave action experienced along the shore by dissipating energy from storm surges and wind generated waves, and over time, naturally encouraging a sediment substrate to support tidal marsh vegetation between the shoreline and the breakwater. The breakwaters would be aligned to provide the greatest area of shoreline protection available. However, this alternative would not be appropriate for all areas due to wave energy, topography, and existing structures. It would also not slow or prevent current erosion of the upper banks and may obstruct navigation in some areas. Therefore, this alternative was eliminated from further analysis.

2.3.2 Seawall/Bulkhead Alternative

This alternative would involve the construction of a seawall or bulkhead along the entire shoreline of the North Severn Complex. A properly engineered seawall would consist of a seawall/bulkhead, filter cloth, and appropriate tiebacks installed in the seawall. This alternative would only be effective where wave and tidal energy is less pronounced than other parts of the shoreline. It would not provide for creation of wetlands and would require substantial backfilling in order to provide the necessary structural integrity. Failure of the seawall could occur over time in areas exposed to high wave energy and storm surges. Therefore, this alternative was eliminated from further analysis.

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE ACTION ALTERNATIVES

A summary of environmental consequences for the alternatives analyzed in this EA is provided in Table 2.4-1. Temporary impacts to soils, water resources, biological resources, air quality, noise, and transportation would occur as a result of the proposed action during the construction phase, regardless of the alternative that may be implemented. Beneficial impacts would occur to the economy during the construction phase. The proposed action alternatives would have long-term beneficial impacts to soils, water resources, biological resources, transportation, and infrastructure and utilities by reducing shoreline erosion and sedimentation, and by reducing the potential safety risks from unstable bluffs along the shorelines. With the use of Best Management Practices (BMPs), and avoidance, minimization, and mitigation measures, none of the impacts associated with any of the alternatives for the proposed action would be significant.

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Geology, Topography, and Soils	• No impacts to geology • Soils in construction staging areas would be compacted, but restored post-construction • Appropriate BMPs would be identified in a soil erosion and sediment control plan (SESCP) and implemented during construction activities • Beneficial impacts to shoreline soils would occur; protection from future erosion and the risk of release of the disposed dredge sediments reduced	• Impacts to geology and topography would be minimal • Minor impacts to soils • Appropriate BMPs would be implemented during construction activities • Beneficial impacts as toe of slope topography would be stabilized and soil erosion and sedimentation would be reduced	• Impacts to geology and topography would be minimal • Minor impacts to soils; temporary soil disturbance during construction • Appropriate BMPs would be identified in a SESCP and implemented during construction activities • Beneficial impacts and reduction in erosion potential by created marsh	• Existing shoreline conditions would continue to decline and erosion would continue to take place resulting in continued bank sloughing and sedimentation
Water Resources	• Impacts to water quality during construction as a result of increased sedimentation and turbidity from ground disturbance during construction • Long-term beneficial impacts to water quality by reduction of sediments entering the watershed • Potential impact to approximately 4.1 acres of wetlands • Impacts to the 100-year floodplain would be minimized through implementation of BMPs in accordance with the Memorandum of Understanding (MOU) between the State of Maryland and Department of Defense (DoD) (May 2013) • No impacts to groundwater • The Navy determined the proposed action is consistent to the maximum extent practicable with Maryland's Coastal Zone Management Program	• Impacts to water resources would be minimal and less than those described for Alternative 1 • Adverse impacts to wetlands during installation of living shoreline would be minimized and avoided through compliance with permit requirements and BMPs • Long-term, beneficial impacts to water resources by reducing shoreline erosion and sedimentation	• Impacts to water resources would be minimal and less than those described for Alternative 1 • Adverse impacts to wetlands during installation of living shoreline would be minimized and avoided through compliance with permit requirements and BMPs • Long-term, beneficial impacts to water resources by reducing shoreline erosion and sedimentation	• Water quality would continue to decline as a result of sedimentation • Potential for unknown contaminants from the former dredge spoil lagoon along Reach C to enter water resources could cause significant impacts to the Chesapeake Bay • The area and quality of existing wetlands may be adversely impacted over time

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Water Resources (Continued)	(CZMP) and would not result in significant impacts to coastal zone resources (refer to Appendix A, *Federal Coastal Consistency Determination*). In accordance with Section 307 of the Coastal Zone Management Act (CZMA), the Navy submitted the Federal Coastal Consistency Determination for the proposed action to the Maryland Department of the Environment (MDE). On March, 25, 2015, the MDE concurred with the Navy's finding, specifically review finding "R1 Consistent with Qualifying Comments (MD20150112-0024)" (refer to Appendix B, *Agency Correspondence*).Impacts to water resources from construction would be avoided and minimized through the identification (i.e., preparation of a SESCP and stormwater management plan) and implementation of appropriate BMPs			

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Biological Resources	• Adverse impacts to vegetation during construction; long-term beneficial impacts to vegetation as shoreline erosion and sedimentation would be reduced • BMPs would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation; long-term beneficial impacts to submerged aquatic vegetation from improved water quality • Compliance with applicable regulations, permits, and BMPs, would minimize localized impacts to biological resources during construction activities; temporary disturbance to Essential Fish Habitat (EFH); long-term beneficial impacts to terrestrial and marine biological resources and EFH would occur following completion of repair and restoration activities • No adverse impacts to federally-listed or state-listed species are anticipated.	• Impacts to biological resources for Reaches A, C, E, and F would be the same as for Alternative 1 • Potential impacts to biological resources along Reaches B, D, and G would be less than those described under Alternative 1 because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope • Compliance with applicable regulations, permits, and BMPs would further minimize and avoid impacts to biological resources • Long-term beneficial impacts to terrestrial and marine biological resources would occur following completion of repair and restoration • No adverse impacts to federally-listed or state-listed species are anticipated.	• Impacts to biological resources for Reaches A, C, and E would be the same as for Alternative 1 • Impacts to biological resources for Reaches B, D, F, and G would be less than Alternative 2, except for potential short-term impacts to vegetation and EFH • Compliance with applicable regulations, permits, and BMPs would further minimize and avoid impacts to vegetation • Long-term beneficial impacts to terrestrial and marine biological resources would occur following completion of repair and restoration • No adverse impacts to federally-listed or state-listed species are anticipated. In a June 29, 2015 letter, the USFWS concurred with the preferred alternative (see Appendix B, *Agency Correspondence*). In response to a February 26, 2015 letter from NMFS regarding impacts to EFH, the Navy will comply with the EFH conservation recommendations. Once design plans are finalized, the Navy anticipates reinitiating consultation with NMFS with respect to EFH (refer to Appendix B, *Agency Correspondence*)	• Impacts to submerged aquatic vegetation, fish, and EFH from declining water quality due to sedimentation and the potential for unknown contaminants from the former dredge spoil lagoon along Reach C • Significant adverse impacts to biological resources within the Severn River watershed

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Land Use	• Consistent with existing land use • Short-term impacts to land use for the duration of construction	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact the installation mission and its capital assets from continued shoreline erosion
Air Quality	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds (refer to Appendix C, *Air Quality*) • No long-term emission sources would be constructed • No impacts	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds • No long-term emission sources would be constructed • No impacts	• Pollutant emission resulting from proposed repair and restoration activities are well below *de minimis* thresholds • No long-term emission sources would be constructed • No impacts	• No impact
Noise	• Temporary increases in noise during construction phase from construction equipment operating at the site, and construction/delivery vehicles • Implementation of noise attenuation measures would reduce potential for disturbance from noise • No long-term increase in noise	• Impacts would be the same as those described for Alternative 1, with additional temporary increased noise from sheet pile driving activities	• Impacts would be the same as those described for Alternative 1, with additional temporary increased noise from sheet pile driving activities	• No impact
Transportation	• Minor impacts to vehicular and recreational boat traffic in the vicinity of the reaches during construction activities • No permanent impact to transportation • Long-term, beneficial impacts to the North Severn Complex perimeter roads	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact transportation from continued shoreline erosion, threatening some of the road infrastructure and the ability to navigate around the outer limits of the North Severn Complex

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Infrastructure and Utilities	• Minimal to no impacts to utilities and infrastructure during construction • No permanent impacts to utilities and infrastructure	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential to adversely impact transportation from continued shoreline erosion, threatening some of the road infrastructure and the ability to navigate around the outer limits of the North Severn Complex • Potential to impact utilities; the NSA Annapolis wastewater treatment plant is located near Carr Creek and sections of the wastewater collection system and the treated wastewater outfall are in proximity to the degrading shoreline
Cultural Resources	• Ten previously recorded and unevaluated archaeological sites and one site eligible for listing on the National Register of Historic Places (NRHP) are in the vicinity of Reaches D1, F, and G • No eligible or unevaluated archaeological sites in the vicinity of the other Reaches • The Navy would prepare Archaeological Site Protection Requirements plans for review and concurrence by the Maryland Historical Trust (MHT) to ensure no	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• Potential adverse effects to cultural resources, as shoreline erosion would continue, which could lead to the deterioration of archaeological sites near the shoreline

Table 2.4-1. Summary of Environmental Consequences

Resource Area	Alternative 1–Hardened Structure/Revetment	Alternative 2–Log Toe Stabilization	Alternative 3–Living Shoreline (Preferred)	No Action Alternative
Cultural Resources (Continued)	construction activities occur within areas of known archaeological sites • With the provision of the Archaeological Site Protection Requirements plans, there would be No Adverse Effect to NRHP-eligible archaeological resources. MHT concurred with the finding of No Adverse Effect in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*) • No adverse effect on NRHP-listed and eligible architectural resources.			
Human Health and Safety	• No impacts to human health and safety	• Impacts would be similar to those described for Alternative 1 • Completion of construction of the sheet pile structure at the berm along Reach C would result in a beneficial impact to human health and the environment by preventing release of contaminants into the Severn River	• Impacts would be similar to those described for Alternative 1 • Completion of construction of the sheet pile structure at the berm along Reach C would result in a beneficial impact to human health and the environment by preventing release of contaminants into the Severn River	• Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality • Adverse impacts from potential release of contaminated sediments
Socioeconomic Resources	• Short-term beneficial impacts to economy during construction	• Impacts would be the same as those described for Alternative 1	• Impacts would be the same as those described for Alternative 1	• No impact

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, NSA Annapolis would maintain the status quo. Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex mission critical areas would decrease. There would be potential adverse impacts to soils, water resources, biological resources, land use, transportation, and infrastructure and utilities. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter presents the affected environment and the environmental consequences for the proposed action. The affected environment section under each resource topic describes the existing conditions of resources that could be affected by the project. The environmental consequences section under each resource topic analyzes the potential environmental impacts associated with each of the alternatives described in Chapter 2. Generally, the region of influence (ROI) for the resources analyzed is within the project area designated in Chapter 2 and shown in the figures in this chapter.

3.1 GEOLOGY, TOPOGRAPHY, AND SOILS

3.1.1 Affected Environment

3.1.1.1 Geology

The North Severn Complex is situated within the Atlantic Coastal Plain physiographic province, which extends from Cape Cod to Florida along the Atlantic Ocean. The Coastal Plain is underlain by unconsolidated sediments containing gravels, sands, and clays of the late Mesozoic and Cenozoic Age that are 100 million years old or younger. Geologic formations occurring in the area include the Aquia Greensand and Matawan Formation, which overlie the Magothy Formation. There are no major geographical structural features and no active fault lines in the Annapolis area (NAVFAC Washington 2011b).

3.1.1.2 Topography

The project area occupies a relatively flat, low profile area adjacent to Carr Creek, Mill Creek, and the Severn River. The lowest areas are along the creek and river shorelines. Elevation varies from sea level to approximately 24 feet (NAVFAC Washington 2011b). The waterfront shoreline topography ranges from gentle slopes to vertical eroded embankments.

3.1.1.3 Soils

The Natural Resources Conservation Service (NRCS) soil survey for Anne Arundel County identified 14 major soil series on the North Severn Complex. Of those that occur within the project area, the Deale-Shadyoak complexes, Donlonton, Mispillion and Transquaking, and Widewater and Issue soils are considered hydric and prone to flooding. Outside developed or previously-built areas, several of the Annapolis, Collington-Wist, and Cumberstone-Mattapex, soils are classified as prime farmland or farmland of statewide importance (NAVFAC Washington 2011a).

In addition, soils are assigned an erosion “K” factor ranging from 0.2 to 0.69 (the higher the value the more erodible the soil). The Deale-Shadyoak and Cumberstone-Mattapex complexes have K factors of 0.43 and 0.37 respectively, and both Donlonton and Collington-Wist have K factors of 0.32. These K factor values indicate a moderate potential for soil erosion (NRCS 2013).

Soils within the project area are illustrated in Figure 3.1-1. Their characteristics are summarized in Table 3.1-1.

Figure 3.1-1. Soil Types within the Project Area

Table 3.1-1. Description of the Soils within the Project Area

Soil Type Symbol	Soil Name	Description
AoB	Annapolis loamy sand, 2 to 5 percent slopes	Very deep and well drained soils occurring in uplands on the coastal plane. Depth to bedrock is greater than 72 inches, as is the depth to seasonal high water table. It has no frequency for flooding or ponding. K factor of 0.20
AsA, AsB, AsC, AsE	Annapolis fine sandy loam, 0 to 2 percent slopes, 2 to 5 percent slopes, 5 to 10 percent slopes, and 15 to 25 percent slopes	Very deep and well drained soils, occurring on side slopes in the coastal plain. Depth to bedrock is greater than 72 inches, as is the depth to seasonal high water table. It has no frequency for flooding or ponding. K factor of 0.28.
AuB, AuD	Annapolis-Urban land complex, 0 to 5 percent slopes and 5 to 15 percent slopes	Very deep and well drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches as is the depth to seasonal high water table. It has no frequency for flooding or ponding and includes some developed areas. K factor of 0.28
CoA, CoB, CoC	Collington-Wist complex, 0 to 2 percent slopes, 2 to 5 percent slopes and 5 to 10 percent slopes	Very deep and well drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches as is the depth to seasonal high water table. It has no frequency for flooding or ponding. K factor of 0.32.
CpB, CpD	Collington-Wist-Urban land complex, 0 to 5 percent slopes and 5 to 15 percent slopes	Very deep and well drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches as is the depth to seasonal high water table. It has no frequency for flooding or ponding and includes some developed areas. K Factor of 0.32
CRD	Collington and Annapolis soils, 10 to 15 percent slopes	Very deep and well drained soils located on hillslopes in the coastal plane. Depth to bedrock is greater than 80 inches as is the depth to seasonal high water table. It has no frequency for flooding or ponding. K factor of 0.28
CSE	Collington, Wist, and Westphalia soils, 15 to 25 percent slopes	This mapping unit consists of very deep well drained soils located on hillslopes in the coastal plane. Depth to bedrock is greater than 80 inches as is the depth to seasonal high water table. It has no frequency for flooding or ponding. K Factor of 0.32.
CxA, CxB	Cumberstone-Mattapex complex, 0 to 2 percent slopes and 2 to 5 percent slopes	Very deep and somewhat poorly drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 15-20 inches. It has no frequency for flooding or ponding. K Factor of 37.
DcA	Deale-Shadyoak complex, 0 to 2 percent slopes	Very deep and somewhat poorly drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 10-15 inches. It has no frequency for flooding or ponding. K factor of 0.43.
DeA	Deale-Shadyoak-Urban land complex, 0 to 2 percent slopes	Very deep and somewhat poorly drained soils located on terraces in the coastal plane. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 10-15 inches. It has no frequency for flooding or ponding, but includes some developed areas. K factor of 0.43.

Table 3.1-1. Description of the Soils within the Project Area

Soil Type Symbol	Soil Name	Description
DnA	Donlonton fine sandy loam, 0 to 2 percent slopes	Very deep and somewhat moderately well drained soils located in drainage ways and swales in the coastal plane. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 20-40 inches. It has no frequency for flooding or ponding. K factor of 0.32.
MZA	Mispillion and Transquaking soils, 0 to 1 percent slopes, tidally flooded	Very deep and very poorly drained soils located in tidal marshes in the coastal plane. Depth to bedrock is greater than 80 inches and the depth to water table is 0-5 inches. It is subject to frequent flooding but no ponding. K factor is not provided due to tidal marsh location.
UxB	Udorthents, loamy, sulfidic substratum, 0 to 5 percent slopes	Very deep and well drained soils that have been graded or disturbed in some way. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 40-72 inches. It has no frequency for flooding or ponding. No K factor determined.
Uz	Urban land	This mapping unit consists of areas that have been developed. No K factor determined.
W	Water	This mapping unit consists of open water areas.
WBA	Widewater and Issue soils, 0 to 2 percent slopes, frequently flooded	Very deep and poorly drained soils located on floodplains. Depth to bedrock is greater than 80 inches and the depth to seasonal high water table is 0-10 inches. This soil type is subject to frequent flooding and ponding. K Factor of 0.28.

Source: NRCS 2013.

3.1.2 Environmental Consequences

3.1.2.1 Alternative 1 – Hardened Structure/Revetment

No impacts to geology are expected because excavation would be avoided to the greatest extent practicable during construction of the revetments**.** Impacts to topography would be expected to be negligible. The sites proposed for shoreline repair and restoration could require minor grading during site preparation for installation and construction of revetments; however, the sites are mostly level and undeveloped. Installation of revetments would generally alter the existing topography as shown in the typical cross section in Figure 2-2 and would help preserve existing topography in areas adjacent to shorelines.

Access would be provided for the construction equipment as well as the heavy machinery required for transporting construction materials to proposed shoreline sites. As a result, soils along ingress and egress routes as well as adjacent to the project sites would be compacted. The use of logging mats in heavily traveled areas would reduce the extent of compacted soils. In addition, post-construction soils restoration (i.e., ripping or grading) would restore compacted areas.

Soil productivity can be defined as the ability of the soil to produce vegetative biomass. This trait would be almost completely eliminated for the areas where revetments are constructed as soil surfaces would be permanently covered with geotextile fabric and stone or other similar item. At construction staging and access areas, soil productivity would be temporarily reduced, but would return to previous productivity levels once construction activities are completed and the areas restored. Staging areas would be graded

and either seeded with grass and covered with straw mulch or hydroseeded depending on the size of the disturbed areas.

Construction of revetments would generally not displace the river/creek bottom as they would primarily be installed on the shoreline slopes. However, at specific locations where final design dictates the structural requirement, portions of the revetment could be constructed in such a manner as to possibly extend into the tidal zone (Figure 2-2).

Soil impacts occurring from the construction and staging activities would be minimized by proper construction management and planning. Prior to the initiation of construction, NSA Annapolis would prepare a SESCP in accordance with Maryland soil erosion and sediment control guidelines (MDE 2011). This site-specific plan would identify BMPs to be implemented, with the goal of minimizing soil erosion and runoff from construction activities. BMPs could include silt fences, silt or turbidity curtains, inlet and outlet protection, erosion control matting, sediment logs, construction entrances, temporary and permanent seeding, mulching, and check dams, as well as any other measures determined appropriate for the specific site conditions. Maryland requires a SESCP for disturbance of 5,000 square feet (SF) or greater and EO 12088, *Federal Compliance with Pollution Control Standards*, requires any project that may result in the discharge or runoff of pollutants to comply with state requirements respecting the control and abatement of water pollution.

Shoreline repair and restoration efforts would result in beneficial impacts because the topography would be stabilized. Shoreline soils would be protected from future erosion, and sedimentation in adjacent areas would be reduced. Additionally, the failing berm at Reach C would be stabilized and the risk of the release of disposed dredge sediments reduced.

3.1.2.2 Alternative 2 – Log Toe Stabilization

Impacts to soils for Reaches A, E, and F under Alternative 2 would be the same as those described for Alternative 1. Impacts to geology and topography under Alternative 2 would be minimal and less than those described for Alternative 1. The berm adjacent to Reach C that requires restoration is a man-made structure that is not part of the natural topography. Access would be provided for the construction and pile driving equipment as well as the heavy machinery required for transporting construction materials to proposed shoreline sites. As a result, soils along ingress and egress routes as well as adjacent to the project sites would be compacted. The use of logging mats in heavily traveled areas would reduce the extent of compacted soils. In addition, post-construction soils restoration (i.e., ripping or grading) would restore compacted areas.

Impacts to soils in the reaches where log toe stabilization would occur would be minor as the construction effort would be limited to the placement and anchoring of logs along the eroded toe of slope. BMPs would be utilized as appropriate.

Beneficial impacts would be recognized under Alternative 2 as the toe of slope topography would be stabilized and existing soil erosion and sedimentation would be reduced. Additionally, the failing berm at Reach C would be stabilized and the risk of the release of disposed dredge sediments reduced.

3.1.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2. Overall, impacts to geology and topography under

Alternative 3 would be minimal and less than those described for Alternative 1. There would be minor impacts to the soils along the toe of slope and adjacent shallow water habitat where the living shoreline would be installed. Placement of a stabilizing structure and backfill with sand to create the marsh terrace behind the structure would cause temporary soil disturbance during construction. Plants installed on the terrace would develop deep root systems and dense foliage to further stabilize the area. It is anticipated that this effort would require an SESCP. BMPs could include silt fences, turbidity curtains, and sediment logs. Impacts to soils in Reaches A, B, D, E, F, and G would be the same as those described for Alternative 1. Impacts to soils in Reach C would be the same as those described for Alternative 2.

Beneficial impacts would be recognized under Alternative 3 because the created marsh would help dissipate and reduce wave energy on the lower slopes and the vegetation would help stabilize the soils in place, thereby reducing erosion potential. As with Alternative 2, the failing berm at Reach C would be stabilized and the risk of the release of disposed dredge sediments reduced.

3.1.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Existing shoreline conditions would continue to decline and erosion would continue to take place resulting in continued bank sloughing and sedimentation.

3.2 WATER RESOURCES

3.2.1 Affected Environment

3.2.1.1 Surface Water

The reaches defined at the North Severn Complex of NSA Annapolis for shoreline repair and restoration (Figure 2-1) occur within the Severn River watershed. This watershed contains the following subbasins within the project area: Carr Creek, Severn River Tidal, Mill Creek, and Woolchurch Cove (Table 3.2-1).

The Severn River is considered an impaired water body and Total Maximum Daily Load limits have been established for fecal coliform, suspended sediment, and nutrients (nitrogen and phosphorus) (USEPA 2014). The *Severn River Watershed Management Master Plan* ranked Woolchurch Cove as first for subbasins within the Severn River watershed in need of restoration (Anne Arundel County 2006). The western portion of Reach E falls within this subbasin.

Table 3.2-1. Watersheds of Shoreline Repair and Restoration Reaches

Reach	Subbasin
A	Severn River Tidal
B	Carr Creek
C	Carr Creek
D1	Carr Creek
D2	Carr Creek
E	Carr Creek and Woolchurch Cove
F	Mill Creek
G	Mill Creek

The Severn River watershed is located within the Chesapeake Bay watershed, which comprises all tributaries, backwaters, and side channels and their watersheds that drain into the Chesapeake Bay in Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and the District of Columbia. EO

13508, *Chesapeake Bay Protection and Restoration*, was signed on May 12, 2009 to renew efforts by the federal government to restore and protect the Chesapeake Bay watershed. In addition, the Chesapeake Bay Watershed Agreement was signed on June 16, 2014, which sets goals for a partnership of states (Delaware, District of Columbia, Maryland, Pennsylvania, New York, Virginia, and West Virginia) in ten areas: sustainable fisheries, vital habitats, water quality, toxic contaminants, healthy watersheds, stewardship, land conservation, public access, environmental literacy, climate resiliency (Chesapeake Bay Program 2014a).

The Clean Water Act (CWA) of 1972 (33 CFR Part 323) is the primary federal law that protects the nation's waters, including lakes, rivers, aquifers, and coastal areas. The primary objective of the CWA is to restore and maintain the integrity of the nation's waters. Waters of the U.S. are broadly defined to include navigable waters (including intermittent streams), impoundments, tributary streams, and wetlands. Waters of the U.S. are under the jurisdiction of the USACE. Within Maryland, the MDE is the administrative authority for water quality under the CWA.

Section 401 of the CWA requires an applicant applying for a federal license or permit for a discharge to waters of the U.S. to obtain certification that any discharges will comply with the Act, including water quality standard requirements, from the applicable state. In addition, the project proponent must seek water quality certification from the state in which the discharge will originate to ensure the discharge complies with applicable water quality standards. The MDE issues Section 401 water quality certifications for USEPA general permits. Section 404 of the CWA establishes a permit program for the discharge of dredged or fill material into waters of the U.S. Encroachment into waters of the U.S. requires a permit from the State and the federal government. Section 401 approval is typically a condition associated with Section 404 permit issuance.

3.2.1.2 Wetlands

Wetlands are regulated under Sections 401 and 404 of the CWA and tidal wetlands are regulated jointly by MDE and the USACE. Figure 3.2-1 shows both USFWS's National Wetland Inventory (NWI) wetlands and wetlands that were field delineated in the project area. It is worthwhile to note that the NWI mapping is prepared from the analysis of high altitude imagery. A margin of error is inherent when using imagery to map wetlands. Detailed on-the-ground inspection of sites can result in revision of wetland boundaries or classifications determined through image analysis. Nonetheless, NWI mapped wetlands are helpful for areas where wetlands have yet to be field delineated. A non-tidal wetland delineation was conducted on approximately 230 acres at Greenbury Point in 2002 (NAVFAC Engineering Field Activity Chesapeake 2003). Also, a delineation was performed for a small area of wetlands (0.85 acre) at the head of Carr Creek (NAVFAC Engineering Field Activity Chesapeake 2003). Approximately 52 acres of wetlands are located within the project area (Figure 3.2-1) (NAVFAC Washington 2011a). The types of wetlands that are present along each of the reaches for repair and restoration are listed in Table 3.2-2.

Table 3.2-2. Wetland Classifications of the Shoreline Repair and Restoration Reaches

Reach	Classification
A	Palustrine Emergent Palustrine Emergent Persistent Palustrine Forested Broad-leaved Deciduous, seasonally tidal Palustrine Forested Needle-leaved Deciduous, seasonally tidal Palustrine Open Water
B	Palustrine Forested Broad-leaved Deciduous/Scrub/Shrub Broad-leaved Deciduous, temporarily flooded
C	Palustrine Emergent Persistent Palustrine Emergent* Palustrine Open Water*
D1	Estuarine Intertidal Scrub-Shrub Broad-leaved Deciduous, irregularly flooded Estuarine Intertidal Emergent Persistent Estuarine Subtidal Unconsolidated Bottom Palustrine Forested Broad-leaved Deciduous
D2	Estuarine Intertidal Unconsolidated Shore Estuarine Intertidal Scrub-Shrub Broad-leaved Deciduous, irregularly flooded
E	Palustrine Forested Needle-leaved Evergreen, seasonally tidal Estuarine Intertidal Emergent Persistent
F	Estuarine Intertidal Emergent Persistent Estuarine Subtidal Unconsolidated Bottom Palustrine Forested Broad-leaved Deciduous
G	Palustrine Forested Broad-leaved Deciduous Estuarine Intertidal Emergent Persistent

Source: Cowardin 1979 as cited in NAVFAC Washington 2011a.
Notes: * refers to the two relatively large wetland areas not on, but near, the shoreline of Reach C and Reach D2; palustrine refers to any wetland that lacks flowing water, contains ocean-derived salts at concentrations of less than 0.05 parts per thousand (ppt), and is non-tidal (Ferren et al. n.d.).

Figure 3.2-1. Wetlands within the Project Area

3.2.1.3 Floodplains

EO 11988, *Floodplain Management*, instructs federal agencies to consider the risks, danger, and potential impacts from locating projects within floodplains. Floodplains are defined as the lowland and relatively flat areas adjoining inland waters subject to a 1 percent or greater chance of flooding in any given year, or the 100-year floodplain. The EO states that in instances where alternatives are impractical, the agency must minimize harm to or within the floodplain and take appropriate steps to notify the public of the action or project.

In addition, EO 13653, *Preparing the United States for the Impacts of Climate Change*, requires federal agencies to anticipate short- and long-term risks and vulnerabilities to climate change in order to proactively manage for risks to their operations and missions.

In February 2014, the DoD issued the memorandum Floodplain Management on Department of Defense Installations. The memo directs the DoD to minimize construction in 100-year floodplains consistent with EOs 11988 and 13653, DoD policy and regulations, and the Unified Facilities Criteria. In addition, DoD components are responsible for documenting on DoD Form 1391 that flood mitigation measures will be incorporated into the project when mission needs require construction within the 100-year floodplain. Furthermore, submission of the Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal, or Nontidal Wetland in Maryland to the MDE for review and authorization will be required for any such projects. DoD components are also required to annually certify that the appropriate flood damage vulnerability assessment has been completed for military construction projects sited within the 100-year floodplain (Under Secretary of Defense 2014).

The proposed Reaches for repair and restoration are generally located within the 100-year floodplain; Reaches C, D1, and D2 are within the 500-year floodplain (Figure 3.2-2). These same areas would be impacted by coastal flooding from storm surges and sea level rise. In addition to flooding as a result of episodic events, chronic flooding as a result of climate change may also occur in low-lying areas.

3.2.1.4 Groundwater

The principal federal regulation concerning the protection of groundwater is the Safe Drinking Water Act of 1974. This act protects the nation's public water supplies, including groundwater in areas where it is the main potable water source.

Drinking water for the North Severn Complex has been provided by Anne Arundel County since 1999, when the former David Taylor Research Center's water treatment plant was closed. The County obtains its water from the Patapsco and Patuxent Aquifers. Located under the North Severn Complex, the Patapsco Aquifer is an important source of freshwater for the region east of Washington D.C. and Baltimore. The Patapsco Aquifer is used for water consumption. This particular aquifer is recharged over very long time periods. One portion of this aquifer was determined to be more than a million years old, making it the oldest recorded for a major aquifer on the Atlantic Coast. The Patapsco Aquifer continues to experience additional demand as saltwater intrusion concerns for more shallow aquifers has encouraged increased use of this deeper aquifer (U.S. Geological Survey 2012). The Patuxent Aquifer, deeper than the Patapsco Aquifer, similarly has experienced increased pressures, resulting in water level decline. The golf course has a well for irrigation purposes.

Threats to groundwater include: (a) surface contamination, which may be transported through precipitation to the underlying aquifer, and (b) over pumping groundwater, which results when groundwater withdrawal occurs more rapidly than recharge. MDE issues groundwater appropriation

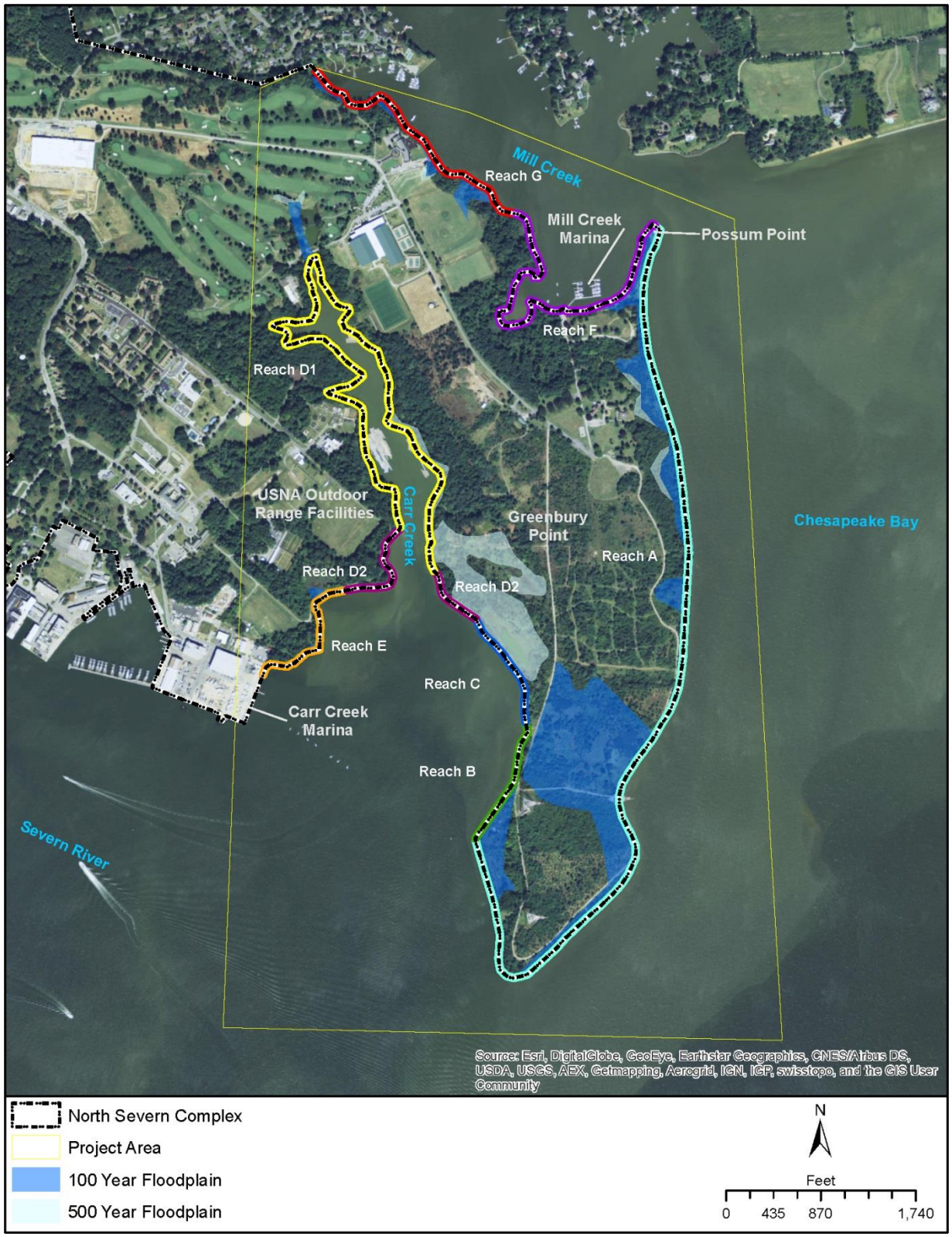


Figure 3.2-2. Floodplains (100-year and 500-year) within the Project Area

permits to ensure aquifers are not overexploited and to reduce the likelihood of saltwater intrusion (Heller and Grace 2009).

3.2.1.5 Coastal Zone

The NSA Annapolis North Severn Complex is located entirely within Maryland's coastal zone. This means that activities conducted within it are deemed reasonably likely to affect use of lands, waters, or natural resources of the coastal zone beyond the boundaries of federal property. Such activities must be consistent to the maximum extent practicable with the enforceable policies of Maryland's CZMP in accordance with the federal CZMA of 1972. Maryland's CZMP addresses coastal hazards, growth management, habitat and living resources, non-point source pollution, non-tidal wetlands, provision of public access, and tidal wetlands, and it encompasses several state laws and regulatory programs, of which the CWA is specifically applicable to the proposed action.

An MOU between the State of Maryland and the DoD, signed in May 2013, outlines the application and implementation of certain enforceable policies of Maryland's CZMP as they relate to federal actions. Additionally, this MOU states that, pursuant to 15 C.F.R. § 930.33(a)(4), listed environmentally beneficial activities are excluded from State agency consistency review. This list includes, "existing living shoreline restoration, maintenance and repair so long as any coastal disturbance is returned to its pre-disturbance condition. During staging operations, BMPs will be applied."

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1 – Hardened Structure/Revetment

Implementation of Alternative 1 may temporarily impact the water quality of the Severn River watershed, including the subbasins Carr Creek, Severn River Tidal, Mill Creek, and Woolchurch Cove. These potential impacts would occur during construction of the hardened structures/revetments along Reaches A, B, C, D, E, F, and G as a result of potential for increased sedimentation and turbidity from ground disturbance in the construction area and temporary sediment disturbance during hardened structure/revetment installation. The repair and restoration of the shoreline would result in long-term benefits for water quality by reducing the amount of sediments entering the watershed. Impacts to surface waters during construction activity would be avoided and minimized through compliance with the CWA and permit requirements. The failing berm at Reach C would be stabilized and the risk of the release of disposed dredge sediments reduced.

The construction of revetments would permanently impact wetlands located within the revetment area, as they would be covered with hardened material. The specific areas and types of wetlands impacted would be determined during the design phase. However, preliminary calculations of potential wetland impacts, using the assumption that all wetlands within 75 feet of the shoreline could be impacted, reveal that approximately 4.1 acres of wetlands could be affected under Alternative 1 (Figure 3.2-3). Table 3.2-3 shows an approximation of the types of wetlands that could be impacted for each reach. Wetlands would be protected through adherence to the Navy's *No Net Loss* policy, the Jurisdictional Determination process with the regulatory agencies, and permitting requirements that avoid and minimize adverse impacts to wetlands.

The project would likely require an individual permit from the USACE and MDE to authorize the construction impacts in Waters of the U.S. The Navy would coordinate with USACE and MDE on these permitting requirements prior to implementation of the proposed action.

Figure 3.2-3. Impacted Wetlands

Table 3.2-3. Preliminary Calculations of Potential Wetland Impacts

Reach	Approximation of Wetland Acres Potentially Affected						
	Estuarine Intertidal Emergent	Palustrine Forested	Palustrine Scrub-Shrub/ Emergent	Palustrine Emergent	Estuarine Intertidal Unconsolidated Shore	Palustrine Open Water	Total
Reach A	0	0.03	0	1.14	0	0.34	1.51
Reach B	0	0.03	0	0	0	0	0.03
Reach C	0	0	0	0.37	0	0	0.37
Reach D1	0.60	0.11	0.18	0	0.02	0	0.90
Reach D2	0	0	0	0	0	0	0
Reach E	0.10	0.03	0	0	0	0	0.14
Reach F	0.87	0	0	0	0	0	0.87
Reach G	0.32	0	0	0	0	0	0.32
						Total	**4.14**

Note: Assumes all wetlands within 75 feet of shoreline could potentially be impacted.

Impacts to the 100-year floodplain would occur, as much of the construction would likely occur within the floodplain. However, NSA Annapolis would comply with the DoD memorandum (February 11, 2014), EO 13653, and EO 11988 to minimize such impacts, as previously described in Section 3.2.1.1, *Floodplains*. The proposed use of revetments would not alter floodplain boundaries or function because revetments would still allow for water transfer. Their installation would preserve existing topography in areas adjacent to the shoreline by modifying the shoreline slope so that it is closer to its original condition. This slope restoration could improve floodplain capacity.

Alternative 1 would not result in transport of contaminants to the underlying aquifer and would not increase the demand on pumped groundwater, so over pumping would not occur. Therefore, there are no anticipated impacts to groundwater resources as a result of implementing Alternative 1.

The entire project area is within Maryland's coastal zone. Therefore, consistency with the CZMA to the maximum extent practicable must be ensured through implementation of the following processes and procedures:

- Coastal zone consistency determination process
- Adherence to CZMA and CZMA Maryland-DoD MOU practices
- Permit submittals and issuance (i.e., stormwater management plans, erosion control plans, and NPDES permits, as applicable)
- Adherence to Navy Low Impact Development Policy, the Energy Independence and Security Act Section 438, the Stormwater Management Act of 2007, MDE's Maryland Stormwater Management Guidelines for State and Federal Projects (2010), Maryland Stormwater Management Design Manual Volumes I and II (2009), and Erosion and Sediment Control Guidelines for State and Federal Projects (2004)

The Navy determined that Alternative 1 is consistent to the maximum extent practicable with Maryland's CZMP and would not result in significant impacts to coastal zone resources (refer to Appendix A, *Federal Coastal Consistency Determination*). In accordance with Section 307 of the CZMA, the Navy submitted the Coastal Consistency Determination for the proposed action to the MDE. On March, 25,

2015, the MDE concurred with the Navy's finding, specifically review finding "R1 Consistent with Qualifying Comments (MD20150112-0024)" (refer to Appendix B, *Agency Correspondence*). The specific impacts to the coastal zone and mitigation measures would be determined during the design stage.

Impacts to water resources resulting from runoff during construction activities would be avoided and minimized by proper construction management and planning. NSA Annapolis would prepare an SESCP and a stormwater management plan when proposed earth disturbance is more than 5,000 SF or 100 cubic yards. These plans would be developed in accordance with Maryland soil erosion and sediment control guidelines (MDE 2011). BMPs specific to the proposed construction site would be identified in these plans. Examples of such BMPs include: silt fences, silt or turbidity curtains, inlet and outlet protection, erosion control matting, sediment logs, construction entrances, temporary and permanent seeding, mulching, check dams, and other measures deemed appropriate for that specific action.

Implementation of appropriate sediment and erosion control BMPs during the construction phase would prevent adverse impacts to water resources from becoming significant. Long-term impacts to water resources as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced.

3.2.2.2 Alternative 2 – Log Toe Stabilization

Impacts to water resources for Reaches A, E, and F under Alternative 2 would be the same as those described for Alternative 1. Under Alternative 2, Reaches B, D, and G would utilize log toe stabilization to repair and restore the shorelines. Potential adverse impacts to water resources along these three reaches would be less than those described under Alternative 1 because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope. Similar to Alternative 1, potential impacts to approximately 4.1 acres of wetlands could occur under Alternative 2, using the assumption that all wetlands within 75 feet of the shoreline could be impacted (Figure 3.2-3). Table 3.2-3 shows an approximation of the types of wetlands that could be impacted for each reach. Compliance with permits and implementation of BMPs, as described under Alternative 1, would further minimize and avoid impacts to water resources.

This alternative includes a sheet pile structure for Reach C. Sheet pile installation is anticipated to occur at the top of the berm and would not occur in the water. However, should the need to install the sheet piles in the intertidal zone arise, all work would be conducted during periods of low tide to avoid in-water impacts. The repair and restoration of the shoreline would result in long-term benefits for water quality by reducing the amount of sediments entering the watershed. In addition, unknown contaminants would be prevented from potentially entering surface waters and other water resources, with restoration measures implemented for the berm along Reach C that was previously utilized as a dredge spoil containment lagoon (details provided in Section 3.10, *Human Health and Safety*). The proposed use of sheet pile would not alter floodplain boundaries or function because sheet piles (Reach C) would still allow for water transfer.

3.2.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2. Overall, impacts to water resources from Alternative 3 would be minimal and less than those described for Alternative 1, except for potential impacts to wetlands. Wetlands would be adversely affected during the installation of the living shoreline with the

placement of a stabilizing structure and backfill. However, for the purposes of this EA, it is assumed that all wetlands within 75 feet of the shoreline would be impacted under any of the alternatives (see Table 3.2-3). Wetlands impacted by the installation of the living shoreline would be replaced with new marsh and wetland habitat behind the stabilizing structures. The specific areas of wetlands adversely impacted and replaced following construction would be determined during the design phase and through completion of a jurisdictional determination. Adverse impacts to wetlands during construction would be minimized and avoided through compliance with permit requirements and BMPs, as described in Alternative 1.

3.2.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex would not occur, and existing conditions along the shoreline would continue to decline. Water quality would continue to decline as a result of sedimentation. Also, the potential would exist for unknown contaminants from the former dredge spoil lagoon along Reach C to enter water resources with continued erosion of the berm. The area and quality of existing wetlands may be adversely impacted over time from continued shoreline erosion.

3.3 BIOLOGICAL RESOURCES

3.3.1 Affected Environment

3.3.1.1 Vegetation

Forests and Woodlands

The ROI is within the project area designated in Chapter 2 and shown in Figure 3.3-1, below. This includes the North Severn Complex, which contains over 200 acres of forested areas, early successional habitat, and developed and mowed areas. Wetlands provide important habitat for wildlife and the types and distribution of wetlands within the project area are discussed separately under Section 3.2, *Water Resources.* The extent of forest and woodland ranges from isolated tree stands to 80 acres. Much of the forested land within the project area occurs along the shoreline and consists of hardwood and a hardwood/pine mix. A 12-acre forest mitigation area containing a variety of native tree species is located at the southern tip of Greenbury Point. The following descriptions of inventoried forests along the reaches proposed for repair and restoration are depicted in Figure 3.3-1 and are based on NSA Annapolis' INRMP (NAVFAC Washington 2011a).

Reaches A and B. Hardwood forest exists along Reach A, halfway between Bullard Boulevard and Cable Road. Further south, along the shoreline of the southern tip of Greenbury Point for both Reach A and Reach B, there is hardwood forest dominated by black cherry (*Prunus serotina*), winged sumac (*Rhus copallina*), and persimmon (*Diospyros virginiana*). Groundcover is abundant and includes Japanese honeysuckle (*Lonicera japonica*), blackberry (*Rubus pensilvanicus*), and poison ivy (*Toxicodendron radicans*). The common reed (*Phragmites australis*) can be found in the wetter areas of this forest. The common reed and Japanese honeysuckle are invasive species.

Reaches C, D1, and D2 (East of Carr Creek). Hardwood forest exists along the eastern shoreline of Carr Creek along Reaches C, D1, and D2. The composition of vegetation in these reach areas is generally similar to that described for Reaches A and B.

Figure 3.3-1. Forest Stands within the Project Area

Reaches D1, D2, and E (West of Carr Creek). Hardwood/pine forest exists along the western shoreline of Carr Creek along Reaches D1 and D2, as well as at the head of Carr Creek. An assessment was conducted between Alder Road and Carr Creek and found that much of this forest area has been disturbed in the last 10-20 years. Trees occur in patches and primarily consist of 20-50 foot tall black locust (*Robinia pseudoacacia*), black cherry, and American elm (*Ulmus americana*), along with scattered loblolly pines (*Pinus taeda*). Tulip poplars (*Liriodendron tulipifera*) and southern red oaks (*Quercus falcata*) occur on a hillside adjacent to Sycamore Court. Groundcover is dominated by invasive species, including: multiflora rose (*Rosa multiflora*), Oriental bittersweet (*Celastrus orbiclatus*), and Japanese honeysuckle.

Reach F. The forest stand found along Reach F is dominated by loblolly pines that are 30-35 feet in height. Along streams and edges, the following tree and shrub species are found: black locust, winged sumac, sawtooth oak (*Quercus acutissima*), persimmon, and red mulberry (*Morus rubra*). Groundcover is sparse except along edges and openings where grasses, blackberry, Japanese honeysuckle, multiflora rose, and goldenrod (*Solidago* spp.) occur.

Reach G. Hardwood forest exists along Reach G. The composition of vegetation in this Reach area is generally similar to that described for Reaches A and B.

Grasslands and Scrub-Shrub Communities

Scrub-shrub communities cover a large portion of Greenbury Point (Figure 3.3-2). Native warm-season grasslands were planted on Greenbury Point in 1996 as part of the natural resource program, but nonnative, cool-season grasses and shrub species are competing with these planted grasses. Grasslands and scrub-shrub communities are managed with periodic burns and nuisance and invasive control treatments, targeting commonly found invasive shrubs (i.e., autumn olive [*Elaeagnus umbellata*], shrubby bush clover [*Lespedeza bicolor*], multiflora rose, and wineberry [*Rubus phoenicolasius*]) and herbaceous plants (i.e., common reed, garlic mustard [*Alliaria petiolata*], and Chinese lespedeza [*Lespedeza cuneata*]). These grasslands and scrub-shrub communities are generally found along the shorelines of Reach A (eastern boundary of Greenbury Point) and the southern portion of Reach C. Otherwise, the shoreline is primarily bordered by a buffer of forested area intermittent areas of developed and mowed areas (generally found along Reaches F and G) (NAVFAC Washington 2011a, 2011c; 2012c).

Developed and Mowed Areas

Landscaped areas and maintained lawns occur at the Golf Course, Navy Exchange, Commissary, Child Development Center, Family Service Center, and other facilities on the North Severn Complex. Pesticide use is minimized, native plants are used, and the facility maintenance contract allows for invasive species control treatments (NAVFAC Washington 2011a).Along the shoreline, these areas are primarily found along Reach F and G (punctuating forested area) and are otherwise located further inland around facilities.

Submerged Aquatic Vegetation

Submerged aquatic vegetation refers to benthic macroalgae and seagrasses (vascular plants) that grow completely submerged below the low-tide line in soft or hard substrates in coastal habitats. They are important to a healthy aquatic ecosystem, providing food, protection, and nursery habitat for waterfowl, fish, shellfish, and invertebrates. They also oxygenate water, filter and trap sediment, remove excess nutrients, and protect shorelines from erosion.

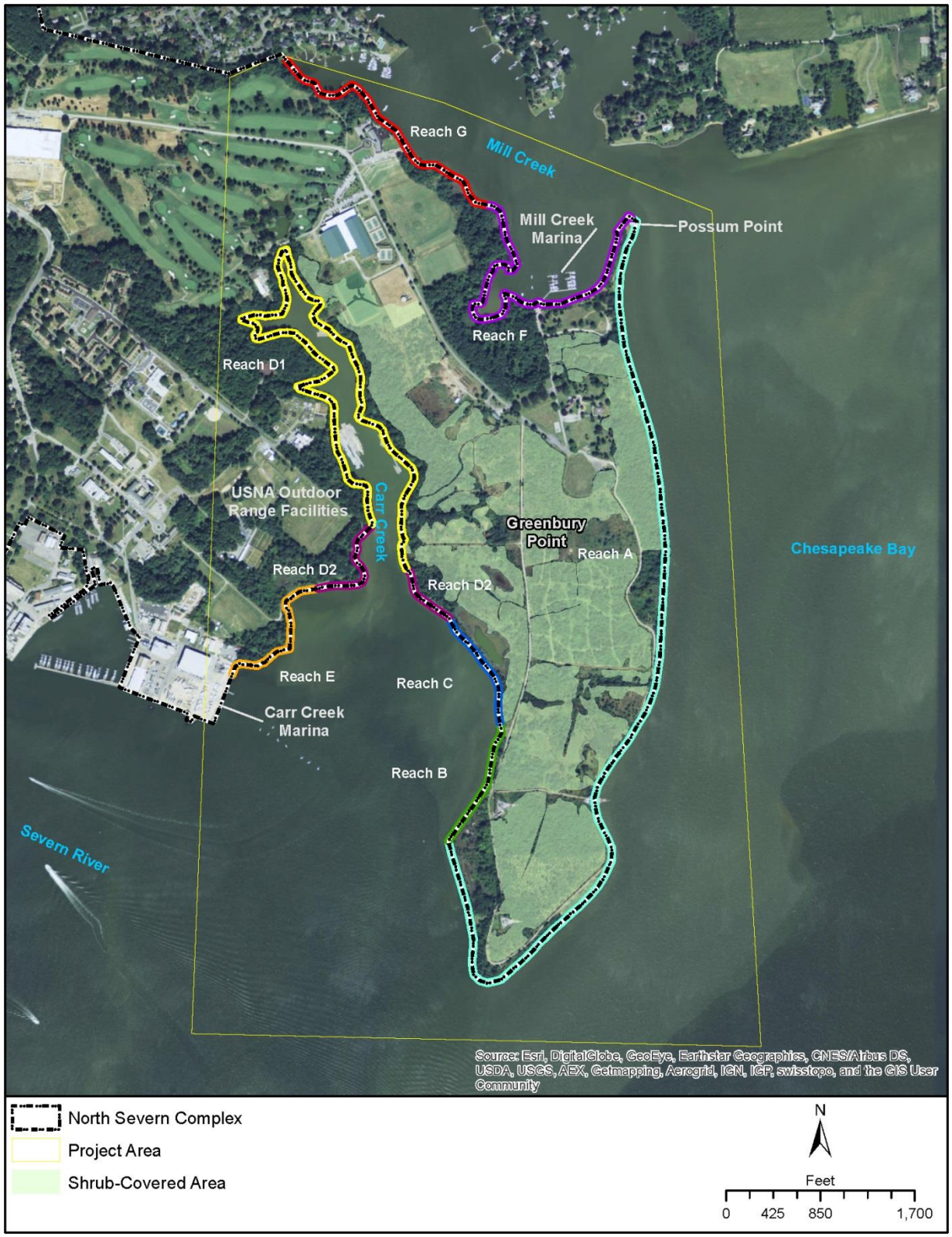


Figure 3.3-2. Scrub-Shrub Communities within the Project Area

Where salinity is lower, redhead grass (*Potamogeton perfoliatus*), sago pondweed (*Potamogeton pectinatus*), horned pondweed (*Pannichellia palustris*), and Eurasian milfoil (*Myriophyllum spicatum*) are common. Widgeon grass (*Ruppia maritime*) is tolerant of both high- and low-salinity waters and is common throughout the bay. Eelgrass (*Zostra marina*) is dominant in areas of higher salinity, generally the lower portion of the bay.

Within the project area, submerged aquatic vegetation is generally limited to the upper portions of Carr Creek and Mill Creek (NAVFAC Washington 2011a), which would correspond to Reach D1 and D2, which are along Carr Creek. The upper portion of Mill Creek is outside the project area – Reach G is located along the bottom portion of Mill Creek but is assumed to have submerged aquatic vegetation because information is limited.

3.3.1.2 Wildlife

Birds

The Migratory Bird Treaty Act (MBTA) protects migratory birds (including their eggs, nests, and feathers) and their habitats (16 U.S.C. §703-711). The MBTA prohibits the taking, killing, or possessing the eggs, parts, or nests of migratory birds unless permitted by regulation. Non-native species are not protected under the MBTA. Migratory birds are a large, diverse group of species and portions of Maryland serve as an important stopover for their breeding and overwintering, especially wading birds in the summer and waterfowl in the winter.

Over 150 bird species have been documented at Greenbury Point and the surrounding Severn River watershed. Species frequently found in the installation's open and more developed areas include eastern meadowlark (*Sturnella magna*), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), northern cardinal (*Cardinalis cardinalis*), brown-headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), purple martin (*Progne subis*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), killdeer (*Charadrius vociferus*), northern bobwhite quail (*Colinus virginianus*), eastern bluebird (*Sialia sialis*), and mourning dove (*Zenaida macroura*). Three common non-native species that are not protected under the MBTA are house sparrow (*Passer domesticus*), rock pigeon (*Columba livia*), and European starling (*Sturnus vulgaris*) (NAVFAC Washington 2011a).

Forested areas support yellow-rumped warbler (*Dendroica coronata*), magnolia warbler (*Dendroica magnolia*), yellow warbler (*Dendroica petechia*), pine warbler (*Dendroica pinus*), white-eyed vireo (*Vireo griseus*), eastern wood pewee (*Contopus virens*), yellow-bellied flycatcher (*Empidonax flaviventris*), Carolina chickadee (*Poecile carolinensis*), wood thrush *(Hylocichla mustelina)*, veery *(Catharus fuscescens)*, ovenbird *(Seiurus aurocapillus*), brown thrasher (*Toxostoma rufum*), wild turkey (*Meleagris gallopavo*) (NAVFAC Washington 2011a). Much of the shoreline within the project area is bounded by the forested areas that support these bird species, along all the Reaches.

The waters of Mill Creek and Carr Creek, adjacent to Greenbury Point, are historical waterfowl concentration areas and a variety of waterfowl overwinter in the area including Canada goose (*Branta canadensis*), canvasback (*Aythya valisineria*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), ruddy duck (*Oxyura jamaicensis*), scaup (*Aythya* spp.), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), and American black duck (*Anas rubripes*). Wetlands, open water habitats, and the shoreline also provide habitat for great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), green heron (*Butorides virescens*), yellow-crowned night heron (*Nycticorax violacea*), sandpipers (*Calidris* spp.), lesser yellowlegs (*Tringa flavipes*), terns (*Sterna* spp.), and pelicans (*Pelecanus* spp.), pie-billed grebe (*Podilymbus podiceps*), horned grebe (*Podiceps auritus*), red-throated loon (*Gavia stellata*), and mergansers (*Mergus* spp.), as well as red-winged blackbird (*Agelaius*

phoeniceus). Common gulls found in the area include herring gull (*Larus argentatus*), laughing gull (*Larus atracilla*) and ring-billed gull (*Larus delawarensis*) (NAVFAC Washington 2011a). Along with the forested habitat described above, the wetland habitat supporting these birds also borders much of the shoreline in the project area (along all the Reaches), except for a small portion of Reach A, according to available data from wetland delineations and NWI (Figure 3.3-1).

Spring and fall avian surveys were conducted at Greenbury Point in 2012, the results of which are briefly summarized below (NAVFAC Washington 2013d). The majority of the bird species encountered are common within suburban and early to mid-successional habitat types in central Maryland. Others (osprey [*Pandion haliaetus*], double-crested cormorant [*Phalacrocorax auritus*], mallard, Canada goose, great black-backed gull [*Larus marinus*], ring-billed gull, laughing gull, great blue heron, and black-crowned night-heron [*Nycticorax nycticorax*]) are also common and are associated with coastal, riverine and/or riparian habitats which are provided by the adjacent, tidal waters of Carr Creek, Mill Creek, and the Chesapeake Bay. No state- or federally-listed rare, threatened or endangered species were recorded during the spring or fall survey periods. However, one species documented during this study, prairie warbler (*Setophaga discolor*), is listed as a Bird of Conservation Concern by the USFWS for the Mid-Atlantic Coast region.

NSA Annapolis also provides important habitat for a number of raptors, including bald eagle (*Haliaeetus leucocephalus*), osprey, American kestrel (*Falco sparverius)*, and red-tailed hawk (*Buteo jamaicensis*), barn owl (*Tyto alba*), barred owl (*Strix varia*), short-eared owl (*Asio flammeus*), and eastern screech owl (*Otus asio*). Ospreys nest on the remnant tower structures in the conservation area on Greenbury Point, and 10 osprey nesting platforms have been constructed 100 feet offshore (outside the project area) from Greenbury Point (NAVFAC Washington 2011a).

The USFWS has also identified birds of conservation concern within the New England/Mid-Atlantic Coast Bird Conservation Region, some of which have been recorded at the North Severn Complex (USFWS 2008). These include pied-billed grebe, horned-grebe, red-throated loon, snowy egret, lesser yellowlegs, short-eared owl, and wood thrush.

Mammals

Mammal species that have been documented at Greenbury Point include white-tailed deer (*Odocoileus virginianus*), gray fox (Urocyon cinereoargenteus), red fox (*Vulpes vulpes*), woodchuck (*Marmota monax)*, eastern cottontail (*Sylvilagus floridiana*), eastern gray squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis marsupialis*), short-tailed shrew (*Blarina brevicauda*), eastern mole (*Scalopus aquaticus*), meadow vole (*Microtis pennsylvanicus*), house mouse (*Mus musculus*), and little brown bat (*Myostis lucifugus*) (NAVFAC Washington 2011a). Marine Mammals

Seven marine mammal species have regular occurrences in the Chesapeake Bay: North Atlantic right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), harbor porpoise (*Phocoena phocoena*), and harbor seal (*Phoca vitulina*). The North Atlantic right, humpback, and fin whales are listed as endangered under the ESA and are discussed further in Section 3.3.1.3. Three additional marine mammals, the West Indian manatee (*Trichechus manatus*), gray seal (*Halichoerus grypus*), and harp seal (*Pagophilus groenlandicus*), are considered accidental and there is no evidence of regularly occurring resident or breeding populations in Maryland waters (Maryland Natural Heritage Program [NHP] 2010a). The bottlenose dolphin and harbor porpoise are expected to be the most common species in Chesapeake Bay with others generally present at very low densities and in deeper offshore waters. Although no marine mammal strandings, bycatch, or sightings have been documented for NSA

Annapolis, the only marine mammal with the potential to occur within the project area is the bottlenose dolphin (U.S Navy 2009).

Fish

The Chesapeake Bay supports approximately 350 species of fish. The bay and its tributaries, such as the Severn River, serve as important spawning and nursery sites for many important commercial and recreational finfish and shellfish species. Several of these species are anadromous fish, which spend their adult life in the bay then migrate to the brackish or freshwater tributaries to spawn. These include the American shad (*Alosa sapidissim*), hickory shad (*Alosa mediocris*), blueback herring (*Alosa aestivalis*), alewife herring (*Alosa pseudoharengus*), and striped bass (*Morone saxatilis*) (Chesapeake Bay Program 2015). White (*Morone americana*) and yellow perch (*Perca flavescens*) are also documented to spawn in the Severn River (NMFS 2015).

Within the Severn River, freshwater fish dominate the tidal headwaters of the tributaries while more salt tolerant fish dominate the more saline tidal waters lower in the tributaries. Fish that prefer less saline water in the tidal tributaries include pumpkinseed sunfish (*Lepomis gibbosus*), brown bullhead (*Ameiurus nebulosus*), and the invasive chain pickerel (*Esox niger*) and common carp (*Cyprinus carpio*). The more saline areas of the Severn watershed support American eel (*Anguilla rostrata*), white perch (*Morone Americana*), and smaller species such as Atlantic herring (*Clupea harengus*), hogchokers (*Trinectes maculates*), and banded killifish (*Fundulus diaphanus*). Saltwater fish that may enter the Severn River and its creeks include bluefish (*Pomatomus saltatrix*), spot (*Leiostomus xanthurus*), and the anadromous American shad, striped bass and needlefish (*Strongylura marina*).

Finfish and shellfish of the zones with higher salinity are species such as spot, croaker (*Micropogonias undulates)*, striped bass, flounder, menhaden (*Brevoortia tyrannus)*, herring, and shad as well as blue crabs (*Callinectes sapidus)*, oysters, and clams. Oyster reef restoration projects have been conducted in the North Severn Complex region. Rare, threatened, and endangered fish likely to occur in the action area are discussed in Section 3.3.1.3.

Essential Fish Habitat (EFH). The Magnuson-Stevens Fishery Conservation and Management Act mandates habitat conservation for federally managed fish species by minimizing to the extent practicable any adverse effect on EFH for each federally managed species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802[10]). Federal agencies must consult with the NMFS for any action that may adversely affect EFH. An adverse effect is defined as "any impact which reduces quality and/or quantity of EFH [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), and site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of action" (50 CFR 600.810).

EFH has been designated and described for the following species in the Severn River and its tributaries (NAVFAC Washington 2011a). Table 3.3-1 indicates that EFH has been designated within this area for a given species and life stage.

- Atlantic Herring. Atlantic herring are a pelagic schooling species found at various depths depending on lifestage, season, and geographic location. EFH for adult Atlantic herring includes the seawater salinity zone of the Chesapeake Bay. Because the proposed action would occur entirely within the mixing salinity zone of the Severn River, this species would not be affected by the proposed action. Therefore, this species is not discussed further.

- Windowpane Flounder (*Scopthalmus aquosus*). EFH for juvenile and adult windowpane flounder includes bottom habitats with a substrate of mud or fine-grained sand, water temperatures below 77° Fahrenheit (F), and salinities between 5.5 and 36 parts per thousand (ppt).
- Summer Flounder (*Paralicthys dentatus*). Inshore EFH for summer flounder larvae include all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the Estuarine Living Marine Resources (ELMR) database, in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones. According to the ELMR database summer flounder larvae were rare-common in the Chesapeake Bay mixing salinity zone between December and April (NOAA 2015). EFH for juvenile and adult summer flounder includes bottom waters, including tidal guts. Juveniles may use estuarine habitats such as submerged aquatic vegetation beds and open bay areas as nursery areas, and adults generally inhabit shallow estuarine waters during the warmer months.
- Bluefish (*Pomatomus saltatrix*). Bluefish is a highly migratory, schooling pelagic species found along the Atlantic coast. EFH for juvenile and adult bluefish includes the pelagic water column, and inland within the mixing and seawater zones with salinities between 0.5 and 25 ppt, and greater than 25 ppt, respectively.
- Coastal migratory pelagic species including king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculates*), and cobia (*Rachycentron canadum*). EFH has been designated for all life stages of these species in the Chesapeake Bay and Severn River and includes sandy shoals of capes and offshore bars, high-profile rocky bottom and barrier island ocean-side water, and all coastal inlets. EFH also includes estuaries and submerged aquatic vegetation for cobia.
- Red Drum (*Sciaenops occelatus*). EFH for the various life stages of red drum includes tidal inlets and creeks, salt marshes, submerged aquatic vegetation, and unconsolidated bottom.
- Red Hake (*Urophycis chuss*). Juvenile and adult red hakes are seasonal visitors in Chesapeake Bay that are common during the late winter and spring months. They occur in the deeper channels of the bay within the seawater salinity zone as well as the deep channels of Hampton Roads Harbor, and they are occasionally found in the upper bay, extending as far north as the Patuxent River. Because the proposed action would occur entirely within the mixing salinity zone of the Severn River, this species would not be affected by the proposed action. Therefore, this species is not discussed further.

Table 3.3-1. Summary of Species and EFH in the Proposed Project Area

Species	Eggs	Larvae	Juveniles	Adults	Description of EFH
Atlantic herring				S	Species not present, no EFH
Windowpane flounder			M, S	M,S	Bottom habitats with a substrate of mud or fine-grained sand with water temperatures below 77°F, depths from 1-100 meters, and salinities between 5.5-36 ppt.
Summer flounder		M, S	M, S	M, S	Mixing salinity zone and salt marsh creeks, seagrass beds, mudflats, and open bay areas in water temperatures greater than 37°F and salinities from 10 to 30 ppt range
Bluefish			M, S	M, S	Major estuaries
King mackerel	X	X	X	X	Coastal inlets
Spanish mackerel	X	X	X	X	Coastal inlets

Species	Eggs	Larvae	Juveniles	Adults	Description of EFH
Cobia	X	X	X	X	Coastal inlets, high salinity bays, estuaries and seagrass habitat
Red drum	X	X	X	X	Unconsolidated bottom (soft sediments)
Red hake			S	S	Species not present, no EFH

Source: NOAA 2014.
Notes: S = The EFH designation for this species includes the seawater salinity zone of this bay or estuary (salinity ≥ 25ppt). M = The EFH designation for this species includes the mixing water/ brackish salinity zone of this bay or estuary (5 ppt < salinity < 25 ppt). X= EFH has been designated for given species and life stage.

EFH that is either important to the long-term productivity of one or more managed species populations or deemed to be particularly vulnerable to degradation may be identified by fishery management councils and NOAA Fisheries as a Habitat Area of Particular Concern (HAPC). HAPCs are located within the project area for adult and juvenile summer flounder (Chesapeake Bay) and all life stages of red drum (all coastal inlets).

HAPC for summer flounder includes all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed as well as loose aggregations, within adult and juvenile EFH.

HAPC for red drum includes all coastal inlets, all state-designated nursery habitats of particular importance to red drum; documented sites of spawning aggregations in North Carolina, South Carolina, Georgia and Florida; other identified spawning areas in the future; and habitats identified for submerged aquatic vegetation (SAV).

Seagrass beds or SAV prevalent in the Chesapeake Bay and the sounds and bays of North Carolina and Florida are also critical areas for red drum, particularly for 1 and 2 year old fish (>750mm or 29.5 in Florida). Seagrass beds, shallow areas of estuarine rivers, and mainland shorelines, are where many red drum reside during the summer. The various inlets, adjoining channels, sounds, and outer bars of ocean inlets are critical areas for spawning activity as well as feeding and daily movements.

Description of EFH Species in the Proposed Project Area

Windowpane Flounder.

The Chesapeake Bay mixing salinity zone has been identified as EFH for juvenile and adult windowpane flounder. Windowpane flounder is a left-eyed flounder with a thin body and nearly round outline found from the Gulf of St. Lawrence to Florida, but are most abundant from Georges Bank to the Chesapeake Bay (Chang et al. 1999). The ELMR database has indicated that windowpane flounder juveniles are present in the Chesapeake Bay year round and adults are common from April to October in the Chesapeake Bay.

Windowpane flounder is an eurythemal, euryhaline, and fast-growing fish with a thin body. Larvae and eggs are found in pelagic waters where the water temperature is less than 68°F and the depth is less than 230 feet. Windowpane juveniles are most abundant in waters with water temperatures below 77°F, depths from 3 to 328 feet, and salinities between 22 ppt and 30 ppt. Juvenile windowpane are found in nearshore estuaries and bays in the Mid-Atlantic Bight region in May through July and October through November (Chang et al. 1999). Both juveniles and adult windowpane flounder are associated with bottom habitats with substrates of mud or fine grained sand (NMFS n.d.). Adults inhabit shallow waters less than 245 feet with sand, sand/silt, or mud substrates, inhabiting near shore bays and estuaries year round. They are generally observed spawning where water temperatures are below 69.8°F, and during the months of February and December with a peak in May in the Middle Atlantic.

Non-spawning adults are generally found in areas with water temperatures below 80°F, depths to 246 feet, and salinities between 5.5 ppt and 36 ppt.

Juvenile and adults diets include polychaetes and small crustaceans such as mysids, decapods, and shrimp (Chang et al. 1999). Adults also consume a variety of small fish, such as hake and tomcod.

Summer Flounder

EFH supporting larval, juvenile, and adult summer flounder have been identified in the mixing zone of the Chesapeake Bay. Summer flounder are found between Nova Scotia to Florida in areas ranging from shallow estuarine waters to the outer continental shelf (Packer et al. 1999). This species is most abundant within the Mid-Atlantic Bight between Cape Cod and Cape Hatteras. Larvae are present from January-April; juveniles are present year round; and, adults are present from April-November in the Chesapeake Bay.

Development of post-larvae and juveniles occurs primarily within bays and estuarine areas, including Chesapeake Bay (Packer et al. 1999). Summer flounder larvae prefer shallow tidal flats and marsh creeks and are most abundant near shore at depths between 33 to 230 feet and temperatures between 48.2 and 64.4°F. They are most frequently found in the northern part of the Mid-Atlantic Bight from September to February, and in the southern part from November to May (Packer et al. 1999). Juveniles may have a preference for creek mouths and inlets for foraging habitat. Adults and juveniles normally inhabit shallow (1.6 to 16.4 feet) coastal and estuarine waters during the warmer months of the year and remain offshore at depths down to 490 feet during fall and winter. Juveniles prefer mostly sand demersal substrates and are found in flats, channels, salt marsh creeks, and eelgrass beds (NMFS n.d.). Adult summer flounder return inshore to coastal waters April through June, and are often found in the high salinity portions of estuaries; however, the adult summer flounder's distribution may be due more to substrate preference than salinity preference.

The major prey for juvenile summer flounder are mysid shrimp (NMFS n.d.). Adult summer flounder are opportunistic feeders with fish and crustaceans making up a significant portion of their diet. Included in their diet are: windowpane, winter flounder, northern pipefish, Atlantic menhaden, bay anchovy, red hake, silver hake, scup, Atlantic silverside, American sand lance, bluefish, weakfish, mummichog, rock crabs, squids, shrimps, small bivalve and gastropod mollusks, small crustaceans, marine worms and sand dollars (Packer et al. 1999).

Bluefish

The Chesapeake Bay mixing salinity zone has been identified as EFH for juvenile and adult bluefish. Bluefish are found in the western North Atlantic from Nova Scotia to Argentina, but this species is rare between southern Florida and northern South America (Fahay et al. 1999). All major estuaries between Penobscot Bay, Maine and St. Johns Bay, Florida, are considered EFH for juvenile and adult bluefish (NOAA 2011). According to the ELMR database, within the Chesapeake Bay mixing zone, bluefish adults and juveniles may be present from spring to late fall (April-November).

Juvenile blue fish are usually found near shorelines or in tidal creeks during the day and the open bay or channel waters at night (Fahay et al. 1999). In the spring, juvenile blue fish are typically found in water temperatures between 46.4 to 73.4°F (most commonly from 50 to 66°F) and they were found at shallow depths ranging from 3 to 131 feet (most commonly from 3 to 98 feet; Fahay et al. 1999). Typically, juveniles of this species are found in the spring in waters with a salinity range was between 33 to 36 ppt. In the fall, the juveniles were spread over a temperature range of 50 to 82.4°F, with most between about 62.6 to 77°F. During sampling in the Chesapeake Bay, juvenile blue fish were found in depths between

26 and 32 feet. Most juveniles were found in the Chesapeake Bay in areas with dissolved oxygen levels were 6 to 9 mg/l. Juveniles use mostly sand substrates, but can be associated with some mud, silt, clay. Juveniles also can be associated with some seagrass beds and oyster bars.

Adult bluefish occur in the open ocean, large embayments, and most estuarine systems within their range (Fahay et al. 1999). They travel in schools of like-sized individuals and undertake seasonal migrations, moving into the Mid-Atlantic Bight during spring and south or farther offshore during fall. Within the Mid Atlantic Bight they occur in large bays and estuaries as well as across the entire continental shelf, where water temperatures are greater than 57.2 to 60.8°F and salinities typically range from 29 ppt to 35 ppt. In the spring, they were found over a temperature range of 46.4 to 68°F, with most spread between about 48.2 to 60.8°F. They were found at much deeper depths than the juveniles; they were spread over a depth range of 3 to greater than 1,000 feet). Their salinity range was between 33 to 36 ppt, with the majority at 35 ppt. In the fall, the adults were spread over a temperature range of 46 to 82°F, with most spread between about 57.2 to 75.2°F. They were also found at shallower depths than in the spring: 3 to 328 feet, with most found at 36 to 98 feet. Their salinity range was between 29 to 35 ppt, with the majority at 31to 32 ppt. Juvenile bluefish diets consist of menhaden, bay anchovy, striped bass, clupeids, and Atlantic silversides (Fahay et al. 1999). Adult bluefish are sight feeders that prey nearly exclusively on other fish species.

King Mackerel

EFH has been identified in the mixing zone of the Chesapeake Bay for all life stages of king mackerel. King mackerel is a marine pelagic species that is found throughout the Gulf of Mexico and Caribbean Sea and along the western Atlantic Ocean from the Gulf of Maine to Brazil. This species can be found near the shoreline to areas off the shelf with depths of 656 feet.

Adults are known to spawn in areas of low turbidity, with salinity and temperatures of approximately 30 ppt and 80.6°F, respectively. Spawning occurs generally from May through October with peak spawning in September. Eggs and larvae are pelagic and are found in depths from 98 to 262 feet. Juveniles are generally found closer to shore at depths to greater than 29.5 feet and occasionally in estuaries. Adults are migratory and form two migratory groups: Gulf and Atlantic (Gulf of Mexico Fishery Management Council [GMFMC] and South Atlantic Fishery Management Council [SAFMC] 2004). Food availability and water temperature are likely causes of this species' migratory patterns.

King mackerel primarily eat other fish species (herring, sardines, and menhaden) and to a lesser extent squid at all life stages (larvae to adult) (GMFMC/SAFMC 2004).

Spanish Mackerel

Spanish mackerel migrate in large schools and are distributed from New York to Mexico. Juvenile and adult Spanish mackerel EFH has been identified in the mixing zone of the Chesapeake Bay for all life stages of this species. Spanish mackerel enter the Chesapeake Bay when temperatures exceed 63°F, and this species prefers water temperatures between 70 and 88°F. This species is common to the middle and lower Chesapeake Bay and can occur as far north as the Patuxent River during the spring to autumn time period (Chesapeake Bay Program 2015).

Adults usually are found in neritic waters and along coastal areas. They will inhabit estuarine areas, especially the higher salinity areas, during seasonal migrations, but are considered rare and infrequent in many estuaries. Spawning occurs off the North Carolina and Virginia coasts from April to September (NOAA 2015). Adults do not show a specific substrate preference, and are found in subtidal and innershelf areas (32 to 164 feet) (Center for Coastal Monitoring and Assessment [CCMA] 1998). Eggs

and larvae occur most frequently offshore over the inner continental shelf at water temperatures between 68 to 89.6°F and salinities between 28 ppt and 37 ppt (SAFMC 1998). They are also frequently found in water depths from 30 to about 275 feet, but are most common in greater than 164 feet. Juveniles are most often found in coastal and estuarine habitats and at temperatures greater than 77°F and salinities greater than 10 ppt. Juveniles typically are found in mixing and seawater salinity ranges (CCMA 1998). Although they occur in waters of varying salinity, juveniles appear to prefer marine salinity levels and generally are not considered estuarine dependent.

Spanish mackerel feed mainly on small fishes (clupeoids and anchovies) and some penaeoid shrimp and cephalopods (Fishbase 2015).

Cobia

The proposed project area has been identified as EFH for all life stages of cobia. Cobia are generally found in the lower Chesapeake Bay from May to October. Cobia migrate out of the Chesapeake Bay to warmer southern waters around October. Cobia are pelagic and are normally solitary except for annual spawning aggregations; however this species will congregate at reefs, wrecks, harbors, buoys and other structures. They may also enter estuaries and mangroves in search of prey. Cobia are found in areas of the Atlantic and Pacific Oceans where water temperatures average 75.2 °F or greater. The spawning season extends from late June to mid-August along the southeastern United States (SAFMC 2015).

Spawning occurs near the mouth of the Chesapeake Bay or just offshore (Chesapeake Bay Program 2015).

Cobia feed primarily on crab, shrimp, squid, and other fish (Chesapeake Bay Program 2015).

Red Drum

The Chesapeake Bay mixing salinity zone has been identified as EFH for all life stages of red drum. Red drum are distributed along the Atlantic coast, in the ocean and estuarine areas, depending on their stage of maturity. Juvenile and adult red drum are identified as being present in the Chesapeake Bay from May-October. Adults are most abundant in salinities above 15 ppt and juveniles are generally concentrated in the middle estuary at salinities around 18 ppt (MDNR 2015). Spawning occurs in or near inlets, with larvae being transported into the upper estuarine areas of low salinity. As larvae develop into juveniles and sub-adults, they utilize progressively higher salinity estuarine and beachfront surf zones (SAFMC 1998).

Juvenile red drum are most abundant in estuarine waters and inlets (MDNR 2015). Young red drum are found in quiet, shallow, protected waters with grassy or slightly muddy bottoms (SAFMC 1998). Juveniles use shallow backwater areas as nursery areas and then move to deeper portions of estuaries and are associated with river mouths and oyster bars. Shallow bay bottoms or oyster reef substrates are preferred by subadult and adult red drum (SAFMC 1998). SAV is important for this species. Red drum move out of estuarine areas as adults and occupy the high salinity surf zone nearshore and offshore coastal waters. Red drum are eurythermal, occurring over a water temperature range of 35.6 to 91.4°F. Juvenile red drum feed on zooplankton and invertebrates.

Reptiles and Amphibians

Reptiles and amphibians recorded at Greenbury Point include the spring peeper (*Pseudacris crucifer*), gray treefrog (*Hyla chrysoscelis)*, redback salamander (*Plethodon cinereus)*, diamond-back terrapin (*Malaclemys terrapin*), painted turtle (*Chrysemys picta)*, eastern rat snake (*Pantherophis alleghaniensis*),

northern water snake (*Nerodia sipedon sipedon*), eastern worm snake (*Carphophis amoenus amoenus*), and box turtle (*Terrapene carolina carolina*).

Common amphibians potentially occurring on NSA Annapolis include American bullfrog (*Lithobates catesbeiana*), green treefrog (*Hyla cinerea*), Cope's gray treefrog (*Hyla chrysoscelis*), northern green frog (*Lithobates clamitans melanota*), wood frog (*Lithobates sylvaticus*), eastern cricket frog (*Acris crepitans crepitans*), southern leopard frog (*Lithobates sphenocephalus utricularius*), northern spring peeper (*Pseudacris crucifer*), upland chorus frog (*Pseudacris feriarum*), eastern American toad (*Anaxyrus americanus americanus*), Fowler's toad (*Anaxyrus fowleri*), eastern spadefoot toad (*Scaphiopus holbrookii*). Common salamanders include the marbled salamander (*Ambystoma opacum*), spotted salamander (*Ambystoma maculatum*), eastern red-spotted newt (*Notophthalmus viridescens viridescens*), eastern red-backed salamander (*Plethodon cinereus*), northern dusky salamander (*Desmognathus fuscus*), northern two-lined salamander (*Eurycea bislineata*), and the four-toed salamander (*Hemidactylium scutatum*) (NAVFAC Washington 2011a; Maryland Department of Natural Resources [DNR] 2014a).

Common snakes include the common ribbon snake (*Thamnophis sauritus sauritus*), eastern rat snake (*Pantherophis alleghaniensis*), eastern garter snake (*Thamnophis sirtalis sirtalis*), eastern hognose snake (*Heterodon platirhinos*), eastern king snake (*Lampropeltis getula getula*), eastern worm snake (*Carphophis amoenus amoenus*), northern black racer (*Coluber constrictor constrictor*), northern brown snake (*Storeria dekayi dekayi*), northern copperhead (*Agkistrodon contortrix contortrix*), northern ring-necked snake (*Diadophis punctatus edwarski*), northern rough green snake (*Opheodrys aestivus*), and northern water snake (*Nerodia sipedon sipedon*). Common lizards include the eastern fence lizard (*Sceloporus undulatus*), eastern six-lined racerunner (*Aspidoscelis sexlineatus sexlineatus*), common five-lined skink (*Pleistiodon fasciatus*), little brown skink (*Scincella lateralis*), and broad-headed skink (*Pleistiodon laticeps*). Common turtles include the eastern snapping turtle (*Chelydra serpentina serpentina*), northern red-bellied cooter (*Pseudemys rubriventris*), eastern box turtle (*Terrapene carolina carolina*), eastern mud turtle (*Kinosternon subrubrum subrubrum*), spotted turtle (*Clemmys guttata*), eastern painted turtle (*Chrysemys picta picta*), and eastern musk turtle (*Sternotherus odoratus*) (NAVFAC Washington 2011a; MDNR 2014a).

3.3.1.3 Special-Status Species

Special-status species include those plant and animal species that are: (1) listed or proposed for listing as threatened and endangered by the USFWS under the federal Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq*.), (2) species considered as candidates for listing under the ESA, and (3) species listed as threatened and endangered by the State of Maryland. The federal ESA provides for the conservation of threatened and endangered species of plants and animals and the habitats where they are found.

State-listed threatened and endangered species known to occur or potentially occur on NSA Annapolis or in nearshore waters are listed in Table 3.3-2, along with their potential to occur within the ROI. Surveys focusing on birds, plants, and butterflies were conducted at Greenbury Point in 1996, and no federally listed threatened, endangered, of candidate species were identified (NAVFAC Washington 2011a). In a letter dated December 2, 2014, the MDNR, Wildlife Heritage Service, stated there are no State or Federal records of rare, threatened or endangered species within the boundaries of the project site as delineated (refer to Appendix B, *Agency Correspondence*).

Table 3.3-2. Threatened and Endangered Species Known to Occur or Potentially Occur on NSA Annapolis or within the Nearshore Waters, Anne Arundel County, Maryland

Group	Common Name (Scientific Name)	Status*	Habitat	Within ROI*
Plants	Sensitive joint vetch (*Aeschynomene virginica*)	FT, SE	Fresh to slightly brackish tidal river systems where flooding occurs two times a day along the outer fringe of marshes or shores	N
	Swamp pink (*Helonias bullata*)	FT, SE	Acidic wetlands where it is perennially saturated, but not flooded	N
Birds	Short-eared owl (*Asio flammeus*)	SE	Coastal tidal and brackish marshes, inland fields, pastures, and grasslands	N
	Mourning warbler (*Oporornis philadelphia*)	SE	Semi-open areas with dense shrubs	N
	Least tern (*Sterna antillarum*)	ST	Beaches and sandbars in large rivers	Y
	Royal tern (*Thalasseus maximus*)	SE	Beaches, harbors, estuaries, and waters near the coast	Y
Mammals	Northern long-eared bat (*Myotis septentrionalis*)	FT	Forests, woodlots with dense or loose aggregates of trees, riparian forests, other wooded corridors, grass fields, and ponds	Y
Reptiles	Atlantic hawksbill turtle (*Eretmochelys imbricata*)‡	FE, SE	Gulf and bay systems, warm shallow waters	N
	Green turtle (*Chelonia mydas*)‡	FT, ST	Gulf and bay systems; shallow water seagrass beds	N
	Kemp's ridley turtle (*Lepidochelys kempii*)‡	FE, SE	Gulf and bay systems, shallow waters	N
	Leatherback turtle (*Dermochelys coriacea*)‡	FE, SE	Gulf and bay systems	N
	Loggerhead turtle (*Caretta caretta*)‡	FT, ST	Gulf and bay systems	N
Fish	Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus)*	FE, SE	Chesapeake Bay population has disappeared; found in salt water until spawning (York and James rivers)	N
	Shortnose sturgeon (*Acipenser brevirostrum*)	FE, SE	Potomac and Susquehanna rivers, occasionally found in Chesapeake Bay	N

Sources: Maryland NHP 2010b; NAVFAC Washington 2011a;
Notes: * FE = federally endangered; FT = federally threatened; N = no; SE = state endangered; ST = state threatened; Y = yes.
‡Sea turtles are under joint jurisdiction between the USFWS (terrestrial, nesting stage) and NMFS (marine stage).

Plants

Although the federally and state-listed sensitive joint vetch and swamp pink are known to occur in Anne Arundel County, they have not been documented at the North Severn Complex (Maryland NHP 2010b; NAVFAC Washington 2011a). No critical habitat has been designated for the sensitive joint vetch or swamp pink (USFWS 2014a, b).

Birds

A number of state-listed endangered species (mourning warbler, royal tern, and short-eared owl) and one state-listed threatened species (least tern) have been documented at or near the North Severn Complex (Table 3.3-2). None of these state-listed birds are known to nest at Greenbury Point (NAVFAC Washington 2011a).

Mammals

On April 2, 2015, the USFWS listed the northern long-eared bat as threatened under the ESA. The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches but a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears (USFWS 2015). The northern long-eared bat hibernates in the small cracks and crevices of caves and mines that have large passages and relatively constant, cool temperatures with high humidity and no air currents. During the summer they roost singly or in colonies underneath bark or in cavities, crevices, or hollows of both live and dead trees within forests, woodlots with dense or loose aggregates of trees, riparian forests, and other wooded corridors. Males or non-reproductive females may also roost in caves or mines. In addition, northern long-eared bats have been observed roosting in structures such as barns and bridges. They are not considered to be a long-distance migrant, as they typically migrate 35–55 miles between their winter hibernacula and summer habitat (USFWS 2015). There is potential habitat for the northern long-eared bat within the shoreline reaches at Greenbury Point, but there are currently no records of the species within the project area.

Fish

The Atlantic sturgeon is federally and state-listed as endangered. It is anadromous, spending the majority of its life in saltwater but entering freshwater to spawn. Juveniles stay in the rivers where they were born for up to 6 years, before moving to coastal waters. Populations in the Chesapeake Bay disappeared due to over-fishing, poor water quality, and river dams that prevented fish from reaching their spawning grounds. The Atlantic sturgeon is therefore unlikely to be found in the Severn River or its tributaries located in the project area (MDNR 2009; USFWS 2013; NMFS 2014a).

The federally and state-listed endangered shortnose sturgeon is found in the Chesapeake Bay. They prefer large, low-salinity river systems, and like the Atlantic sturgeon, are anadromous. They primarily live in the Potomac and Susquehanna rivers, where spawning occurs from February through April. Therefore, the shortnose sturgeon is unlikely to be found in the Severn River or its tributaries located in the project area (Chesapeake Bay Program 2014b; NMFS 2014b).

Sea Turtles

Five species of sea turtles have been recorded in the Chesapeake Bay and occurrences in the vicinity of the North Severn Complex would be considered extralimital (Table 3.3-2). These include the leatherback, loggerhead, Kemp‘s ridley, green, and hawksbill turtles. No sea turtle strandings, bycatch, or sightings have been documented for the North Severn Complex (NAVFAC Washington 2011a).

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1 – Hardened Structure/Revetment

Vegetation

Implementation of Alternative 1 would impact vegetation at the North Severn Complex. Potential adverse impacts would occur during construction of hardened structures/revetments along Reaches A, B, C, D, E, F, and G. These impacts to terrestrial vegetation would occur during the installation of the revetments, addition of fill material, and utilization of heavy construction equipment. Establishment of construction staging areas, to be determined during the design phase, may also result in temporary impacts to vegetation, which would be minimized and avoided to the extent practicable. Trees, shrubs, and grasses may be removed, damaged, or trampled during the construction phase of Alternative 1, with permanent

loss of vegetation where land was covered by the hardened structures/revetments. However, long-term impacts to vegetation as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced, thereby creating a stable environment for vegetation along the shoreline.

Submerged aquatic vegetation (Reaches D1, D2, and possibly G) could also be impacted under Alternative 1. Direct, physical impacts could result during the construction activities as described above and through temporary increased sedimentation of surface waters. Implementation of appropriate sediment and erosion control BMPs, as described under Section 3.2, *Water Resources*, would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation. Long-term impacts to submerged aquatic vegetation as a result of the proposed action would be beneficial because improved water quality would better support its growth.

Following construction, re-vegetation (terrestrial and aquatic) of temporarily damaged areas would be replanted with natural vegetation; however, monitoring and control measures may be necessary to ensure re-vegetation is dominated by native plant species.

With implementation of appropriate sedimentation and erosion control BMPs, as described under Section 3.2, *Water Resources,* and terms and conditions of applicable permits, short-term, localized adverse impacts to vegetation are anticipated during construction activities for Alternative 1. However, long-term beneficial impacts to vegetation would occur following completion of repair and restoration activities because shoreline erosion and sedimentation would be reduced.

<u>Wildlife</u>

Mammals and Birds

Proposed construction activities associated with Alternative 1 would be phased over a 5-year period. Project activities would result in short-term increases in noise levels with project areas temporarily displacing wildlife and migratory birds from the immediate area. Wildlife and migratory birds may experience short-term intermittent disturbance associated with noise from construction activities. Highly mobile species of wildlife would be temporarily displaced during construction activities. Smaller, or less mobile species, could be injured or experience direct mortality. While there could be an adverse impact to individual animals, these impacts are not expected to affect the stability of local population levels of these species. Habitat for wildlife may be lost temporarily and permanently (impacts to vegetation are described in the previous section), but the adverse impact of habitat loss on wildlife as a result of the proposed action is expected to localized and limited.

With implementation of appropriate sedimentation and erosion control BMPs, as described under Section 3.2, *Water Resources*, and terms and conditions of applicable permits, short-term, localized impacts to wildlife and migratory birds and their habitat from Alternative 1 would not be significant.

Shellfish

Shellfish could be impacted in the short-term by increased sedimentation due to construction if they are located within the immediate area of the construction activity. Long-term impacts would be beneficial, with improved water quality following shoreline repair and restoration.

With implementation of appropriate sedimentation and erosion control BMPs, as described under Section 3.2, *Water Resources,* and terms and conditions of applicable permits, short-term, localized impacts to shellfish from Alternative 1 would not be significant.

Fish and EFH

Fish may avoid the area immediately surrounding construction as a result of in-water construction activity, increased noise, and a possible temporary decrease in water quality. To avoid and minimize adverse effects to the aquatic environment during anadromous fish spawning period, a restriction on in-water work would be observed between February 15 and June 15. Impacts to EFH and managed species are summarized in the following sections.

Long-term impacts to EFH as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced, thereby improving the quality of EFH.

Windowpane Flounder**.** Windowpane flounder are bottom-dwelling species, therefore, they could be impacted during the construction. However, since these lifestages are highly mobile, it is expected that they would avoid active construction areas, thereby minimizing any impacts. Indirect impacts on summer flounder EFH are expected to be minor. Installation of the revetment could result in a loss of the benthic forage organisms that juvenile and adult summer flounder feed upon. However, summer flounder can forage for additional prey items along areas surrounding the project area that would not be affected by the proposed project.

Summer Flounder. As summer flounder larvae are present in the Chesapeake Bay from January to April, they may be present if project construction were to occur during the winter or early spring. Summer flounder larvae are pelagic and could avoid the construction area. Potential direct construction impacts to juvenile and adult summer flounder EFH include temporary disturbance during construction of the proposed Project. As juvenile summer flounder are bottom-dwelling species, they could be impacted during the construction. However, since these lifestages are highly mobile, it is expected that they would avoid active construction areas, thereby minimizing any impacts. Indirect impacts on summer flounder EFH are expected to be minor. Installation of the revetment could result in a loss of the benthic forage organisms that juvenile and adult summer flounder feed upon. However, summer flounder can forage for additional prey items along areas surrounding the project area that would not be affected by the proposed project.

Bluefish. Because bluefish adults and juveniles would typically not be present within the proposed project area during the winter months, winter construction would not result in a direct impact to this species. If the proposed project is constructed during those months when this species may be present in the Project area (i.e. April-November), the juvenile and adult lifestages are pelagic and mobile and would be expected to avoid active construction areas. Any indirect impacts associated with prey items would also be expected to be negligible since suitable prey species would be found in adjacent non-disturbed areas.

King Mackerel. The ELMR database did not identify any life stages of king mackerel to likely be preset in the proposed project area. Therefore, construction of the proposed project would not be likely to affect king mackerel. While adult and juvenile king mackerel may occasionally occur within the proposed project area during periods with warm water temperatures, this species is not common to the area. Furthermore, due to their highly mobile nature, if king mackerel were present during project construction, they would likely avoid construction work areas.

Any indirect impacts associated with prey items would also be expected to be negligible since suitable prey species would be found in adjacent non-disturbed areas.

Spanish Mackerel. The ELMR database did not identify any life stages of Spanish mackerel to likely be preset in the proposed project area. Therefore, construction of the proposed project would not be likely to affect Spanish mackerel. While adult and juvenile Spanish mackerel may occasionally occur within the

proposed project area during periods with warm water temperatures, this species is not common to the area. Furthermore, due to their highly mobile nature, if Spanish mackerel were present during project construction, they would likely avoid construction work areas.

Any indirect impacts associated with prey items would also be expected to be negligible since suitable prey species would be found in adjacent non-disturbed areas.

Cobia. The ELMR database did not identified any life stages of cobia to likely be preset in the proposed project area. Therefore, construction of the proposed project would not be likely to affect cobia. While adult and juvenile cobia may occasionally occur within the proposed project area during periods with warm water temperatures, this species is not common to the area. Furthermore, due to their highly mobile nature, if cobia were present during project construction, they would likely avoid construction work areas.

Any indirect impacts associated with prey items would also be expected to be negligible since suitable prey species would be found in adjacent non-disturbed areas.

Red Drum. EFH has been identified in the Chesapeake Bay mixing zones for all life stages of red drum; however, the ELMR database did not identified eggs or larvae to likely be present in the proposed project area. Therefore, construction of the proposed project would not be likely to affect red drum eggs or larvae. Because red drum adults and juveniles would typically not be present within the proposed project area during the winter months, winter project construction would not result in a direct impact to this species. If the proposed project is installed during those months when this species may be present in the project area (i.e., May-October), the juvenile and adult lifestages are mobile and would be expected to avoid active construction areas. Any indirect impacts associated with prey items would also be expected to be negligible since suitable prey species would be found in adjacent non-disturbed areas.

HAPCs

SAV has been identified as HAPC for summer flounder and red drum may be affected in reaches D1, D2 and G within the proposed project area. Impacts to SAV would be avoided to the maximum extent practicable. However, since the amount of existing SAV in the project area is undetermined, impacts to HAPC cannot be determined.

As stated under Section 3.3.1.2, *Wildlife*, HAPCs are located within the project area for adult and juvenile summer flounder (Chesapeake Bay) and all life stages of red drum (all coastal inlets). The summer flounder stock was declared rebuilt in 2010, and according to a 2013 benchmark stock assessment, the summer flounder stock is not overfished and overfishing is not occurring. The following passage is contained in the Draft 2014 Review of the Chesapeake Bay Summer Flounder Fishery Management Plan (MDNR 2014c):

> "Summer flounder are subject to localized benthic habitat disruption from non-fishing activities (Mid-Atlantic Fishery Management Council and NMFS 2013). Habitat disruptions arise from projects that disturb the benthos and/or water quality such as marine mining, dredging, and construction (such as piling installation). The habitat impacts from these activities are believed to be localized and the negative effects on the summer flounder stock are anticipated to be minimal (Mid-Atlantic Fishery Management Council and NMFS 2013)."

Based on the healthy summer flounder stock in the Chesapeake and the stated minimal impacts to summer flounder habitat as a result of construction activities along the shoreline, impacts to the HAPCs for summer flounder in the project area are anticipated to be minimal and not significant.

In 2009, an Atlantic States Marine Fisheries Commission stock assessment found the red drum stock to be relatively stable and offered a conservative conclusion that overfishing is not occurring. Management efforts focus on submerged aquatic vegetation, which is important habitat to the red drum, and water quality (MDNR 2013). Submerged aquatic vegetation (Reaches D1, D2, and possibly G) could be impacted under Alternative 1, as described under Section 3.2.2, *Environmental Consequences* for Water Resources. However, implementation of appropriate sediment and erosion control BMPs would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation. Long-term impacts to submerged aquatic vegetation as a result of the proposed action would be beneficial because improved water quality would better support its growth. In addition, the juvenile and adult lifestages of red drum are mobile and would be expected to avoid areas with ongoing construction activity. Suitable habitat and prey species would be found in adjacent non-disturbed areas, resulting in negligible impacts to red drum and their habitat, with long term benefits to red drum and their habitat.

With implementation of appropriate sediment and erosion control BMPs, as described under Section 3.2, *Water Resources*, and the observation of the construction window discussed in Section 3.3.2.1, *Fish and EFH*, temporary impacts to EFH during construction would be minimized. Re-establishment of the benthic substrate within the EFH (especially submerged aquatic vegetation) of temporarily damaged areas would naturally occur; however, monitoring and control measures may be necessary to ensure re-establishment is dominated by native species.

Special-Status Species

The ESA requires federal agencies to ensure their action is not likely to jeopardize the continued existence of any endangered or threatened species (animal or plant) or result in the destruction or adverse modification of designated critical habitat. Special-status plant species are not found within the project area; therefore, no impacts are anticipated.

No significant impacts to state-listed birds are expected because they are not known to nest within the project area. They are highly mobile and would avoid the area impacted by construction activity. No impacts are anticipated to the federally- and state-listed Atlantic sturgeon, shortnose sturgeon, or sea turtles as they are highly unlikely to be present within the project area.

3.3.2.2 Alternative 2 – Log Toe Stabilization

Impacts to biological resources for Reaches A, E, and F under Alternative 2 would be the same as for Alternative 1. Reaches B, D, and G would utilize log toe stabilization to repair and restore the shorelines instead of hardened structures/revetments. The use of log toe stabilization does not utilize armoring and therefore would mimic natural shoreline processes as much as possible. This would minimize impacts during installation while also minimizing impacts to habitat from the changes in wave energy, currents, and adjacent shoreline creation/erosion processes more often associated with methods requiring extensive armoring.

This alternative includes a sheet pile structure for Reach C. Sheet pile installation is anticipated to occur at the top of the berm and would not occur in the water. However, should the need to install the sheet piles in the intertidal zone arise, all work would be conducted during periods of low tide to avoid in-water impacts to aquatic wildlife. The repair and restoration of the shoreline would result in long-term benefits for water quality (habitat) by reducing the amount of sediments entering the watershed. In addition, unknown contaminants would be prevented from potentially entering wildlife habitat, with restoration measures implemented for the berm along Reach C that was previously utilized as a dredge spoil containment lagoon (details provided in Section 3.10, *Human Health and Safety*). The proposed use of

sheet pile would not alter floodplain boundaries or function because sheet piles (Reach C) would still allow for water transfer.

Potential impacts to biological resources along Reaches B, D, and G would be less than those described under Alternative 1 because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope. Compliance with applicable regulations, permits, and BMPs, as described under Alternative 1, would further minimize and avoid impacts to biological resources.

Impacts to biological resources along Reach C may be slightly higher than those described under Alternative 1 due to the more construction-intensive installation of sheet pile instead of hardened revetments. Fish may avoid the area immediately surrounding construction as a result of increased noise. The installation of sheet piles with an impact pile hammer can produce underwater noise that can affect fish species (refer to Section 3.6, *Noise*, for further information on sound levels and noise metrics). Currently, there are no U.S. domestic or international standards for exposure of fish to impulsive sounds. However, NMFS has developed interim criteria for pile driving. These criteria specify both a maximum permitted sound pressure level (SPL_{peak}) for a single pile driving strike and a maximum cumulative sound exposure level (SEL_{cum}) for lower level signals. The SPL_{peak} was selected to be 206 dB re 1 μPa and the maximum SEL_{cum} was designated as 187 dB re 1μPa2•s for fish ≥2 grams and 183 dB re 1 μPa2•s for fish <2 grams (Popper et al 2014).

Estimated SPL_{peak} for the nearshore installation of 24-inch sheet piles using an impact hammer is recorded to be 205 μPa2•sec. SEL_{cum} for the nearshore installation of 24-inch sheet piles using an impact hammer is recorded to be 180 μPa2•sec (Illingworth and Rodkin 2009, updated 2012). The number of sheet piles to be driven on any particular day or time would vary and pile driving would not occur for the entire duration of the project. Since sheet piles are proposed to be installed in the upland environment, noise impacts would likely be less than those for nearshore installation. Based on this information, the effects of pile driving on fish would be less than the maximum SPL_{peak} and SEL_{cum} and would not be significant.

Under Alternative 2, gaps in the shoreline structures may be incorporated into the design, where appropriate, to allow for water exchange and the movement of aquatic species. Additionally, the use of a "soft start" or system of "warning strikes" where the pile driving would begin at only 25-40% of its total energy, may be employed to reduce potential underwater noise impacts to fish if specified in the project permit.

3.3.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2. Impacts to biological resources from the living shoreline for Reaches B, D, F, and G would be minimal and less than Alternative 2, except for potential impacts to vegetation and habitat (EFH) as described below.

Terrestrial and aquatic vegetation would be temporarily affected during the installation of the living shoreline with the placement of a stabilizing structure and backfill. However, vegetation impacted by the installation of the living shoreline would be replaced with new marsh and wetland habitat behind the stabilizing structures. Living shorelines have been noted to maintain many of the natural benefits to wildlife and water quality that natural shorelines provide. These include: decreasing nutrients, sediment and pollutants from runoff, absorbing wave energy, maintaining natural shoreline processes such as near shore sediment transport, providing a natural link (continuous habitat) from uplands to aquatic habitats, providing shallow water habitat that increases the abundance of aquatic species, and restoring habitat for

fish, waterfowl, and wading birds (Swann 2008; Currin et al 2010; Virginian Coastal Zone Management Program 2012; Bilkovic and Mitchell 2013).

The specific area and type of vegetation adversely impacted and replaced following construction would be determined during the design phase and, potentially, through jurisdictional determination.

In correspondence dated June 29, 2015, the U.S. Fish and Wildlife Service concurred with the preferred alternative (refer to Appendix B, *Agency Correspondence*). If northern long-eared bats are identified within project reaches requiring tree clearing as the project moves forward, all tree-clearing activities will be restricted to occur outside the northern long-eared bat pupping season (June 1 to July 31). In response to a February 26, 2015 letter from NMFS regarding impacts to EFH, the Navy will comply with the EFH conservation recommendations. Once design plans are finalized, the Navy anticipates reinitiating consultation with NMFS, as necessary, to minimize potential adverse impacts (see Appendix B, *Agency Correspondence*). Compliance with applicable regulations, permit requirements, and appropriate sediment and erosion control BMPs, as described under Section 3.2, *Water Resources*, would further minimize and avoid impacts to biological resources and habitat.

3.3.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex would not occur, and existing conditions along the shoreline would continue to decline. Water quality would continue to decline as a result of sedimentation impacting submerged aquatic vegetation, fish, and EFH. Also, the potential would exist for unknown contaminants from the former dredge spoil lagoon along Reach C to enter water resources with continued erosion of the berm, also adversely impacting submerged aquatic vegetation, fish, and EFH. The area and quality of existing vegetation, fish, and habitat may be adversely impacted over time from continued shoreline erosion. Therefore, implementation of the No Action Alternative would result in significant adverse impacts to biological resources within the Severn River watershed.

3.4 LAND USE

3.4.1 Affected Environment

Land use refers to the various ways in which land is developed and used, typically in terms of the types of activities allowed and the type and use of structures permitted. Impacts to lands use include those that are incompatible with existing land use or that violate enforceable policies of the State of Maryland, or conflict with the fundamental mission of NSA Annapolis.

Operations and activities at the North Severn Complex include training support, housing and community support, and natural resources conservation. Much of Greenbury Point has been managed as a conservation area since 1999. The Greenbury Point Nature Center, 2.1 miles of walking trails, and a bird-watching platform are the primary natural resource-based activities at North Severn. The primary goals of outdoor recreation management at North Severn are to:

- Provide outdoor recreational opportunities for station personnel, their dependents, and the general public to the maximum extent possible within the constraints of the installation mission and capability of natural resources; and

- Foster understanding and awareness of the environment through educational conservation programs (NAVFAC Washington 2011a).

Some of this conservation area also serves as the SDZ[3] for the small arms firing ranges (see Figure 3.4-1). The range facilities include a 25 position 200-yard range, a three position 25-yard range, a five position 25-yard range, a 40 position 50-yard range, a 40 position 15-yard range, a Trap Range, and a Skeet Range. The range facilities are for the basic and advanced marksmanship training of the USNA Brigade of Midshipmen. Other units that use the facilities for weapons qualification are: NSA Annapolis Security, Annapolis Police Department, NCIS personnel, Federal Bureau of Investigation, Office of Naval Intelligence, National Security Agency, U.S. Naval Reserve units and the U.S. Coast Guard. The range facilities are used extensively throughout the year.

Also located on Greenbury Point are three former Navy radio towers, which have been turned over to Anne Arundel County for telecommunications and training. Within the installation boundary, the land to the north of the conservation area is generally undeveloped, consisting of fields and forest, aside from some of the facilities described above offering base operations support. Lands south of the USNA golf course and to the west of Carr Creek is mostly classified as community support, but the land along its shoreline is generally forest. Finally, a residential neighborhood borders the shoreline immediately north of the installation boundary, across Catelins Cove from Reach G.

Current and future land use at the North Severn Complex is constrained by natural and cultural resources including: wetlands, floodplains, and Maryland's coastal zone (NAVFAC Washington 2011a). Operational and safety constraints are also present due to the range facilities. The total constrained area is 87 percent (740 acres) of the North Severn Complex.

[3]An SDZ is a ground designated area associated with a training range that is designed to protect people during weapons training. When a range is in active use, the SDZ is an exclusion area that is strictly controlled and could contain projectiles, fragments, debris, and components resulting from firing weapons systems.

Figure 3.4-1. Surface Danger Zone at North Severn Complex

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1 – Hardened Structure/Revetment

There is no currently developed area on the shoreline that would be impacted by the proposed shoreline repair and restoration measures. Establishment of construction staging areas, to be determined during the design phase, may result in minor, temporary impacts to land use, which would be minimized and avoided to the extent practicable. Operation of the small arms ranges may also be temporarily impacted during construction activity, but construction could be planned around scheduled operation of the firing ranges to reduce such temporary impacts (proposed shoreline repair and restoration measures along Reaches F and G would not impact operation of the small arms ranges). Impacts to wetlands, floodplains, and Maryland's coastal zone are expected to be beneficial in the long-term with short-terms impacts discussed in more detail under Section 3.2, *Water Resources*. No significant impacts to cultural resources are anticipated to National Register of Historic Places (NRHP)-listed or eligible archaeological resources, with the stipulations discussed under Section 3.9, *Cultural Resources*.

Buildings or facilities that fall within a 200-foot radius of construction activities could be exposed to a temporary increase in noise levels, as described under Section 3.6, *Noise*. With implementation of appropriate noise attenuation measures, noise impacts to utilization of these buildings or facilities are not anticipated to be significant.

Implementation of Alternative 1 would be consistent with existing land use and the State of Maryland's enforceable policies; however, there would be short-term impacts to land use for the duration of construction of the revetments.

3.4.2.2 Alternative 2 – Log Toe Stabilization

Impacts to land use under Alternative 2 would be similar to those described for Alternative 1. Buildings or facilities that fall within a 200-foot radius of construction activities could be exposed to a temporary increase in noise levels, particularly during sheet pile driving activities, as described under Section 3.6, *Noise*. Implementation of Alternative 2 would be consistent with existing land use and the State of Maryland's enforceable policies; however, there would be short-term impacts to land use for the duration of construction of the revetments and sheet pile structure.

3.4.2.3 Alternative 3 – Living Shoreline (Preferred)

Impacts to land use under Alternative 3 would be the same as those described for Alternative 2.

3.4.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the North Severn Complex shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shoreline would continue to erode, threatening certain Navy facilities as mentioned in Section 1.2.1, *North Severn Complex*, and affecting available land and its use. The No Action Alternative has the potential to adversely impact the installation mission and its capital assets from continued shoreline erosion.

3.5 AIR QUALITY

3.5.1 Affected Environment

3.5.1.1 Ambient Air Quality

Air quality in a given location is described 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. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The CAA and its subsequent amendments established the National Ambient Air Quality Standards (NAAQS) for what are commonly referred to as "criteria" pollutants:

- ozone
- carbon monoxide (CO)
- nitrogen dioxide (NO_2)
- sulfur dioxide (SO_2)
- particulate matter less than 10 microns (PM_{10})
- particulate matter less than 2.5 microns ($PM_{2.5}$)
- lead

These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. Short-term standards (1-, 8-, and 24-hour periods) are established for pollutants contributing to acute health effects. Long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.

Areas that comply with NAAQS are designated as attainment areas. Areas that violate ambient air quality standards are designated as nonattainment areas. Areas that have improved air quality from nonattainment to attainment are designated as attainment/maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are treated as attainment areas for regulatory purposes.

The affected environment for the air quality analysis for the proposed action is identified as the Metropolitan Baltimore Intrastate Air Quality Control Region (AQCR) defined in 40 CFR § 81.28. This AQCR includes Anne Arundel County, Baltimore City, Baltimore County, Carroll County, Harford County, and Howard County. Specifically, the proposed action is located at the North Severn Complex in the City of Annapolis, which is located in Anne Arundel County.

The Metropolitan Baltimore Intrastate AQCR is classified (40 CFR § 81.321) as:

- nonattainment for $PM_{2.5}$ (annual NAAQS)
- unclassifiable/attainment for $PM_{2.5}$ (24-hour NAAQS)
- better than national standards for SO_2
- unclassifiable/attainment for CO
- Subpart 2/serious nonattainment for the 1997 8-hour ozone standard and moderate nonattainment for the 2008 8-hour ozone standard
- not designated for lead or PM_{10}
- cannot be classified or better than national standards for NO_2

The MDE published the Baltimore Nonattainment Area $PM_{2.5}$ State Implementation Plan and Base Year Inventory on March 24, 2008. This plan is currently awaiting approval of the USEPA.

The MDE published the Baltimore Nonattainment Area 8-hour Ozone State Implementation Plan and Base Year Inventory on June 15, 2007. The complete plan is currently awaiting approval from the USEPA. USEPA initially approved the 1-hour ozone attainment plan for the Metropolitan Baltimore Area on October 30, 2001 (66 Federal Register 54666).

Hazardous Air Pollutants

In addition to the ambient air quality standards 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 Parts 61 and 63). HAPs emitted from mobile sources are called Mobile Source Air Toxics (MSATs); these are compounds emitted from highway vehicles and non-road equipment that are known or suspected to cause serious health and environmental effects. In 2001, USEPA issued its first MSAT Rule, which identified 21 compounds as being HAPs that required regulation. In February 2007, 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. The rule also identified several engine emission certification standards that must be implemented.

Unlike the criteria pollutants, there are no NAAQS for HAPs. The primary control methodologies instituted by federal regulation for MSATs involve technological improvements for reducing their content in fuel and altering engine operating characteristics to reduce the volume of pollutants generated during combustion. MSATs would be the primary HAPs emitted by mobile sources during construction and operation of the proposed action alternatives. The equipment used during construction would likely vary in age and have a range of pollution reduction effectiveness. Construction equipment, however, would be operated intermittently over a large area and would produce negligible ambient HAPs in a localized area. Operational equipment, including vehicles driven by commuters, is anticipated to be primarily newer equipment (post-2005 model year) that generate lower emissions and would also produce negligible ambient HAPs. Therefore, MSAT emissions are not considered further in this analysis.

Regulatory Requirements – New Source Review and Prevention of Significant Deterioration

As part of the 1977 amendments to the CAA, Congress established the New Source Review (NSR) program. This program is designed to ensure that air quality is not significantly degraded from the addition of new and modified factories, industrial boilers, and power plants. In areas with unhealthy air, NSR assures that new emissions do not slow progress toward cleaner air. In areas with clean air, especially pristine areas like designated Class I areas (e.g., national parks), NSR assures that new emissions do not significantly worsen air quality.

The construction activities associated with the proposed action are temporary and would not be an issue with regard to Class I Prevention of Significant Deterioration (PSD) areas, nor would any new major sources (greater than 250 tons per year of any pollutant) be constructed as a result of the proposed action. Therefore, NSR and PSD requirements are not carried forward in the air quality analysis.

3.5.1.2 General Conformity Rule

Federal actions proposed to occur in areas that are classified as nonattainment or maintenance by the USEPA must demonstrate that emissions from the action will not exceed emission budgets established in a state's plan to attain or maintain the NAAQS. Construction for this proposed action would occur in an area that has been classified as nonattainment for ozone and for the annual $PM_{2.5}$ NAAQS. Thus, the construction emissions for the proposed shoreline repair and restoration activities have been evaluated against the General Conformity Rule's *de minimis* thresholds and any applicable portions of the Maryland State Implementation Plan.

3.5.2 Environmental Consequences

Pollutant emissions resulting from proposed repair and restoration activities have been evaluated for the proposed action. Air quality impacts would be significant if emissions associated with the proposed action would: 1) increase ambient air pollution concentrations above the NAAQS, 2) contribute to an existing violation of the NAAQS, 3) interfere with, or delay timely attainment of the NAAQS, or 4) for mobile source emissions, result in an increase in emissions to exceed 250 tons per year for any pollutant. Pollutants considered in this air quality analysis include the criteria pollutants measured by federal standards.

The proposed action involves the repair and restoration of eroding shoreline using a variety of techniques. No permanent emission sources would be added as a result of the proposed action. In order to assess the air quality impacts of the proposed action, emissions generated by heavy diesel equipment required to complete the repair and restoration activities under each alternative were compared to the General Conformity Rule *de minimis* thresholds for volatile organic compounds (VOCs) and NO_2, because these are ozone precursors; as well as $PM_{2.5}$ and its precursor SO_2. For the criteria pollutants that the Metropolitan Baltimore Intrastate AQCR is designated as unclassifiable/better than national standards, the calculated emissions are compared to the 250-ton comparative threshold. The construction activities were assessed based on the activities primarily occurring using equipment located on barges, and the bulk of construction materials were assumed to be brought to the shoreline areas via barge. This assumption of how the shoreline repair and restoration activities would most likely occur was based on a review of the roads accessing the area, and the comparative ease of access via water as opposed to land. Placement of riprap would be most advantageous if performed using equipment and materials located on barges directly offshore. Appendix C contains the detailed emissions calculations prepared to assess the air quality impacts of the proposed action and a Record of Non-Applicability verifying that emissions are well below *de miminis* thresholds.

3.5.2.1 Construction Emissions from Shoreline Construction Activities

Air quality impacts from construction would primarily occur from combustion emissions due to the use of fossil fuel-powered equipment and from fugitive dust emissions (PM_{10} and $PM_{2.5}$). Fugitive dust emissions are expected to be minimal due to the limited areas where grading would occur. Only rough grading involving a dozer and possibly a long reach excavator are anticipated. Equipment usage was based on similar construction projects to estimate fuel combustion.

The emissions associated with the proposed shoreline repair and restoration activities are summarized in Table 3.5-1. Variations in the techniques utilized are represented in Alternatives 1, 2, and 3. The activities associated with each alternative were assumed to occur within a single year in order to represent the worst-case scenario. The calculations for the shoreline repair and restoration activities for each of the alternatives indicate that annual emissions for proposed construction activities would not exceed the *de*

minimis thresholds or the 250 tons per year for any criteria pollutant. Detailed calculations can be found in Appendix C.

Table 3.5-1. Maximum Estimated Emissions for Shoreline Repair and Restoration Alternatives

Construction Activity	Air Pollutant Emissions (tons)					
	VOCs	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Alternative 1 - Hardened Structure	0.14	0.67	1.05	0.09	0.10	0.09
Alternative 2 – Log Toe/ Hardened Structure/Sheet Pile	0.11	0.37	0.79	0.09	0.08	0.07
Alternative 3 – Living Shoreline/Hardened Structure/Sheet Pile (Preferred)	0.20	0.96	1.50	0.09	0.14	0.13
Major Source Comparative Threshold		250	-	-	250	-
de minimis Thresholds	[1]50	-	100	100	-	100

Notes: [1]VOC *de minimis* established for nonattainment areas located in ozone transport region.

3.5.2.2 No Action Alternative

Under the No Action Alternative, shoreline repair and restoration would not occur and therefore no associated constructed for this effort would take place at the North Severn Complex. Therefore, implementation of the No Action Alternative would have no significant impacts to air quality.

3.6 NOISE

Noise can be defined as any unwanted sound. Sound is all around us and becomes noise when it interferes with normal activities such as sleep and conversation. The principal human response to noise is annoyance. Human response can vary according to the type and source of the noise, the distance between the source and the human receptor, the perceived importance of the noise, its appropriateness in the setting, and the sensitivity of the person receiving the noise (i.e., receptor).

Levels of noise are measured in units called decibels (dB). A number of factors affect how the human ear perceives sound: the actual level of noise, frequency, period of exposure, and fluctuations in noise levels during exposure. The human ear cannot equally perceive all pitches or frequencies; therefore, noise measurements are adjusted or weighted to compensate for the human lack of sensitivity to low- and high-pitched sounds. This adjusted unit is known as the A-weighted dB, or dBA. The A-weighted metric, de-emphasizes very low and very high pitched sound and is most often applied to noise generated by motor vehicle traffic, small boats, and aircraft. Background, or ambient, noise levels are all sounds present in an environment and are dependent upon land use. Very rural areas with little human activity would be expected to have the lowest levels of background noise, typically on the order of 15–20 dBA (USEPA 1971). Noise increases with increased population, as demonstrated in Table 3.6-1.

Table 3.6-1. Sound Levels Estimated by Population Density

Description	Population Density (people per square mile)	Sound Level (dB)
Rural (undeveloped)	20	35
Quiet suburban	60	45
Normal suburban	600	50
Urban	2,000	55
Noisy urban	6,000	60
Very noisy urban	20,000	65

Source: USEPA 1982.

In addition to noise in the air, underwater noise can be produced by pile driving, and other construction activities. Pile driving is one of the noisiest operations involved in construction (Vagle 2003). Aquatic pile driving generates hydroacoustic pressure impulses and particle velocities.

Underwater noise is referenced as dB relative to one micropascal (re 1 μPa). Average measurements are in root mean square (RMS). Sound levels expressed as RMS values may be appropriate for some continuous sounds, but they do not adequately describe more complex sounds, as the RMS simply averages out varying sound levels. As a conservative measure, NMFS has used a 150 dB re 1 μPa RMS as a threshold for behavioral effects to fish species that are listed as endangered or threatened. However, sounds that are of short duration and high amplitude can damage tissues and evoke strong behavioral responses. For impulsive sounds, the instantaneous peak sound pressure level (SPL_{peak}) is more appropriate. However, SPL_{peak} does not account for the total energy within the sound. Sound exposure level (SEL), which is related to total acoustic energy, takes into account both level and duration of exposure. SEL can be used to account for accumulated exposure to repeated sound energy over the duration of a repetitive activity (i.e. pile driving) or a continuous activity over a specified period of time and is expressed as SEL_{cum}. As a result, the criteria agreed upon by NMFS for assessing impacts of percussive pile driving on fish uses a dual criteria. These criteria specify both a maximum permitted sound pressure level (SPL_{peak}) for a single pile driving strike and a maximum cumulative sound exposure level (SEL_{cum}) for lower level signals. The SPL_{peak} was selected to be 206 dB re 1 μPa and the maximum SEL_{cum} was designated as 187 dB re 1μPa2•s for fish ≥2 grams and 183 dB re 1 μPa2•s for fish <2 grams (Popper et al 2014).

No marine mammals or special-status fish species were identified as occurring in the proposed project area. Therefore, for the purposes of this EA, the underwater noise analysis is limited to impacts on fish.

3.6.1 Affected Environment

3.6.1.1 Airborne Noise

The Occupational Safety and Health Administration (OSHA) regulates noise impacts to workers and sets forth thresholds for a safe work environment. OSHA has set permissible noise exposure limits (codified in 29 CFR § 1910.95). Based on these limits, an employee should not be subjected to continuous noise exceeding 90 dBA for durations lasting more than 8 hours per day (Table 3.6-2). As the level increases, the allowed duration of noise decreases. The maximum limit is 115 dBA for duration of 15 minutes or less. OSHA standards are the best documented requirements for safe long-term human noise exposure. In addition, OSHA standards state that exposure to impulsive or impact noise (loud, short duration sounds) is not to exceed 140 dB peak sound pressure level (OSHA 2013).

Table 3.6-2. OSHA Permissible Noise Exposures

Duration per Day (hours)	Sound Level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

In addition to the OSHA permissible noise exposure levels, the Navy and State of Maryland also have set noise exposure levels to protect the health and welfare of employees and residents. The Navy‘s standard

for occupational noise exposure of 84 dBA for 8 hours of constant noise is set in OPNAVINST 5100.23G (Change 1), *Navy Safety and Occupational Health Program Manual* (DoN 2011). Additionally, Code of Maryland Regulations 26.02.03, *Control of Noise Pollution*, states that "a person may not cause or permit noise levels emanating from construction or demolition site activities which exceed: (a) 90 dBA during daytime hours; [or] (b) the levels specified in Table 3.6-3 during nighttime hours." Anne Arundel County has the same daytime and nighttime noise criteria and the same day and night hour intervals as the State.

Table 3.6-3. Maximum Allowable Noise Levels (dBA) for Receiving Land Use Categories

Day/Night*	Industrial	Commercial	Residential
Day	75	67	65
Night	75	62	55

Note: *Defined as Day - 7:00 a.m. to 10:00 p.m. and Night - 10:00 p.m. to 7:00 a.m.

Daily operations associated with the North Severn Complex of NSA would be expected to fall within the 50–55 dBA range and primarily consist of the daily operation of personal vehicles and a normal suburban environment. The dBA for light traffic and for a normal suburban environment is 50 dBA.

3.6.1.2 Underwater Noise

No site-specific underwater noise data exists for the proposed project area. However, ambient underwater noise levels for nearshore areas of large marine bays that support heavy commercial uses and recreational boat traffic have been estimated to range between 147 – 156 dB_{peak} and 132-143RMS (Illingworth and Rodkin 2009, updated 2012).

3.6.2 Environmental Consequences

As stated in Section 3.6.1, *Affected Environment*, OSHA standards (29 CFR § 1910.95) state that employees should not be subjected to continuous noise exceeding 90 dBA for durations lasting more than 8 hours per day. Navy standards are more conservative in that maximum allowable exposure over an 8-hour period should not exceed 84 dBA. State of Maryland standards allow for 90 dBA during a 15-hour daytime period. For the purposes of this analysis, noise at a sensitive receptor above the level for a residential district, 55 dBA, is noted for impacts, and noise emissions exceeding 90 dBA for more than 8 hours per day at a sensitive receptor location would be considered to have significant adverse impacts.

A noise sensitive receptor is defined as a location or facility 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 noise receptors may also include supporting habitat for certain wildlife species or noise sensitive cultural practices. For the purposes of this analysis all buildings associated with the North Severn Complex were considered to be sensitive noise receptors.

3.6.2.1 Alternative 1 – Hardened Structure/Revetment

<u>Airborne Noise</u>

The proposed action would result in temporary increases to noise during the construction phases of Alternative 1. Construction activities that would impact noise levels include noise from construction equipment operating at the site and construction/delivery vehicles traveling to and from the site. Noise levels at a given receptor location would depend on the type and number of pieces of construction equipment being operated and the receptor's distance from the construction site. Construction related noise emissions are listed in Table 3.6-4 and can range from 74 dBA to 101 dBA when measured 50 feet from the respective piece of equipment.

Table 3.6-4. Airborne Construction Related Noise Emissions

Equipment Description	Actual Measured L_{max} at 50 feet (dBA)
Flat Bed Truck	74
Welder/Torch	74
Man Lift	75
Dump Truck	76
Backhoe	78
Compressor (air)	78
Concrete Mixer Truck	79
Drill Rig Truck	79
Front End Loader	79
Rivet Buster/Chipping Gun	79
Ventilation Fan	79
Drum Mixer	80
Vibratory Concrete Mixer	80
Concrete Pump Truck	81
Crane	81
Generator	81
Pumps	81
Dozer	82
Boring Jack Power Unit	83
Warning Horn	83
Auger Drill Rig	84
Scraper	84
Pneumatic Tools	85
Vacuum Excavator	85
Vibrating Hopper	87
Jackhammer	89
Concrete Saw	90
Mounted Impact Hammer (hoe ram)	90
Sheers (on backhoe)	96
Impact Pile Driver	101
Vibratory Pile Driver	101

Source: Federal Highway Administration 2006.

Small increases in noise levels would be expected as a result of the operation of delivery trucks and other construction vehicles. Moderate noise impacts would extend up to 1.5 miles from the construction site, as this is the distance at which noise levels would attenuate to 55–60 dBA.

To minimize the impact to noise receptors during the operation of construction equipment, a variety of measures could be taken, including but not limited to:

- Installing a portable noise barrier that is rated up to Sound Transmission Class 60 in the areas where loud activities are occurring

- Performing the work during daytime hours, defined by Maryland regulations as the period between 7:00 a.m. and 10:00 p.m.

In conclusion, temporary and short-term noise disturbance would occur during construction; however, implementation of noise attenuation measures stated above would reduce potential disturbance from noise. Therefore, implementation of Alternative 1 would have no significant impacts to sensitive noise receptors from noise.

Upon completion of the construction activities, there would be no long-term increases in noise.

3.6.2.2 Alternative 2 – Log Toe Stabilization

Airborne Noise

Impacts associated with noise would generally be similar to those described for Alternative 1, except for the sheet pile driving activities for Reach C. Larger increases in noise levels would result during sheet pile driving activities. Under the worst case scenario during pile driving, there would be periods during construction when noise would range from 101 dBA at 50 feet from the equipment to 89 dBA at 200 feet from the equipment.

To minimize the impact to noise receptors during the operation of the sheet pile driving equipment, a variety of measures could be taken, including but not limited to:

- Selecting the quietest pile driving method that allows the work to be performed based on structural, geotechnical, and pile friction requirements and ground conditions
- Installing a portable noise barrier that is rated up to Sound Transmission Class 60 in the areas where pile driving and similarly loud activities are occurring
- Using impact cushions on top of piles that are being driven by an impact hammer
- Using noise bellows systems to provide further noise attenuation
- Performing the work during daytime hours, defined by Maryland regulations as the period between 7:00 a.m. and 10:00 p.m.
- Scheduling the pile driving for less intrusive times (mid-morning to mid-afternoon)

In conclusion, temporary and short-term noise disturbance would occur during construction; however, implementation of noise attenuation measures stated above would reduce potential disturbance from noise. Within Reach C, these increases in noise levels would occur in areas that are undeveloped and would not be anticipated to result in impacts to noise receptors. Therefore, implementation of Alternative 1 would have no significant impacts to sensitive noise receptors from noise.

Upon completion of the construction activities, there would be no long-term increases in noise.

Underwater Noise

Impacts associated with underwater noise would affect marine species and are discussed in detail for each alternative in Section 3.3.2, *Environmental Consequences*. Estimated SPL_{peak} for the nearshore installation of 24-inch sheet piles using an impact hammer is recorded to be 205 µPa2•sec. SEL_{cum} for the nearshore installation of 24-inch sheet piles using an impact hammer is recorded to be 180 µPa2•sec (Illingworth and Rodkin 2009, updated 2012). The number of sheet piles to be driven on any particular day or time would vary and pile driving would not occur for the entire duration of the project. Since sheet piles are proposed to be installed in the upland environment, noise impacts would likely be less than those recorded for nearshore installation. Based on this information, the effects of pile driving on fish would be within regulatory thresholds and would not be significant.

3.6.2.3 Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, impacts associated with noise would generally be the same as those described for Alternative 2.

3.6.2.4 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, Severn River, and the Chesapeake Bay would not occur. As a result, no increases in noise associated with construction noise would occur.

3.7 TRANSPORTATION

3.7.1 Affected Environment

Landside - Baltimore Annapolis Boulevard (designated as Maryland State Route [MD] 648) is the major access route to the North Severn Complex (Figure 1-1). Direct access to the North Severn Complex from MD 648 is via Greenbury Point Road. Greenbury Point Road is a two-lane urban collector that primarily runs east-west, with limited right-of-way to private residences (NAVFAC Washington 2013b).

Access to North Severn is through the intersection of Greenbury Point Road and Kinkaid Road. Greenbury Point Road travels through the USNA Golf Club and past the Naval Academy Primary School, and leads to the Brigade Sports Complex and a conservation area. Kinkaid Road passes through a housing area leading to the NSA Annapolis headquarters and waterfront operations area. The majority of the secondary vehicular routes are located off Kinkaid Road. The secondary roads typically lead to support, administrative, and waterfront operations areas and many of these secondary roads are unpaved.

A full traffic analysis of the North Severn Complex was performed in 2012. The study included the evaluation of 10 intersections throughout the base. Results of the analysis indicate that all studied intersections function at an acceptable level of service, with the exception of the intersection of Greenbury Point Road and Kinkaid Road during afternoon peak hour traffic. The results indicate that during this period, the intersection functions at an unacceptable Level of Service (LOS) 'F.' LOS represents levels of traffic delay on a scale from LOS A to F, in which LOS A indicates free flow conditions, and LOS F indicates the intersection is highly congested. Another field observation made during the study was that the large amount of traffic generated along Greenbury Point Road between the Naval Academy Primary School and the Kinkaid Road intersection were heavily affected by school-related traffic (NAVFAC Washington 2013b).

Waterside – All active duty and retired military members and their dependents and non-temporary civilian employees assigned to NSA Annapolis are eligible to fish and crab within the confines of the USNA, including Possum Point. In addition, there is an existing Moral, Welfare, and Recreation (MWR) marina and boat ramp off of Mill Creek right next to Possum Point that can be used by all active duty and retired military members and their dependents and non-temporary civilian employees assigned to NSA Annapolis. The Carr Creek Marina is adjacent to Reach E at the headwaters of the Carr Creek inlet. The marina provides rentals and lessons for a variety of recreational boating types to all active duty and retired military members and their dependents and non-temporary civilian employees assigned to NSA Annapolis. Additional privately-owned recreational boats are located along much of the opposing shorelines of the waterways in contact with the area to be repaired and restored. The primary boating season in this vicinity runs approximately five months; from May through September.

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1 – Hardened Structure/Revetment

The implementation of Alternative 1 would have no impact on the permanent number of employees at NSA Annapolis. Therefore, any impacts on transportation associated with the implementation of Alternative 1 are expected to be limited to impacts during construction.

It is anticipated that implementation of Alternative 1 would require a combination of landside and waterside construction. The landside transportation impacts would include localized traffic associated with workers arriving and departing the project site, as well as the movement of materials and equipment throughout the North Severn Complex and the hauling of excavated material and the removal of other construction and demolition wastes. The majority of the construction traffic would be along Greenbury Point Road and therefore the majority of interruptions would affect the traffic accessing the school, golf course, Brigade Sports Complex, and conservation areas. There would be minimal impact to the housing area and NSA Annapolis headquarters and operations areas. The vehicular traffic affected along the Greenbury Point route would be a combination of privately owned vehicles and base-related traffic. Due to the peak traffic associated with the primary school, construction traffic would be scheduled to avoid traffic conflicts during school start and end times.

It is likely that a portion of the repair and restoration activities would be performed from the waterside. Waterside transportation for this effort could include boat-mounted equipment as well as the possibility of using barges for construction staging. This would likely be limited to periodic large deliveries rather than for day-to-day deliveries. This option would reduce the number of construction trips on the landside transportation system, but would have a greater impact on recreational boating traffic in the vicinity. These impacts could be minimized by scheduling portions of the work before or after the prime boating season. As appropriate, the Navy would coordinate with the U.S. Coast Guard to issue a Notice to Mariners when barges or other project-related vessels are in transit or in use.

There would be noticeable impacts to vehicular and recreational boat traffic in the vicinity of the Reaches for the duration of the construction activities, but it is anticipated that with a coordinated schedule to minimize vehicular construction traffic during peak school hours, these impacts would be minor and would result in little inconvenience to commuters and recreational boaters.

3.7.2.2 Alternative 2 – Log Toe Stabilization

Impacts to transportation under Alternative 2 would generally be the same as those described under Alternative 1.

3.7.2.3 Alternative 3 – Living Shoreline (Preferred)

Impacts to transportation under Alternative 3 would generally be the same as those described under Alternative 1.

3.7.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode, threatening some of the road infrastructure and the ability to adequately navigate around the outer limits of the North Severn Complex. Therefore, the No Action Alternative has the potential to adversely impact transportation at the North Severn Complex.

3.8 INFRASTRUCTURE AND UTILITIES

3.8.1 Affected Environment

3.8.1.1 Roads

As noted in Section 3.7, Transportation, the North Severn Complex has two primary roads bisecting the facility. Kinkaid Road provides access to NSA Annapolis Headquarters and other waterfront operations areas and Greenbury Point Road provides access to the Naval Academy Primary School, USNA Golf Club, Brigade Sports Complex, and conservation area. Alder Road is a secondary road in the section of the base accessed by Kinkaid Road. Alder Road runs parallel to the shoreline of Carr Creek in Reaches D2 and E. Approximately 500 feet of Alder Road are within 30 feet of the shoreline to be repaired. Similarly, the section of the base accessed by Greenbury Point Road has a secondary road network that includes an 11,000 foot loop around the outer boundary of the Greenbury Point peninsula. This loop includes West Road and East Road. Approximately 2,000 feet of this loop are located within 30 feet of Reaches A and B. These sections closest to the shoreline are most threatened by the eroding banks within the North Severn Complex.

3.8.1.2 Water Supply

Potable water for the North Severn Complex is supplied by Anne Arundel County at an average flow of 110 gallons per minute. The connection point to the County system is located at the intersection of Greenbury Point Road and Kinkaid Road. The waterlines then parallel the existing roads to supply the various areas of the base. Most of the waterlines were installed in the 1940s and are owned and maintained by the Navy. Potable water is used for domestic consumption, fire suppression. To meet the fire suppression pressure requirements, the existing water system includes a water tower at the intersection of Beach Road and Kinkaid Road. Due to water quality issues associated with the water tower during fire events, the base has plans to install a larger diameter pipe to connect to the Anne Arundel County system, so that the higher pressures required to meet the fire suppression standards can be maintained (NAVFAC Washington 2013b). The majority of the waterlines on the North Severn Complex are located in the portion of the base accessed by Kinkaid Road. However, there are sections of waterlines located in proximity to Reaches A, D1, F, and G.

3.8.1.3 Wastewater

North Severn has its own WWTP with a rated capacity of 1,000,000 gallons per day (GPD). The actual use averages 150,000 GPD. The WWTP is located in proximity to Carr Creek, within Reach D1. The wastewater collection system consists of both gravity flow and pressure systems (NAVFAC Washington 2013b). The majority of the sewer lines on the North Severn Complex are located in the portion of the base accessed by Kinkaid Road. However, there are sections of the collection system located in proximity to Reaches A, D1, F, and G, and the treated wastewater outfall is located in Reach D2.

3.8.1.4 Stormwater

The North Severn Complex occupies approximately 853 acres. It has 13 major drainage areas that drain to various locations in the tributaries surrounding the base. The developed areas of the base are equipped with a stormwater system that collects, treats, and discharges into Carr Creek (NAVFAC Washington 2013b). The majority of the stormwater system on the North Severn Complex is located in the portion of the base accessed by Kinkaid Road. However, there are sections of the system located in proximity to Reaches A, F, and G.

3.8.1.5 Electricity

Baltimore Gas and Electric (BGE) provides power to the base and NAVFAC owns and maintains the electrical distribution grid. The Kinkaid substation provides a single point of service and the operating site has mostly aerial transmission lines. The Kinkaid substation has two dedicated feeders that provide redundancy. One-half of the capacity of the system is dedicated to NSA Annapolis, and BGE has an easement for the remaining half. Generators are also maintained by NAVFAC to provide back-up power for critical functions when needed (NAVFAC Washington 2013b). The majority of the electrical lines on the North Severn Complex are located in the portion of the base accessed by Kinkaid Road. However, there are sections of electrical lines located in proximity to Reaches A, B, D1, and F.

3.8.1.6 Fiber Optic/Telecommunications

The Navy provides communications and information technology (IT) services to the operations and administrative buildings in North Severn, and a private provider supplies these services to the Sports Complex on Greenbury Point Road. The North Severn fiber optic and telecommunications systems are connected to the NSA Annapolis facilities west of the Severn River via an underwater cable (NAVFAC Washington 2013b). The distribution system in North Severn consists of both aerial and underground components. The underground portion primarily comprises manholes and 3-inch telecommunication ducts, much of which are at capacity. The NSA Annapolis communications and IT systems are not located in the vicinity of the shoreline reaches to be repaired and restored.

3.8.1.7 Natural Gas

Natural gas is provided by BGE. There are easements for BGE to maintain their infrastructure on the base. The natural gas lines are only located in the section of the base accessed by Kinkaid Road. The service main extends from the main entrance to the residential area and the headquarters and support buildings. These facilities are not located in the vicinity of the shoreline reaches to be repaired and restored (NAVFAC Washington 2013b).

3.8.2 Environmental Consequences

3.8.2.1 Alternative 1 – Hardened Structure/Revetment

The implementation of Alternative 1 would have no impact on the permanent number of employees at the base therefore would not increase the demand for utilities serving the North Severn Complex. Impacts to the utilities associated with the implementation of Alternative 1 are expected to be limited to impacts during construction. There would be impacts to the road infrastructure as a result of the implementation of Alternative 1. Implementation of this Alternative would stabilize the eroding shorelines adjacent to the perimeter roads in Reaches A, B, D2, and E, resulting in beneficial impacts to the North Severn perimeter roads that are being threatened by eroding shorelines.

During the construction period, there would be an influx of construction workers at the base. During this period it is anticipated that the demand for on-site utilities would increase. These increases would be negligible compared to current demand and therefore it is anticipated that the impacts to the utilities during the implementation of Alternative 1 would not be noticeable to those in and around the construction site. Therefore, implementation of Alternative 1 would result in beneficial impacts to infrastructure and no significant impacts to utilities.

3.8.2.2 Alternative 2 – Log Toe Stabilization

Impacts to infrastructure and utilities under Alternative 2 would generally be similar to those described under Alternative 1.

3.8.2.3 Alternative 3 – Living Shoreline (Preferred)

Impacts to infrastructure and utilities under Alternative 3 would generally be similar to those described under Alternative 1.

3.8.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode, threatening some of the road infrastructure along the perimeter of the Complex. Therefore, the No Action Alternative has the potential to adversely impact the road infrastructure at the North Severn Complex. The No Action Alternative has the potential to impact the existing utilities due to the proximity of outfalls to the degrading shoreline.

3.9 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, empowers the Advisory Council on Historic Preservation to comment on federally initiated, licensed, funded, or permitted projects affecting cultural resources listed or eligible for listing in the NRHP (i.e., historic properties). Each state or territory has a State Historic Preservation Office (SHPO) that is responsible for administering cultural resources programs within a given jurisdiction; the Maryland SHPO is the Maryland Historical Trust (MHT). The NHPA requires federal agencies, in carrying out their Section 106 responsibilities, to consult with the SHPO, Indian tribes, representatives of local governments, and the public in a manner appropriate to the agency planning process for the planned action, and to its potential to cause effects on historic properties. The criteria of adverse effect (36 CFR § 800.5) are applied to evaluate the effects of a proposed undertaking on a historic property located in the area of potential effects (APE). An APE 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 any such properties exist (36 CFR § 800.16[d]). The APE for cultural resources for this proposed action includes the areas of direct construction impacts (the eight reaches and adjacent areas of for staging and access) and adjacent areas with water-related views of the shoreline.

The management of cultural resources at the North Severn Complex is guided by the Integrated Cultural Resources Management Plan (ICRMP) for NSA Annapolis (NSA Annapolis and NAVFAC Washington Public Works Department [PWD] Annapolis 2010). The ICRMP provides the protocols for managing and protecting cultural resources at NSA Annapolis. The ICRMP also addresses compliance actions for meeting federal regulations regarding cultural resources.

3.9.1 Affected Environment

3.9.1.1 Archaeological Resources

Eighteen archaeological studies have been conducted at the North Severn Complex and 29 previously recorded archaeological sites have been identified there. Twenty-four of these sites are located within the proposed shoreline repair and restoration project area or are located within approximately 500 feet of the shoreline (Table 3.9-1). Fifteen of these sites have not been evaluated and are recommended for Phase II testing (NSA Annapolis and NAVFAC Washington PWD Annapolis 2010).

Table 3.9-1. Archaeological Sites and Potential Site Locations at North Severn Complex

Site Number	Site Name	Type	Recommendation
18AN0091	Club House	Historic: 18th-20th century (C.)	Not eligible
18AN0092	Carr Creek	Historic: kiln; 1675-1720	Not evaluated – Phase II
18AN0160	Golf Course	Prehistoric: Woodland; Historic: domestic, 1720-1900	Not evaluated – Phase II
18AN0340	Country Club	Historic: 1630-1720	Not evaluated – Phase II
18AN0528	KWW-4 (Pines 1)	Prehistoric: Woodland scatter; Historic: unknown	Not evaluated – Phase II
18AN0529	KWW-6 (Helix 3)	20th C. house foundation	Not evaluated – Phase II
18AN0944	Towne Neck (Ralph Williams)	Historic: Plantation, 1630-1675	Eligible - Avoid
18AN0969	18th Green	Possible structure	Not evaluated – Phase II
18AN1018	Bullard I	Late Archaic; 20th C.	Not eligible
18AN1019	Driving Range	18th-20th C. artifact concentration	No further work recommended; Consult MHT
18AN1020	Athletic Fields	18th-19th C.	Not evaluated – Phase II
18AN1021	Pines 2	Lithic scatter	Not evaluated – Phase II
18AN1022	Pines 3	Lithic scatter; 19th C.	Not evaluated – Phase II
18AN1023	Helix 1	Prehistoric: lithic	Not eligible
18AN1024	Helix 2	Prehistoric: lithic	Not eligible
18AN1030	Site 5	Historic unknown	Not eligible
18AN1031	Site 6	Historic: 1720-20th C.	Not eligible
18AN1112	Carr's Creek 2	Unknown: shell midden	Not evaluated – Phase II
18AN1113	Carr's Creek 3	Historic: submerged brick	Not evaluated – Phase II
18AN1114	Carr's Creek 4	Prehistoric: shell midden	Not eligible
18AN1115	Carr's Creek 5	Unknown: shell midden	Not evaluated – Phase II
18AN1116	Carr's Creek 6	Historic: Cold War Sub Pier	Not evaluated – Phase II
18AN1117	Carr's Creek 7	Historic: shell midden	Not evaluated – Phase II
18AN1410	Greenbury Point	Prehistoric: Mid Woodland camp; Historic: scatter, 1900-1930	No further work
QF2	N/A	Prehistoric: scatter; Historic: fort, 18th-19th C.	Consult MHT
QF18	Carr's Creek wharf	Historic: meeting house, wharf	Consult MHT
QF19	Taylor's Landing	Historic: wharf	Consult MHT

Site 18AN0944, the Towne Neck Site, has been determined to be eligible for the NRHP. This site is a seventeenth-century merchant's house that was discovered during earthmoving activities for a new ball field.

In addition, there are three unrecorded locations (QF) where possible sites may exist. Any disturbance of these locations would require consultation with the MHT to determine the level of additional work necessary. Several areas that contain potential archaeological deposits are also noted in the MHT files. These areas have not been formally investigated, but may contain archaeological resources. Any disturbance of these locations would require consultation with MHT to determine the level of additional work necessary (NSA Annapolis and NAVFAC Washington PWD Annapolis 2010).

Some areas within the project area have not been previously surveyed and it is not known if additional sites are located in areas along the shoreline. The majority of the North Severn Complex is identified as high probability for both prehistoric resources as well as early historic domestic, historic waterfront, military, and underwater resources. Woodland Period shell mounds are likely along the shoreline and areas along Mill Creek, Carr's Creek, the Severn River, and the Chesapeake Bay (NSA Annapolis and NAVFAC Washington PWD Annapolis 2010).

3.9.1.2 Built Environment

Several architectural surveys have been conducted at the North Severn Complex. A 1996 survey of the former Naval Radio Transmitter Facility recommended the facility eligible for inclusion in the NRHP, and the MHT concurred; however, in 2003 a new determination of eligibility was completed that concluded the facility was no longer eligible because of demolition of several of its associated resources. The MHT concurred with this determination (NSA Annapolis and NAVFAC Washington PWD Annapolis 2010). In 2011, a district of seven buildings referred to as the Marine Barracks and Rifle Range Historic District was recommended eligible for inclusion in the NRHP (NAVFAC Washington 2013c). In May 2014, NSA Annapolis and MHT determined that three of the buildings, both associated with the Marine Barracks, are not eligible as contributing to a historic district. The four remaining buildings, referred to as the Rifle Range Buildings (Buildings 2NS, 3NS, 4NS and 31NS), are eligible for their role in the training of midshipmen at the USNA and for exemplifying the construction of early-twentieth century ammunition magazines and range buildings by the Navy (NSA Annapolis 2014b). The four Rifle Range Buildings form a discontiguous complex in the south-central part of the North Severn Complex (Figure 3.9-1). The other surveys at the North Severn Complex have not identified any other NRHP-eligible architectural resources (NSA Annapolis and NAVFAC Washington PWD Annapolis 2010).

Approximately 1.1 mile west of Greenbury Point on the southwest side of the Severn River is the USNA, which was designated a National Historic Landmark in 1961 and listed in the NRHP in 1966 (Figure 3.9-1). The USNA historic district is nationally significant for its importance in American naval affairs and the education of naval officers, its Beaux Arts-style architecture and campus plan, and as an outstanding example of the work of noted architect Ernest Flagg. There are no other NRHP-listed or eligible architectural resources within the APE.

Figure 3.9-1. Historic Properties in the Project Vicinity

3.9.2 Environmental Consequences

3.9.2.1 Alternative 1 – Hardened Structure/Revetment

Archaeological Resources

Ten previously recorded sites that are recommended for Phase II evaluation are in the vicinity of Reaches D1, F, and G, and may be potentially affected by construction of the proposed hardened structure/revetment under Alternative 1. One NRHP-eligible site, Site 18AN0944, is located within 100 feet of the proposed shoreline work in Reach D1. It is on a bluff, and the immediate area has not been affected by wave energy. There are no eligible or unevaluated archaeological sites in the vicinity of Reaches A, B, C, D2, and E.

The extent of cutting, grading, or earth moving within areas of known archaeological sites in Reaches D1, F, and F is not known at this time. Should Alternative 1 be selected for implementation, the Navy would prepare Archaeological Site Protection Requirements plans for Reaches D1, F, and G and submit them to MHT for review and concurrence. Therefore, with the provision of these plans, it is anticipated there would be No Adverse Effect to NRHP-listed or eligible archaeological resources under Alternative 1. .

Built Environment

Implementation of Alternative 1 would have No Effect on the Rifle Range Buildings. Three of the buildings are more than 1,600 feet from Reach E and 2,000 feet from Reach D2, and the fourth building is approximately 1,500 feet from Reach D1. Forest stands between the Rifle Range Buildings and Carr Creek would obscure views of any construction activities.

Those portions of the USNA on the Severn River waterfront have distant views of the southwestern shoreline of Greenbury Point, which includes Reaches A, B, and C. Implementation of Alternative 1 would alter visual elements of the shoreline along these reaches. However, with the Greenbury Point shoreline more than a mile from the USNA, these changes would likely have a negligible effect to the historic external views from the USNA toward Greenbury Point. There is the potential for temporary effects to the setting of the USNA during construction from machinery and equipment operating or being stored along the shoreline, particularly related to potential in-water work. The Navy concluded, however, the effect would not be adverse to the integrity of the USNA historic district. Implementation of Alternative 1, therefore, is expected to have No Adverse Effect on historic architectural resources.

3.9.2.2 Alternative 2 – Log Toe Stabilization

Impacts to cultural resources under Alternative 2 would be the same as those described for Alternative 1.

3.9.2.3 Alternative 3 – Living Shoreline (Preferred)

The Navy anticipates that implementation of Alternative 3 would not include cutting, grading, or earth moving within areas of known archaeological sites in Reaches D1, F, and G. Nonetheless, the Navy will prepare Archaeological Site Protection Requirements plans for Reaches D1, F, and G and submit them to MHT for review and concurrence when the design plans are available. Therefore, the Navy determined Alternative 3 would have No Adverse Effect on historic properties. With the provision of review and concurrence of the Archaeological Site Protection Requirements plans, MHT concurred with the No Adverse Effect finding in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*).

3.9.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. The shoreline would continue to erode under this alternative, which could lead to the deterioration of archaeological sites near the shoreline. Therefore, the No Action Alternative has the potential to adversely affect cultural resources listed in or eligible for listing in the NRHP.

3.10 HUMAN HEALTH AND SAFETY

3.10.1 Affected Environment

This section describes the human health and safety within the affected environment associated with construction workers as well as visitors, enlisted personnel and employees of NSA Annapolis, and recreational users of Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. Human health and safety can be adversely affected by physical injury or harm that can occur directly or indirectly from an activity associated with the proposed action or through exposure to solid or hazardous materials and wastes used, generated or encountered by activities associated with the proposed action. Improper storage, management, and disposal of hazardous materials and wastes can result in direct human exposure and/or indirect exposure via contamination of groundwater, drinking water supplies, soil, and surface water. Potential human health and safety concerns associated with the proposed action include:

- worker and public safety hazards from construction and development activities such as water and overhead hazards
- hazardous materials and waste that might be utilized, generated, or exist at the sites proposed for development
- unexploded ordnance (UXO)

3.10.1.1 Worker and Public Safety Hazards

With the Occupational Safety and Health Act of 1970, Congress created OSHA to assure safe and healthful working conditions for working men and women by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health. OSHA standards are listed in 29 CFR Part 1910.

General hazards to human health and safety found at the proposed construction sites include moderately traveled roadways, undeveloped areas with slip, trip and fall hazards, and water hazards. Existing hazards are minimized through the use of exclusionary measures such as fencing, signage, safety awareness discussions, and proper personal protection equipment.

3.10.1.2 Hazardous Materials/Hazardous Wastes

A hazardous substance, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. § 9601(14)), is defined as: "(a) any substance designated pursuant to Section 1321(b)(2)(A) of Title 33; (b) any element, compound, mixture, solution, or substance designated pursuant to Section 9602 of this title; (c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, (42 U.S.C. § 6921); (d) any toxic pollutant listed under Section 1317(a) of Title 33; (e) any hazardous air pollutant listed under Section 112 of the CAA (42 U.S.C. § 7412); and (f) any imminently hazardous chemical substance or mixture with respect to which the Administrator of the USEPA has

taken action pursuant to Section 2606 of Title 15. Hazardous materials are defined by 49 CFR § 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), 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 within 49 CFR Parts 105–180.

OSHA, in 29 CFR § 1910.1200, further defines a hazardous material as any item or chemical which is a "health hazard" or "physical hazard," including:

- Chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, and agents that damage the liver, kidneys, nervous system, blood cells, lungs, skin, eyes, or mucous membranes;

- Chemicals that are combustible liquids, compressed gases, explosives, flammable liquids, flammable solids, organic peroxides, oxidizers, pyrophorics, unstable (reactive) or water-reactive; and

- Chemicals that, in the course of normal handling, use or storage, may produce or release dusts, gases, fumes, vapors, mists or smoke which have any of the above characteristics.

RCRA defines a hazardous waste in 42 U.S.C. § 6903, 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."

CERCLA is the primary federal law addressing the problem of releases of hazardous substances into the environment. CERCLA requires the federal government and other responsible parties to clean up contamination from the release of hazardous substances.

Hazardous materials and wastes at NSA Annapolis are managed in accordance with the USNA and North Severn Integrated Contingency Plan (ICP). The ICP contains the facility Tank Management Plan, hazardous substance inventory, and Spill Prevention Control and Countermeasures Plan. The ICP identifies hazardous materials storage areas and response facilities and provides the procedures for all aspects of hazardous materials management and reporting including spill response and training. According to the ICP no oil storage tanks are located in the proposed project area and no large hazardous material spills have been recorded along the proposed project area. Three spills of 25 gallons or less were reported in the YP Boat Basin west of the westernmost extent of the proposed project area and were addressed immediately. As a result, these spills are not anticipated to have any effect on site conditions in the proposed project area. Petroleum storage tanks are located at several sites in the vicinity of the proposed project area, but are located at such a distance inland from the shoreline that they would not be affected by the proposed action or have any impact on site conditions within the proposed project area (USNA 2002).

Polychlorinated biphenyls (PCBs) are a group of chemical mixtures used as insulators in electrical equipment such as transformers and fluorescent light ballasts. Transformers and electrical equipment containing greater than 500 parts per million (ppm) PCBs, between 50 and 500 ppm PCBs, and less than 50 ppm PCB are considered PCB, PCB-contaminated, and non-PCB, respectively. PCB products with 0 to 49 ppm PCB are not subject to federal regulations and can be transferred, donated, sold, or otherwise

processed under CFR § 101-42.1102-2. There are no oil/water separator or electrical equipment and lighting containing PCBs or mercury documented in the proposed project area.

Asbestos is regulated by the USEPA with the authority promulgated under the Occupational Safety and Health Act, 29 U.S.C. §§ 669 *et seq*. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. The USEPA has established that any material containing more than 1 percent asbestos by weight is considered an asbestos containing material (ACM) (15 U.S.C. § 2642[4]) and must be handled in accordance with the procedures outlined in 40 CFR Part 61, Subpart M. No structures with the potential to contain ACM are known to occur within the proposed project area.

The three remaining telecommunication towers at Greenbury Point, currently maintained by Anne Arundel County, were determined to contain lead based paint (LBP). This area is managed under the Installation Restoration Program (IRP) and is discussed below. No other structures with the potential to contain LBP are documented within the proposed project area. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X) regulates the use and disposal of LBP on federal facilities. Federal agencies are required to comply with applicable federal, state, and local laws relating to LBP activities and hazards.

The NSA Annapolis WWTP is located along Carr Creek near Reach D1 (west side). The WWTP serves the North Severn Complex area and currently treats an average of 0.120 million GPD. The treatment plant provides secondary treatment, disinfection prior to discharging into Carr Creek (Ammerman and Maimone 2013). Originally built in 1946, with major parts added in the 1970s, the NSA Annapolis WWTP is failing, and repairs typically require specially fabricated parts due to obsolescence of existing design. NSA Annapolis plans to upgrade the WWTP to meet the concentration-based annual maximum loading limits specified in the NPDES operating permit (Permit # MD002523) (NAVFAC Washington 2012d). According to the USEPA Enforcement and Compliance History Online database, the WWTP had reportable violations of the CWA in 2011, 2012, and 2013, which appear to be attributed to non-receipt of reports. No formal or informal enforcement actions have been recorded for the WWTP in the last five years.

The DoD has developed the IRP to identify, characterize, and clean up past hazardous waste sites in response to CERCLA and RCRA. There is one known IRP site, Former Naval Radio Transmitting Facility, near the proposed project area. In conjunction with the decommissioning of the facility, the Navy evaluated environmental impacts from historical operations at the former Naval Radio Transmitting Facility. Limited sampling was conducted in 1996 to evaluate soil conditions beneath the current and former tower locations. It was determined that soils in the vicinity of the towers were contaminated with fine particulate LBP from historical maintenance activities including sandblasting and re-coating of the structures. From 1996 to 2001, the Navy conducted several investigative efforts to determine the extent of contamination within the footprints of the current and preexisting towers. In 2002, the Navy finalized an Engineering Evaluation and Cost Analysis that evaluated potential risks to human health and ecological receptors, and determined the costs of soil mitigation. Risks to ecological receptors were not identified; however, to release the property for unrestricted future use, soil removal was deemed necessary. Excavation of contaminated soil to meet removal action goals was completed in the first quarter of 2003. The site has been restored and re-seeded with grasses recommended by the USFWS. The post-removal action report was reviewed by the MDE, and it confirms the achievement of the Navy's objectives (MDE n.d.).

Although not identified as an IRP site, the berm at Greenbury Point, adjacent to Reach C, is a former dredge spoil lagoon that is believed to contain contaminants. The site is located on the west side of Greenbury Point peninsula, near Carr Creek and the mouth of the Severn River. The berm was constructed in the 1940s and the site was used as a primary soil repository for material generated during

the construction of the David Taylor Research basins and the dredging of Annapolis Harbor and Church Channels. In the late 1990s, the sediment behind the berm was reportedly sampled and approximately 14 tractor trailer loads of hazardous material were removed from the lagoon. It is unknown what contaminants were present in the material (NAVFAC Washington 2010).

In 2008, six additional sediment samples were collected from the berm area, composited into two samples, and submitted for chemical analysis for polycyclic aromatic hydrocarbons (PAHs), Priority Pollutant +40, Toxicity Characteristic Leaching Procedure, grain size, and total organic carbon. Analytical results were evaluated with respect to the USEPA Region III Freshwater Sediment Screening Benchmarks (BTAG). One composite sample yielded five metals above the BTAG: arsenic (23.1 milligrams per kilogram [mg/kg]), chromium (131 mg/kg), lead (64.1 mg/kg), mercury (0.35 mg/kg), and zinc (173 mg/kg). The remaining composite sample also exceeded BTAG for the same metals: arsenic (26.6 mg/kg), chromium (201 mg/kg), lead (73.4 mg/kg), mercury (0.29 mg/kg), and zinc (283 mg/kg). Nickel was also detected above the BTAG in the second composite sample at a concentration of 37.7 mg/kg. PAH concentrations in the second composite sample also exceeded the BTAG.

All leachate parameters for pesticides, herbicides, PAHs, and metals were below the laboratory reporting limits in both composite sediment samples. Therefore, the contaminant concentrations in the sediment are not considered hazardous (NAVFAC Washington 2010).

3.10.1.3 UXO

The Military Munitions Rule (MMR) under RCRA (40 CFR Part 266, Subpart M) was published as a final rule in 1997 and identifies when conventional and chemical military munitions become RCRA hazardous waste. Military munitions include, but are not limited to: confined gases, liquids, or solid propellants; explosives; pyrotechnics; chemical and riot agents; and smoke canisters (USEPA 2011). Under the MMR, wholly inert items and non-munitions training materials are not defined as military munitions (USEPA 1997).

Munitions-related training activities result in the presence of UXO, discarded military munitions, and munitions constituents. UXO, discarded military munitions, and munitions constituents all present potential explosive hazards and are collectively referred to as munitions and explosives of concern (MEC). The MMR defines handling requirements for munitions and explosives of concern.

Military munitions that are used for their “intended purposes” are not considered waste per the MMR (40 CFR § 266.202). In general, military munitions become subject to RCRA transportation, storage, and disposal requirements (i.e., judged not to have been used for their “intended purposes”) when:

- Transported off-range for storage
- Reclaimed and/or treated for disposal
- Buried or land filled on or off range
- Land off-range and are not immediately rendered safe or retrieved

According to the Installation Master Plan for NSA Annapolis, no issues regarding UXO/munitions were discovered or reported at the North Severn Complex (NAVFAC Washington 2012a). However, there is a potential for lead to be present in soils and sediment from expended rounds in areas that are within the SDZ of the small arms firing ranges. The SDZ extends over Carr Creek (includes Reaches D1, D2, and E), Greenbury Point (includes Reaches A, B, and C), and the Chesapeake Bay (refer to Figure 3.4-1).

3.10.2 Environmental Consequences

3.10.2.1 Alternative 1 – Hardened Structure/Revetment

Worker and Public Safety Hazards

To prevent unauthorized members of the public from entering the project site during construction, temporary fences would be installed landward around the perimeter of the construction site, and notification signs would be placed at all entrances and approaches to the site prior to the commencement of construction activity. In addition, construction workers would be clearly identifiable so as to prevent unauthorized persons from entering the site during construction. To minimize potentially significant safety hazards to construction workers and the public, a health and safety program would be implemented by the contractor to ensure construction workers are aware of the hazards associated with the project site and the safety measures that must be taken to prevent injury and hazardous conditions within and outside of the working environment. The program would identify and address safety issues such as site access, construction hazards, safe work practices, security, heavy equipment transportation, vehicle management, emergency procedures, unknown hazards, and fire control. The program would identify requirements for temporary fencing around staging areas, storage yards, and excavation areas, as well as measures to be taken after construction of the project is completed to limit public access to potential hazards (e.g., permanent fencing, signage, locked access).

Because unknown hazards may exist along the shoreline, most notably along the berm area adjacent to Reach C and within the USNA Outdoor Range Facilities SDZ that extend over Reaches A, B, C, D1, D2, and E, soils characterization would be conducted to identify or dismiss any potential hazards and to identify the appropriate level of personal protection equipment for working at the project sites. Additionally, a site-specific Health and Safety Plan would be prepared in compliance with the requirements of 29 CFR § 1926.65, Hazardous Waste Operations and Emergency Response, paragraph (b)(4) in the event that previously unknown environmental contamination is encountered. The site-specific Health and Safety Plan would identify the chain of command and notification procedures, identify potential safety concerns, describe procedures and site controls that would be implemented upon discovery, identify exposure prevention measures and personal protection equipment requirements, specify the locations of medical aid kits, and outline the appropriate response action for emergencies. Adherence to the health and safety program and site-specific Health and Safety Plan would ensure that the construction activities under Alternative 1 would have no significant impacts to human health and safety.

Hazardous Materials/Hazardous Wastes

Construction activities would require the use of hazardous materials. The majority of the hazardous materials expected to be used are common to construction and include diesel fuel, gasoline, and propane to fuel the construction equipment; hydraulic fluids, oils, and lubricants; and batteries. The transport and use of hazardous materials would have the potential to result in accidental spills that could adversely impact soil, surface water, and groundwater on and adjacent to the construction sites or along transportation routes. Hazardous materials associated with construction activities would be delivered and stored in a manner that would prevent these materials from leaking, spilling, and potentially polluting soils, groundwater, and surface waters, and in accordance with applicable federal, state, and local environmental and public and occupational health and safety regulations. Adherence to the policies and procedures contained in the ICP would minimize the potential impacts from accidental releases during shoreline repair and restoration. As a result, impacts to human health and safety from hazardous materials would be less than significant under Alternative 1.

Hazardous waste would be generated during construction activities and would include but not be limited to empty containers, spent solvents, waste oil, spill cleanup materials (if used), and lead-acid batteries

from construction equipment. Construction contractors would be responsible for safely removing these construction-generated wastes from the construction site and for arranging for recycling or disposal in accordance with applicable regulations. The total monthly generation of hazardous waste during construction is anticipated to be less than 100 kilograms. The construction contractor would be responsible for determining their regulatory status regarding hazardous waste generation during construction, and obtaining and maintaining compliance in accordance with federal and state laws. Hazardous wastes associated with construction activities would be handled and stored in a manner that would minimize human exposure to these materials and prevent these materials from polluting soils, groundwater, and surface waters and in accordance with the ICP and applicable federal, state, and local environmental and human health and safety regulations. Adherence to these policies, procedures, and regulations would minimize the potential impacts from exposure and accidental releases during revetment construction. In the event of an accidental release, contaminated media would be treated on-site or would be promptly removed and disposed of in accordance with the ICP and applicable federal and state regulations. With the implementation of appropriate handling and management procedures, hazardous wastes generated during shoreline repair and restoration would result in no significant impacts to human health and safety.

No enforceable violations have occurred at the NSA Annapolis WWTP. The shoreline repair and restoration would be conducted so as to have no or minimal disruption to facility operations. Therefore, shoreline repair and restoration in the area of the WWTP outfall would have no significant impacts on human health and safety.

The remediation of the IRP site associated with the former Naval Radio Transmitting Facility has been completed and no human health risks are present. Therefore, shoreline repair and restoration in this area would have no significant impacts on human health and safety.

Prior to any soil disturbing activities within the berm area at Greenbury Point along Reach C, soil/sediment characterization would be conducted to evaluate soil/sediment quality in order to protect human health and the environment. Additionally, measures would be implemented to protect the Severn River from receiving sediments from within the lagoon during shoreline repair and restoration. As a result, impacts to human health and safety from Alternative 1 would not be significant.

The remaining shoreline areas are not anticipated to contain contaminants. However, if suspected hazardous material (i.e., contaminated soil, ACM, PCBs) is encountered during construction, it would be the responsibility of the construction contractor, supervised by the Navy, to determine whether the material meets the criteria of hazardous waste. Work would cease upon discovery of the suspect material and the USNA Fire Station and the USNA Environmental Office would be notified, as appropriate (USNA 2002). Once the suspected hazardous material is properly characterized, the Navy and construction contractors would manage the waste in accordance with applicable federal and state laws and regulations. Compliance with applicable federal and state laws and regulations would ensure that no significant impacts to human health and safety would occur.

<u>UXO</u>

According to the Installation Master Plan for NSA Annapolis, no issues regarding UXO/munitions were discovered or reported at the North Severn Complex. Therefore, Alternative 1 would have no significant impacts on UXO.

Prior to any soil disturbing activities within the SDZ of the small arms firing ranges, soil/sediment characterization would be conducted to evaluate soil/sediment quality (e.g., lead) in order to protect

human health and the environment. As a result, impacts to human health and safety from Alternative 1 would not be significant.

3.10.2.2 Alternative 2 – Log Toe Stabilization

Impacts to human health and safety under Alternative 2 would generally be similar to those described under Alternative 1.

The two sediment samples collected to characterize sediment quality within the lagoon indicate concentrations of several metals and PAHs are present in excess of the BTAG (NAVFAC Washington 2010). However, installation of the sheet piles along Reach C would result in a beneficial impact to human health and the safety by preventing release of contaminants into the Severn River.

3.10.2.3 Alternative 3 – Living Shoreline (Preferred)

Impacts to human health and safety under Alternative 3 would generally be the similar to those described under Alternative 2.

3.10.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex land and facilities would decrease. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist. The release of contaminated sediments would have adverse impacts on human health and the environment.

3.11 SOCIOECONOMIC RESOURCES

3.11.1 Affected Environment

The ROI for socioeconomic resources includes the City of Annapolis. The City of Annapolis is part of the Baltimore-Columbia-Towson, MD Metropolitan Statistical Area, which in turn is part of the Washington-Baltimore-Arlington, DC-MD-VA-WV-PA Combined Statistical Area. Metropolitan Statistical Areas have at least one urbanized core area of 50,000 or more population, plus adjacent areas that have a high degree of social and economic integration with the core as measured by commuting ties. Combined Statistical Areas represent larger geographic regions that reflect broader social and economic interactions, such as wholesaling, commodity distribution, and weekend recreational activities (Office of Management and Budget 2013).

The 2013 Annapolis population was 38,722, up 0.9 percent from 2010 (Table 3.11-1). The city's population grew by 7.1 percent between 2000 and 2010. The 2013 population estimate for Anne Arundel County was 555,743, up 3.4 percent from 2010. The county's population grew by 9.8 percent from 2000 to 2010. The comparable rates for the state are 2.7 percent growth from 2010 to 2013 and 9.0 percent growth between 2000 and 2010 (U.S. Census Bureau 2014a). Annapolis has been growing slower than Anne Arundel County and the state of Maryland.

Table 3.11-1. Population Characteristics

	Annapolis	Anne Arundel County	Maryland
Population			
2013	38,722	555,743	5,928,814
2010	38,394	537,656	5,773,552
2000	35,838	489,656	5,296,486
Race and Ethnicity (percent), 2013[1]			
White	60.1	76.5	60.5
Black/African American	26.0	16.4	30.1
American Indian/ Alaska Native	0.3	0.4	0.6
Asian	2.1	3.7	6.1
Native Hawaiian/ Other Pacific Islander	-	0.1	0.1
Hispanic or Latino origin[2]	16.8	6.9	9.0

Source: U.S. Census Bureau 2014a.
Notes: [1]One race. Data presented reflects most reported race and ethnicity categories; percentages may not add to 100% due to rounding. Annapolis race and ethnicity data are from 2010.
[2]Hispanic origin may be of any race.

The Annapolis population is predominantly white (60 percent), with Black/African Americans making up the largest minority group (26 percent) (Table 3.11-1). Asians make up the next largest minority group (2 percent). American Indians/Alaska Natives and Native Hawaiians/Other Pacific Islanders both comprise less than 1 percent of the population. Hispanics and Latinos (who may be of any race) make up approximately 17 percent of the population (U.S. Census Bureau 2014a). The racial make-up of Annapolis is more diverse than Anne Arundel County and similar to the state of Maryland. Culturally, Annapolis has a greater percentage of Hispanics or Latinos than Anne Arundel County and the state.

The Annapolis total labor force is approximately 22,700 (U.S. Census Bureau 2014b). The industries employing the most civilian workers include educational services and health care (20.4 percent); professional, scientific, and management services (17.8 percent); public administration (12.1 percent); retail trade (9.1 percent); and construction (6.2 percent) (U.S. Census Bureau 2014b).

As shown in Table 3.11-2, the 2013 seasonally unadjusted unemployment rate for Annapolis was 5.6 percent, down from 6.0 percent in 2012 (Maryland Department of Labor, Licensing and Regulation 2014). The 2013 Anne Arundel County unemployment rate was 6.0 percent, down from 6.1 percent in 2012. The comparable rates for the state of Maryland were 6.6 percent in 2013 and 6.9 percent in 2012 (Maryland State Archives 2014). Both Annapolis and Anne Arundel County have lower rates than the state.

Per capita income in the City of Annapolis is approximately $43,153 and the mean family income is $119,562 (Table 3.11-2). The Anne Arundel County per capita income is $40,323, and the mean family income is $121,094. Per capita income in Maryland is approximately $36,056, and the mean family income is $110,686 (U.S. Census Bureau 2014b). The percentage of families and people whose income in the previous 12 months was below the poverty level is 8.1 percent and 10.9 percent, respectively, in Annapolis. In Anne Arundel County, it is 4.0 percent and 5.9 percent, respectively. The comparable rates for the state of Maryland are 6.5 percent and 9.4 percent (U.S. Census Bureau 2014b). While the City of Annapolis has a higher per capita income than Anne Arundel County and the state, it also has a greater percentage of families and individuals living below the poverty level.

Table 3.11-2. Economic Characteristics

	Annapolis	Anne Arundel County	Maryland
Unemployment Rates[1]			
2013	5.6%	6.0%	6.6%
2012	6.0%	6.1%	6.9%
Income[2]			
Per Capita	$43,153	$40,323	$36,056
Mean Family	$119,562	$121,094	$110,686
Families Below Poverty Level	8.1%	4.0%	6.5%
Individuals Below Poverty Level	10.9%	5.9%	9.4%

Sources: Maryland Department of Labor, Licensing and Regulation 2014, Maryland State Archives 2014, U.S. Census Bureau 2014b.
Notes: [1]Not seasonally adjusted.
[2]2008-2012 American Community Survey 5-year estimates.

NSA Annapolis employs approximately 4,373 military and civilian personnel, including approximately 600 USNA faculty. Approximately 4,000 Midshipmen attend the USNA (NAVFAC Washington 2012a). A 2010 study determined that NSA Annapolis generated a total of $677.5 million in economic activity in Maryland and created or supported 8,886 jobs with an estimated $348.6 million in employee compensation (Maryland Department of Business and Economic Development 2010).

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Environmental Justice), was issued in 1994. It stipulates that each federal agency is to make achieving environmental justice a part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. DoD's Strategy on Environmental Justice (DoD 1995) also established actions for addressing environmental justice in NEPA documents. A minority population is defined as either: 1) the minority population of the affected area exceeds 50 percent, or 2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the appropriate community of comparison. Low-income populations are identified where a meaningfully greater portion of the population is living below the poverty level threshold as compared to the appropriate community of comparison (CEQ 1997). Tables 3.11-1 and 3.11-2 present census data on minority and low-income populations.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (Protection of Children) was issued in 1997 requiring federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children. It also requires that each federal agency is to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Table 3.11-3 presents census data on the population less than the age of 18 in the City of Annapolis, Anne Arundel County, and Maryland.

Table 3.11-3. Percent of Population under the Age of 18, 2010

Jurisdiction	< Age 18
Annapolis	8,000
Anne Arundel County	125,061
Maryland	1,352,964

Source: U.S. Census Bureau 2014a.

3.11.2 Environmental Consequences

Project construction is anticipated to begin in late 2015 and would be phased over five years. Potential socioeconomic impacts of the proposed action would include spending within the region directly or indirectly related to the repair and restoration of the North Severn Complex shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. There would be no change to NSA Annapolis personnel as a result of the proposed action.

3.11.2.1 Alternative 1 – Hardened Structure/Revetment

Under Alternative 1, the increase in construction spending would generate direct construction jobs in the region. Given the total dollar amount and the construction timeframe, additional construction workers may move into the area in response to the direct job impacts in construction. Construction spending would also generate additional indirect jobs and income, benefitting the economy. It would be expected that most of the indirect jobs, such as in retail, accommodation, food, and transportation services, would be filled by unemployed workers in the region. While there may be some population in-migration to the region as a result of construction spending, it would not be expected to significantly affect short- or long-term population trends. Overall, construction spending would result in short-term beneficial socioeconomic impacts in the City of Annapolis.

There are no low income or minority populations in the area that would be affected. Therefore, Alternative 1 would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to the community of comparison, the City of Annapolis. Although children may reside in family housing areas at USNA, children would not be permitted access to any of the proposed construction areas. Therefore, Alternative 1 would not have disproportionate environmental health and safety risks to children.

3.11.2.2 Alternative 2 – Log Toe Stabilization

The socioeconomic impacts of Alternative 2 would generally be the same as described for Alternative 1 because construction spending would result in short-term beneficial impacts to socioeconomics.

Alternative 2 would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to the community of comparison, the City of Annapolis. Alternative 2 would not have disproportionate environmental health and safety risks to children.

3.11.2.3 Alternative 3 – Living Shoreline (Preferred)

The socioeconomic impacts of Alternative 3 would generally be the same as described for Alternative 1 because construction spending would result in short-term beneficial impacts to socioeconomics.

Alternative 3 would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations compared to the community of comparison, the City of Annapolis. Alternative 3 would not have disproportionate environmental health and safety risks to children.

3.11.2.4 No Action Alternative

Under the No Action Alternative, the repair and restoration of the North Severn Complex shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Therefore, implementation of the No Action Alternative would have no impacts to socioeconomics.

4.0 CUMULATIVE IMPACTS

According to CEQ regulations, the analysis of cumulative impacts in an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. A cumulative impact results from the additive effect of all projects in the same geographical area. Generally, an impact can be considered cumulative if: a) effects of several actions occur in the same locale, b) effects on a particular resource are the same in nature, and c) effects are long term in nature. The common factor key to cumulative assessment is identifying any potential temporally and/or spatially overlapping or successive effects that may significantly affect resources in the analysis areas.

To analyze cumulative impacts, a NEPA document must identify a cumulative impacts region for impacts of a proposed action and other past, present, and reasonably foreseeable future actions. In this EA, the Navy has identified all actions within and adjacent to the North Severn Complex. A description of past, present, and reasonably foreseeable future actions in the cumulative effects region follows. To the extent that details regarding such actions exist and the actions have a potential to interact with the proposed action described in this EA, these actions are included in the cumulative impact analysis.

4.1 PAST, PRESENT AND REASONABLY FORESEEABLE FUTURE ACTIONS

This section identifies past, present, and reasonably foreseeable future actions not related to the proposed action that have the potential to cumulatively impact the resources in the affected environment for the North Severn Complex. An overview of these actions is presented to emphasize components of the activities that are relevant to the cumulative impact analysis. Geographic distribution, duration, and intensity of similar activities were considered when determining whether a particular activity may contribute cumulatively and significantly to the impacts of the proposed action on the resources identified in the EA. Table 4.1-1 summarizes which past, present, and reasonably foreseeable future projects have the potential for cumulative impacts to the resources affected by the proposed action.

Table 4.1-1. Summary of Projects and Resources for Cumulative Impacts Analysis

Project	Geology, Topography, and Soils	Water Resources	Biological Resources	Land Use	Air Quality	Noise	Transportation	Infrastructure and Utilities	Cultural Resources	Human Health and Safety	Socioeconomic Resources
Past and Present Actions											
WWTP Upgrades (fiscal year [FY] 2015)	X	X	X		X			X		X	
Navy Exchange, Commissary, Health Clinic (FY2014–2015)	X	X	X		X	X	X	X		X	X
Rifle Range Repairs (ongoing–FY2015)	X				X	X	X			X	
IRP Site 1 Remediation (ongoing–FY2016)	X	X			X	X	X	X		X	
Reasonably Foreseeable Future Actions											
Golf Cart Shed (FY2015)	X	X	X		X	X	X	X			
Greenbury Point Telescope (FY2015)	X	X	X		X	X	X	X			
Building 46NS Renovation (FY2015–FY2016)					X	X	X	X		X	
NEX/Commissary Reuse (FY2015–FY2016)					X	X	X	X		X	

WWTP Upgrades (FY2015). The Navy prepared an EA to evaluate the potential environmental impacts of upgrading the NSA Annapolis North Severn WWTP to comply with current and future regulatory requirements and meet future treatment demand. The Preferred Alternative for the proposed action consisted of new construction, demolition, and conversion projects at the North Severn WWTP, and installation of a water reuse conservation system (NAVFAC Washington 2012d).

Navy Exchange (NEX) (FY 2014), Commissary, Health Clinic (FY2015). An EA was prepared by the Navy to assess the potential environmental impacts of constructing and operating four new facilities a new NEX and Commissary and a new health clinic at the North Severn of NSA Annapolis. Located adjacent to Kinkaid and Greenbury Point Roads, the new facilities includes a one-story building with an 88,000 SF NEX, and a 51,500 SF Commissary, a three-story 105,500 SF Health Clinic (two stories and a basement story wholly belowground), and a supporting 550-space parking area. The NEX and Commissary replace the existing facilities at North Severn; the existing NEX and Commissary buildings and their associated parking would be reused. The new Health Clinic at North Severn replaces the existing Health Clinic located at the USNA (NAVFAC Washington 2011b). The NEX/Commissary is currently open, and construction of the Health Clinic is expected to be completed in 2015.

Rifle Range Repairs (Ongoing–FY2015). This project consists of a number of improvements to the rifle range at the North Severn Complex. It includes constructing and/or repairing a canopy to cover the 25 yards between the firing line and the target line, a steel and rubber bullet trap at the target line, and a masonry side containment wall; reshaping the existing earth berm; and providing a sloped wooden baffle to connect to the top of the berm.

IRP Site 1 Remediation (Ongoing–FY2016). This project involves performing remediation work on IRP Site 1, a former refuse disposal site located west of the existing NEX/Commissary. The remediation work has included treating contaminated soil and groundwater (NAVFAC Engineering Service Center 2008). An engineered cap will be constructed on top of landfill waste that will remain in place.

Golf Cart Shed (FY2015). The Navy proposes constructing a 5,000 SF golf cart shed west of the Brigade Sports Complex, which is located on Greenbury Point Road.

Greenbury Point Telescope (FY2015). This project consists of installing a telescope on Greenbury Point south of the Brigade Sports Complex until the telescope can be relocated and installed on the new Center for Cyber Security Studies building at the USNA in 2018. The installation includes building a 20-foot-square concrete pad and anchoring the telescope to it. A chain-link fence may also be installed for security purposes.

Building 46NS Renovation (FY2015–FY2016). This project involves interior renovation of the barracks in Building 46NS.

NEX/Commissary Reuse (FY2015–FY2016). This project consists of interior renovations to the existing NEX and Commissary (Building 321NS) for a new use (the new use is yet to be determined).

4.2 POTENTIAL CUMULATIVE IMPACTS BY ENVIRONMENTAL RESOURCE AREA

Where feasible, the cumulative impacts were assessed using quantifiable data; however, for many of the resources included for analysis, quantifiable data is not available and a qualitative analysis was undertaken. The analytical methodology presented in Chapter 3, which was used to determine potential impacts to the various resources analyzed in the EA, was also used to determine cumulative impacts.

4.2.1 Geology, Topography, and Soils

The ROI for geology, topography, and soils cumulative impacts includes those areas that would be disturbed by proposed construction activities along and adjacent to the shoreline and associated downstream surface waters.

None of the cumulative projects identified in Table 4.1-1 would have impacts to geological resources. In addition, none of the cumulative projects would impact the same topographical area as the proposed action. Therefore, the cumulative impact analysis only assesses the potential cumulative impact to soils.

The projects identified in Table 4.1-1 that have the potential to contribute to cumulative impacts to soils include the WWTP Upgrades, NEX, Commissary, and Health Clinic, Rifle Range Repairs, IRP Site 1 Remediation, Golf Cart Shed, and Greenbury Point Telescope. All of these projects except for the IRP Site 1 Remediation would result in minor short-term temporary impacts to soils as a result of construction activities, and minor long-term impacts due to compaction from grading. A SESCP has been or would be developed for each project in accordance with state and local regulations and the potential impacts would be managed through the use of appropriate BMPs for each site.

Ongoing remediation work of IRP Site 1 has improved the soil quality at the site (NAVFAC Engineering Service Center 2008), resulting in a beneficial impact to soils.

The proposed action would result in minor, temporary impacts to soils as a result of construction activities such as clearing, grading, and compaction. In addition, adverse impacts to soil productivity would be expected in areas where revetments are constructed. Alternatives 2 and 3 would result in minor impacts to the soils along the shoreline toe of slope of reaches where log toe stabilization or living shoreline restoration would be employed. It is anticipated that these impacts would be managed through the use of appropriate BMPs to prevent erosion and sedimentation during construction, and through post-construction soils restoration of disturbed areas.

The proposed action would result in long-term beneficial impacts after completion of construction, as shoreline soils would be protected from future erosion. Implementation of Alternative 3 would provide added beneficial impacts from stabilized soil where marsh terraces are created.

When combined with past, present, and reasonably foreseeable future projects, implementation of Alternative 1, 2, or 3 would not result in significant impacts to soils.

4.2.2 Water Resources

The ROI for water resources cumulative impacts includes those areas that would be disturbed by proposed construction activities along and adjacent to the shoreline, as well as associated downstream surface waters. Of the projects identified in Table 4.1-1, the WWTP Upgrades, NEX, Commissary, and Health Clinic, IRP Site 1 Remediation, Golf Cart Shed, and Greenbury Point Telescope would have potential cumulative water resources impacts.

The WWTP Upgrades could have negligible short-term impacts on surface water as a result of stormwater runoff during construction; the impacts would be minimized through implementation of BMPs and a construction stormwater management plan. The project would result in positive effects to stormwater management as the upgrades to the WWTP system include above- and belowground storage tanks that result in a decrease in impervious surface in the project area. The system upgrades also would result in long-term positive effects to water quality and groundwater. The project would have no impacts to floodplains or wetlands, and would be consistent with Maryland's CZMP.

The NEX, Commissary, and Health Clinic Project would result in a net increase of 13 acres of impervious surface as well as potential impacts to surface and groundwater associated with stormwater runoff. The increase in impervious surface and any increases in overland runoff would be addressed through the development and implementation of a stormwater management plan for site design. Erosion, runoff, and sedimentation would be addressed through the implementation of BMPs during construction. The project would have no impacts to floodplains or wetlands, and would be consistent with Maryland's CZMP.

Remediation of IRP Site 1 has included treating contaminated groundwater at the site; none of the groundwater aquifers are used for domestic water supply within a 1-mile radius of the site (NAVFAC Engineering Service Center 2008). The remediation work has considerably improved groundwater quality at this site. The project has no impact on floodplains or wetlands.

It is anticipated that impacts to surface waters during construction of the Golf Cart Shed and the concrete pad for the Greenbury Point Telescope would be minor and short-term. Impacts would be minimized through implementation of BMPs. Both projects would not impact floodplains or wetlands.

Construction of the proposed action would result in short-term minor impacts to surface and groundwater associated with erosion, runoff, and sedimentation. The impacts would be addressed through development and implementation of a SESCP and implementation of BMPs. The proposed action would result in long-term beneficial impacts to water quality by reducing the amount of sediments entering the watershed and preventing future contamination from the dredge spoil lagoon. Under any of the action alternatives, the proposed action would have impacts to the floodplain, which would be minimized through compliance with EOs and DoD policies. Adverse impacts to wetlands during construction would be minimized and avoided through compliance with permit requirements and BMPs. Under Alternative 3, wetlands impacted by the installation of the living shoreline would be replaced with new marsh and wetland habitat behind the stabilizing structures. Specific impacts to the coastal zone and mitigation measures would be determined during the design stage.

The proposed action, when analyzed in conjunction with past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts to water resources. Construction activities related to these projects at the North Severn Complex could potentially contribute to short-term adverse impacts to water quality. However, it is expected that the major construction activities would adhere to a SESCP and all projects would implement BMPs. No impacts to floodplains or wetlands would occur from the past, present, and reasonably foreseeable future projects. Therefore, the proposed action would not result in cumulative impacts to floodplains or wetlands.

4.2.3 Biological Resources

The ROI for biological resources cumulative impacts includes the North Severn Complex and contiguous land and tidal waters. The WWTP Upgrades, NEX, Commissary, and Health Clinic, Golf Cart Shed, and Greenbury Point Telescope have the potential to cumulatively impact biological resources. These projects generate noise during construction and operations. Construction-related noise has the potential to temporarily disturb wildlife in the immediate vicinity of the project areas. No impacts to state- or federally listed rare, threatened, or endangered species are anticipated.

The WWTP Upgrades include selective clearing of one noncontiguous acre of vegetation. Characterized as forest edge vegetation, it had been disturbed by development within the past couple of decades, so the adverse impact was negligible.

Upon completion of construction, the NEX, Commissary, and Health Clinic would result in a minor impact to vegetation and wildlife from the conversion of 13 acres of lawn and landscape trees into impervious surface.

Construction of the Golf Cart Shed and the concrete pad for the Greenbury Point Telescope would each likely include selective clearing of less than 0.2 acre of vegetation. Both these projects would result in negligible impacts to vegetation and wildlife habitat.

The construction activities associated with the proposed action under any of the action alternatives would result in impacts to terrestrial vegetation and submerged aquatic vegetation. Under the proposed action alternatives, temporary impacts to vegetation and EFH would be minimized through BMPs and compliance with applicable regulations and permit requirements. In the long-term, the impacts from implementation of the proposed action would be beneficial by creating a stable environment for vegetation along the shoreline. The proposed action alternatives would result in short-term, localized impacts to wildlife during construction activities. However, long-term beneficial impacts to wildlife would occur following completion of repair and restoration activities through re-vegetation of damaged areas, the stabilization of the shoreline environment, and the improvement to water quality. No adverse impacts to federally-listed species are anticipated under the proposed action.

When combined with past, present, and reasonably foreseeable future projects, the proposed action is anticipated to have cumulative impacts to vegetation and wildlife habitat that are expected to be less than significant through the implementation of BMPs to decrease erosion and sedimentation. Post-construction monitoring would occur to control invasive species spread and introduction. In the long term, completion of the shoreline repair and restoration would have positive effects on vegetation. Additionally, construction-related noise is anticipated to be short term. Therefore, no significant cumulative impacts to wildlife species as a result of construction noise would occur.

4.2.4 Land Use

The ROI for land use cumulative impacts includes the North Severn Complex. The projects listed in Table 4.1-1 would not impact land use on the installation.

The proposed action, under all three action alternatives, would be consistent with existing land use on the installation and with the State of Maryland's enforceable policies. Temporary impacts to land use would occur during construction of any of the action alternatives.

When past, present, and reasonably foreseeable future projects are analyzed together with the proposed action, significant cumulative impacts to land use from the implementation of Alternative 1, 2, or 3 would not occur.

4.2.5 Air Quality

The ROI for air quality cumulative impacts is Anne Arundel County, within the Metropolitan Baltimore Intrastate AQCR, which is classified nonattainment for the 8-hour ozone and the annual PM2.5. All the projects identified in Table 4.1-1 would likely contribute to short-term and temporary air quality impacts during construction. Based on the nature of the projects, it is anticipated that minor, short-term emissions associated with construction equipment and fugitive dust would occur. No new sources of long-term emissions would be created, and short-term emissions would not exceed de minimis levels.

Air emissions calculated for the proposed action showed that the construction of any of the repair and restoration alternatives would result in a minor increase in air emissions. The short-term and long-term impacts would be well below *de minimis* levels.

When past, present, and reasonably foreseeable future projects are analyzed together with the proposed action, there would be no significant cumulative impacts to Anne Arundel County or regional air quality from implementation of Alternative 1, 2, or 3.

4.2.6 Noise

The ROI for noise cumulative impacts includes the land, population, and underwater acoustic environment in the vicinity of the North Severn Complex. None of the projects identified in Table 4.1-1 have the potential for long-term noise impacts within the project area for airborne or underwater noise cumulative impacts. Activities associated with the construction activities for the NEX, Commissary, and Health Clinic, Rifle Range Repairs, the remediation work for IRP Site 1, and the construction activities for the Golf Cart Shed, Greenbury Point Telescope, Building 46NS Renovation, and NEX/Commissary Reuse would result in short-term noise impacts that are anticipated to occur over intermittent periods between FY2014 and FY2016.

Construction of the proposed action would occur in phases over a five-year period beginning in late 2015. Operation of construction equipment and construction activities such as grading, backfilling, and placing riprap would result in minor short-term noise impacts. In addition, significant short-term impacts to noise receptors located within the vicinity of the construction site would occur during pile driving activities. Noise attenuation measures would be implemented to minimize the noise impacts from pile driving.

Current and proposed construction projects at the North Severn Complex could contribute cumulatively to the potential noise impacts associated with the proposed action. However, construction-related noise impacts generated from the projects would be short in duration. The potential for the construction-related noise to overlap both in time and geographic extent of impact is remote. When past, present, and reasonably foreseeable future projects are analyzed together with the proposed action, significant cumulative impacts to the airborne and underwater acoustic environments from the implementation of Alternative 1, 2, or 3 would not occur.

4.2.7 Transportation

The ROI for transportation cumulative impacts includes the roadways within and surrounding the North Severn Complex. The NEX, Commissary, and Health Clinic, Rifle Range Repairs, IRP Site 1 Remediation, Golf Cart Shed, Greenbury Point Telescope, Building 46NS Renovation, and NEX/Commissary Reuse have the potential for cumulative impacts to landside transportation. Minor temporary impacts would be expected due to construction vehicles and road closures; however, these impacts would not contribute to permanent increases in transportation. The tenant command and patrons of the NEX and Commissary will relocate from the existing buildings to the new buildings, resulting in minor changes in traffic patterns. Similarly, new occupants and patients of the new Health Clinic may be likely to create new traffic patterns. The reuse of the existing NEX/Commissary also has the potential to contribute to new traffic patterns. None of these projects would impact waterside transportation.

Under the proposed action, it is anticipated that construction traffic would result in temporary, short-term impacts to landside transportation. The use of boat-mounted equipment or barges for construction staging would potentially reduce impacts to landside transportation, but would have a short-term, minor impact on recreation boat traffic. Coordinated scheduling and issuance of Notices to Mariners would minimize impacts to waterside transportation.

Proposed construction projects at the North Severn Complex could contribute cumulatively to the potential transportation impacts associated with the proposed action. However, impacts from construction-related traffic generated from the projects would be short in duration. When past, present, and reasonably foreseeable future projects are analyzed together with the proposed action, implementation of Alternative 1, 2, or 3 would not result in significant cumulative impacts to landside transportation, and would have no cumulative impact on waterside transportation.

4.2.8 Infrastructure and Utilities

The ROI for infrastructure and utilities cumulative impacts includes the North Severn Complex. Of the projects identified in Table 4.1-1, the WWTP Upgrades, the NEX, Commissary, and Health Clinic, IRP Site 1 Remediation, Golf Cart Shed, Greenbury Point Telescope, Building 46NS Renovation, and NEX/Commissary Reuse would affect infrastructure and utilities.

Under the WWTP Upgrades project, the plant would continue to operate during construction, so there would be no reduction in capacity for the duration of the project. Operation of the WWTP after completion of the upgrades would not increase the demand on the water supply, electricity, natural gas, or telecommunications systems.

Operations of the NEX, Commissary, and Health Clinic would result in a minor increase in demand on the water supply, electricity, natural gas, telecommunications systems, and wastewater conveyance. It is anticipated the increased demand would be provided without major upgrades to existing utility systems. The project design incorporates stormwater management features to maintain current outflows for most of the site.

Construction and operation of the Golf Cart Shed would result in a negligible increase in demand on electricity and water supply.

Operation of the Greenbury Point Telescope would result in a minor increase in demand on electricity and telecommunications systems.

Construction work associated with the Building 46NS Renovation and interior renovation of the existing NEX/Commissary is anticipated to result in a minor increase in demand for on-site utilities. Operation of Building 46NS after completion of the renovation is not expected to increase the demand on water supply, electricity, natural gas, telecommunications systems, wastewater conveyance, or solid waste disposal. The reuse of the NEX/Commissary is unknown at this time; therefore, sufficient details on potential impacts to infrastructure and utilities after completion of the renovation are not available.

During construction of any of the proposed action alternatives, there would be a negligible increase in demand for water supply, electrical supply, natural gas, and solid waste disposal. Capacity exists within each of the current systems to meet the demands without major upgrades. Implementation of the proposed action would have a beneficial impact to perimeter roads that are being threatened by eroding shorelines.

Implementation of Alternative 1, 2, or 3, when combined with past, present, and reasonably foreseeable future projects, would not result in significant cumulative impacts to infrastructure and utilities.

4.2.9 Cultural Resources

The ROI for cultural resources cumulative impacts includes the North Severn Complex and adjacent areas with water-related views of the shoreline. Of the projects identified in Table 4.1-1, only the Golf Cart Shed project has the potential to contribute to cultural resources impacts. Construction associated with the

golf cart shed has the potential to affect archaeological resources. This project is in the early planning stages at this time; therefore, sufficient details on impacts are not yet available.

Under the proposed action, the Navy would prepare Archaeological Site Protection Requirements plans to protect archaeological sites in Reaches D1, F, and G from impacts during construction activities. The plans would be submitted to MHT for review and concurrence before beginning construction. With the provision of the Archaeological Site Protection Requirements plans, there would be No Adverse Effect to NRHP-listed archaeological resources. MHT concurred with the finding of No Adverse Effect in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*)

When combined with past, present, and reasonably foreseeable future projects, implementation of Alternative 1, 2, or 3 would not result in significant cumulative impacts to cultural resources.

4.2.10 Human Health and Safety

The ROI for human health and safety cumulative impacts includes the North Severn Complex and adjacent waterways. Of the projects identified in Table 4.1-1, the WWTP Upgrades, NEX, Commissary, and Health Clinic, Rifle Range Repairs, IRP Site 1 Remediation, Building 46NS Renovation, and NEX/Commissary Reuse have the potential to have impacts to human health and safety.

The NEX, Commissary, and Health Clinic, Rifle Range Repairs, IRP Site 1 Remediation, Building 46NS Renovation, and NEX/Commissary Reuse projects have the potential to use or disturb hazardous materials or toxic substances during construction or remediation; however, impacts would be avoided by following all applicable federal and state regulations. Likewise, potential impacts from transport and disposal of other hazardous waste would be avoided by following all applicable guidance and regulations. All the projects would manage worker and public safety under existing programs during construction.

The IRP Site 1 Remediation has involved treating contaminated media (i.e., soil and groundwater). The remediation work follows all applicable federal and state regulations and guidelines concerning the handling, treatment, and disposal of contaminated media. The project outcome would result in a beneficial impact to human health through reduction of any potential hazards in the environment.

The WWTP Upgrades, Building 46NS Renovation, and NEX/Commissary Reuse would result in beneficial impacts associated with toxic substances (LBP, ACM, PCBs). The renovation of these existing buildings at the North Severn Complex would permanently remove these substances from the installation.

Under the proposed action, the potential impacts from the use of hazardous materials and transport and disposal of hazardous waste for construction activities would be avoided by following all applicable federal, state, and local regulations, and adhering to the policies and procedures of the ICP. Soils characterization would be conducted prior to construction to identify or dismiss any potential hazards that may be present along the shoreline, particularly for those reaches that are within the SDZ of the USNA Outdoor Range Facilities. Soil/sediment characterization also would be conducted to evaluate soil/sediment quality along Reach C, which is adjacent to the former dredge spoil lagoon. Completion of construction of the sheet pile structure at the berm along Reach C would result in a beneficial impact to human health and the environment by preventing release of contaminants into the river.

When past, present, and reasonably foreseeable future projects are analyzed in conjunction with the proposed action, there would be cumulative beneficial impacts to hazardous materials and waste. Beneficial cumulative impacts would occur as a result of clean up procedures and/or appropriate disposal of hazardous materials and waste, which would permanently remove these hazardous materials from the North Severn Complex.

4.2.11 Socioeconomic Resources

The ROI for socioeconomics cumulative impacts includes the City of Annapolis. Of the projects listed in Table 4.1-1, only the NEX, Commissary, and Health Clinic would generate long-term socioeconomic effects. Temporary increases in local economic activity during construction of the NEX, Commissary, and Health Clinic may be additive with the construction spending under the proposed action. The proposed action may be expected to generate additional construction jobs. The NEX, Commissary, and Health Clinic project would result in increased employment opportunities and income from construction and additional jobs during construction and subsequent operations. Military and civilian personnel payrolls would increase and some of these earnings would be spent on consumer goods and services. These additive cumulative effects would be beneficial to the ROI.

When past, present, and reasonably foreseeable future projects are analyzed together with the proposed action, implementation of Alternative 1, 2, or 3 would result in beneficial short- and long-term cumulative socioeconomic impacts to the ROI. There would be no significant adverse cumulative impacts to socioeconomics.

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5.0 OTHER NEPA CONSIDERATIONS

5.1 CONSISTENCY AND COMPLIANCE WITH FEDERAL, STATE, AND LOCAL PLANS, POLICIES, AND REGULATIONS

The proposed action and alternatives have been assessed to determine their consistency and compliance with applicable environmental regulations and other plans, policies, and controls. This assessment indicates the proposed action and action alternatives would not conflict with the objectives of applicable plans, policies, and regulations. A summary of this compliance status is provided in Table 5.1-1.

Table 5.1-1. Summary of Applicable Environmental Regulations and Regulatory Compliance

Plans, Policies, and Controls	Regulatory Authority	Compliance Status	EA Section
NEPA (42 U.S.C. § 4341 *et seq*.) CEQ regulations implementing NEPA (40 CFR Parts 1500–1508) DoN procedures for implementing NEPA (32 CFR Part 775)	Navy	This EA has been prepared in accordance with NEPA, CEQ regulations implementing NEPA, and Navy NEPA procedures. Public participation and review were conducted in compliance with NEPA.	Entire EA
CWA (33 U.S.C. § 1251 *et seq*.) and Safe Drinking Water Act (42 U.S.C. § 300f *et seq*.)	USEPA, USACE, and MDE	Permits under CWA Sections 401 and 404 would be required. Erosion and stormwater runoff during construction of the project would be managed in accordance with an SESCP and stormwater management plan.	3.2
EO 11988, *Floodplain Management* (42 Federal Register 26951)	Federal Emergency Management Agency	Impacts to floodplains would occur, as much of the construction would likely occur within the floodplain. However, NSA Annapolis would comply with the DoD memorandum (February 11, 2014), EO 13653, and EO 11988 to minimize such impacts.	3.2
CZMA (16 U.S.C. § 1451 *et seq*.)	MDE	The Proposed Action was found to be consistent to the maximum extent practicable with the CZMA. In accordance with Section 307 of the CZMA, the Navy submitted the Coastal Consistency Determination for the proposed action to the MDE. On March 25, 2015, MDE concurred with the Navy's finding, specifically review finding "R1 Consistent with Qualifying Comments (MD20150112-0024)." (refer to Appendix B, *Agency Correspondence*).The specific impacts to the coastal zone and mitigation measures would be determined during the design stage.	3.2
ESA (16 U.S.C. § 1531 *et seq*.)	USFWS and MDNR	The Navy determined that the proposed action would not affect threatened or endangered species or designated critical habitat protected under the ESA. In a letter dated December 2, 2014, the MDNR, Wildlife Heritage Service, stated there are no State or Federal records of rare, threatened or endangered species within the boundaries of the project site as delineated. In a letter dated June 29, 2015, USFWS concurred with the Navy's plans to implement the preferred alternative (refer to Appendix B, *Agency Correspondence*).	3.3

Table 5.1-1. Summary of Applicable Environmental Regulations and Regulatory Compliance

Plans, Policies, and Controls	Regulatory Authority	Compliance Status	EA Section
MBTA (16 U.S.C. § 703 *et seq*.)		The proposed action would not significantly impact migratory birds.	3.3
CAA (42 U.S.C. § 7401 *et seq*.)	USEPA and MDE	The proposed action would not create a major regional source of air pollutants or affect the current attainment status at NSA Annapolis. Implementation of the proposed action would be in compliance with all applicable local and regional air agency rules and regulations. Pollutant emission resulting from propose repair and restoration activities are well below *de minimis* thresholds	3.5
Noise Control Act of 1972 and Quiet Communities Act of 1978	Navy	Due consideration to noise impacts presented in this EA ensured consistency with these Acts.	3.6
Control of Noise Pollution (Code of Maryland Regulations 26.02.03)	MDE	Due consideration to noise impacts presented in this EA ensured consistency with these regulations.	
NHPA, as amended (16 U.S.C. § 470 *et seq*.)	MHT	With the provision of the Archaeological Site Protection Requirements plans, there would be No Adverse Effect to NRHP-listed archaeological resources. MHT concurred with the finding of No Adverse Effect in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*)	3.9
Archaeological Resources Protection Act of 1979 (16 U.S.C. § 470 *et seq*.)*;* Final Uniform Regulations (32 CFR Part 229)	MHT	With the provision of the Archaeological Site Protection Requirements plans, there would be No Adverse Effect to NRHP-listed archaeological resources. MHT concurred with the finding of No Adverse Effect in its letter dated July 21, 2015 (refer to Appendix B, *Agency Correspondence*)	3.9
OSHA Standards (29 CFR Part 1910)	OSHA	A Health and Safety Program, including Site-specific Health and Safety Plans in the event unanticipated environmental hazards are discovered during construction, would be implemented by the construction contractors.	3.10
RCRA (42 U.S.C. § 6901 *et seq*.)	USEPA	The proposed action would not result in significant hazardous materials and wastes related impacts. Management protocols for hazardous substances would follow existing regulations and the installation's ICP policies and procedures for like materials.	3.10
CERCLA (42 U.S.C. § 9601 *et seq*.)	USEPA	The proposed action would not impact IRP sites.	3.10
EO 12898, *Environmental Justice* (59 Federal Register 7629)	Navy and USEPA	There are no low income or minority populations in the area that would be affected; therefore, the proposed action would not result in Environmental Justice concerns.	3.11
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 Federal Register 19883)	Navy and USEPA	The proposed action would not result in environmental human health risks or safety risks and would not disproportionately impact the health and safety of children.	3.11

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires that environmental analysis include identification of any irreversible or irretrievable commitments of resources that would be used if the proposed action is approved and implemented. The term "resources" (both renewable and nonrenewable) means the natural and cultural resources committed to, or lost by, the action, as well as labor, funds, and materials committed to the action.

The permanent use and subsequent loss of nonrenewable resources, such as oil, natural gas, and iron ore, are considered irreversible because nonrenewable resources cannot be replenished by natural means. An action that causes a loss in the value of an affected resource that cannot be restored (e.g., disturbance of an archaeological site) is considered an irretrievable commitment of resources. Similarly, the consumption of a renewable resource that would be lost for a period of time (e.g., wetlands) is also considered an irretrievable commitment of resources. Renewable natural resources include water, lumber, and soil, all of which can be replenished by natural means within a reasonable timeframe.

Implementation of any of the alternatives would involve irretrievable commitments of both nonrenewable and renewable resources. Fuel, construction materials, and labor would be expended during construction of facilities. However, commitment of these resources would not be significant. The total amount of construction materials required for the proposed action is relatively small when compared to the resources available in the region. The construction materials and energy required for repair and restoration of the 28,000 linear feet along the shoreline at the North Severn Complex are not in short supply. Moreover, the use of those construction materials would not have an adverse impact on the continued availability of region-wide usage.

5.3 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires analysis of the relationship between a project's short-term impacts on the environment and the effects those 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.

Potential short-term impacts resulting from repair and restoration of the 28,000 linear feet along the shoreline at the North Severn Complex would include temporary impacts to soils, water resources, biological resources, air quality, noise, and transportation and would occur during the construction phase, regardless of the alternative that may be implemented. Beneficial impacts would occur to the economy during the construction phase.

From a long-term perspective, the proposed action would have long-term beneficial impact to soils, water resources, biological resources, transportation, and infrastructure and utilities by reducing shoreline erosion, sedimentation, and nutrient loading and by reducing the potential safety risks from unstable bluffs along the shorelines. With the use of BMPs, and avoidance, minimization, and mitigation measures, none of the impacts associated with any of the alternatives for the proposed action would be significant.

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7.0 LIST OF PREPARERS

This EA was prepared for Naval Support Activity (NSA) Annapolis by Cardno under contract with Naval Facilities Engineering Command (NAVFAC) Washington. The primary Navy organizations and individuals who contributed to the preparation and review of this document include:

Naval Support Activity Annapolis
Katharine Clark, Natural Resources Manager
Matthew Klimoski, Environmental Division Director
Kimberly Hickey, Cultural Resources Manager
Wendy Markos, NEPA Specialist

NAVFAC Washington
Anna Lubestski, NEPA Project Manager
William Sadlon, NEPA Regional Program Manager
Heather Huddle, Regional Natural Resources Program Manager

The consulting firm responsible for the preparation of this document is:

Cardno
275 West Street, Suite 110
Annapolis, MD

Members of the professional staff are:

Cristina Ailes – Project Administration
B.S. Biology, Ecology/Environmental Science
B.A. International Studies
Years of Experience: 8

Karen Breitlow – Land Use, Biological Resources, Water Resources
M.S. Biological Sciences
Years of Experience: 8

Erika Fuery – Human Health and Safety
M.S. Environmental Science
Years of Experience: 14

Kathleen Hall – QA/QC and Technical Review
B.A. Earth and Environmental Sciences
Years of Experience: 18

Lesley Hamilton – Air Quality
B.A. Chemistry
Years of Experience: 27

Deborah Henson – Noise, Technical Review
M.S. Geoenvironmental Studies
Years of Experience: 16

Jaclyn Johnson – Project Manager, Technical Review
B.S. Ecology
Years of Experience: 15

Joanne Lortie – Socioeconomic Resources
M.A. Economics
Years of Experience: 27

John Lowenthal – Geology, Topography, Soils, Technical Review
M.S. Biology
Years of Experience: 29

Kathleen Riek – Project Director
B.S. Biology
Years of Experience: 24

Kimberly Sebestyen – Cultural Resources
M.A. American Studies
Years of Experience: 21

Abigail Shoff – GIS Specialist, Graphics
B.S. Geographical Information Systems
Years of Experience: 2

Sharon Simpson – Project Administration
A.S. Science
Years of Experience: 11

Rick Spaulding – Technical Review
M.S. Wildlife and Fisheries Science
Years of Experience: 29

Lori Thursby – Deputy Project Manager, Cumulative Impacts, Technical Review
M. Architectural History
Years of Experience: 20

Jill Yamaner – Transportation, Infrastructure and Utilities
M.S. Environmental Science and Engineering
Years of Experience: 23

APPENDIX A
FEDERAL COASTAL CONSISTENCY DETERMINATION

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Table of Contents

1.0 INTRODUCTION A-7

2.0 PROJECT DESCRIPTION A-7

2.1 Public Participation A-14

3.0 SUMMARY OF ANTICIPATED EFFECTS TO ENVIRONMENTAL RESOURCES A-18

3.1 Geology, Topography, and Soils A-18

3.2 Water Resources A-18

3.3 Biological Resources A-19

3.4 Land Use A-20

3.5 Air Quality A-20

3.6 Noise A-21

3.7 Transportation A-21

3.8 Infrastructure and Utilities A-21

3.9 Cultural Resources A-21

3.10 Human Health and Safety A-22

3.11 Socioeconomic Resources A-22

4.0 CONSISTENCY DETERMINATION A-22

4.1 General Policies A-22

4.1.1 Core Policies A-22

4.1.2 Water Resources A-23

4.1.3 Flood Hazards A-23

4.2 Coastal Resources A-24

4.2.1 The Chesapeake and Atlantic Coastal Bays Critical Area A-24

4.2.2 Tidal Wetlands A-24

4.2.3 Non-Tidal Wetlands A-25

4.2.4 Forests A-25

4.2.5 Historical and Archaeological Sites A-26

4.2.6 Living Aquatic Resources A-27

4.3 Coastal Uses A-29

4.3.1 Mineral Extraction A-29

4.3.2 Electrical Generation and Transmission A-29

4.3.3 Tidal Shore Erosion Control A-29

4.3.4 Oil and Natural Gas Facilities A-29

4.3.5 Dredging and Disposal of Dredged Material A-30

4.3.6 Navigation A-30

4.3.7 Transportation A-30

4.3.8 Agriculture A-30

4.3.9 Development A-30

4.3.10 Sewage Treatment A-30

5.0 CONCLUSION A-30

6.0 REFERENCES A-31

List of Figures

Figure 1. Location of the North Severn Complex A-8

Figure 2. Proposed Extent of the North Severn Complex Shoreline Repair and Restoration A-9

Figure 3. North Severn Complex Shoreline – 1847 to Present A-10

Figure 4. Location of Reaches in the Project Area A-12

Figure 5. North Severn Complex and Public Access A-16

List of Tables

Table 2-1. Descriptions of Reaches in the Project Area A-11

Table 2-2. Summary of Proposed Action Alternatives A-13

Table 2-3. Reaches and Shoreline Access Issues A-17

ACRONYMS AND ABBREVIATIONS

BMPs	Best Management Practices
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DoD	Department of Defense
DoN	Department of the Navy
EA	Environmental Assessment
EFH	Essential Fish Habitat
ELMR	Estuarine Living Marine Resources
ICRMP	Integrated Cultural Resources Management Plan
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act of 1969
NMFS	National Marine Fisheries Service
NPS	National Park Service
NSA	Naval Support Activity
U.S.	United States
U.S.C.	United States Code

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1.0 INTRODUCTION

This document provides the State of Maryland with the Department of the Navy's (DoN or Navy) Federal Coastal Consistency Determination under Section 307 of the Coastal Zone Management Act (CZMA), 16 United States Code (U.S.C.) § 1451 *et seq*., as amended, and 15 Code of Federal Regulations (CFR) Part 930, Subpart C, and in accordance with the Memorandum of Understanding (MOU) between the State of Maryland and the United States (U.S.) Department of Defense (DoD), for the proposed action to repair and restore approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland (Figures 1 and 2).

The NSA Annapolis is located entirely within Maryland's coastal zone. Under Section 307 of the CZMA, federal activities within or outside the coastal zone that are reasonably likely to affect the use of lands, waters, or natural resources of the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of states with approved coastal zone management programs. The State of Maryland has a federally approved Coastal Zone Management Program (CZMP), which was last updated in 2011. Maryland's CZMP addresses coastal hazards, growth management, habitat and living resources, non-point source pollution, non-tidal wetlands, provision of public access, and tidal wetlands, and it encompasses several state laws and regulatory programs, of which the Clean Water Act is specifically applicable to the proposed action. In accordance with Section 307 of the CZMA, the Navy has analyzed the proposed action for consistency with Maryland's CZMP. The MOU between the State of Maryland and the DoD, signed on May 8, 2013, outlines the application and implementation of certain enforceable policies of Maryland's CZMP for federal actions. This Federal Coastal Consistency Determination analyzed the proposed action relative to the agreements outlined in the MOU.

2.0 PROJECT DESCRIPTION

The purpose of the proposed action is to repair and restore 28,000 linear feet of the North Severn Complex shoreline that have been severely damaged or made vulnerable by erosion, as shown in Figure 3. Shoreline erosion control measures would help to protect the loss of mission-critical areas and reduce damage from ongoing erosion along Carr Creek, Mill Creek, the Severn River, and Chesapeake Bay shorelines of the North Severn Complex.

The proposed action is needed because significant shoreline areas are eroding, resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The eastern, southern, and southwestern portions of Greenbury Point are exposed to long fetch distances in the Severn River and the Chesapeake Bay, allowing for excessive wind and high wave energy along the shorelines leading to erosion of the banks. In addition, one shoreline area of concern is a berm (former dredge spoil lagoon) at Greenbury Point constructed of soil and fortified with large concrete debris and other disposed materials. This constructed berm, which holds dredge disposal material, has been rehabilitated with a water control structure to relieve head pressure within the dredged material area during storm events, and a small breakwater (trapezoidal riprap structures) along portions of the berm. The water control structure, which was installed in 1998, regulates the water flow from the berm across the west side of Greenbury Point during storm events. Emergency stabilization measures have been implemented to prevent the outer berm from failing and releasing contaminants contained in the dredged materials into the river. However, the berm is under threat of failure if the next phase to construct a permanent berm is not implemented. Furthermore, the proposed action is needed to maintain the safety and usefulness of the North Severn Complex mission-critical areas. The NSA Annapolis wastewater treatment plant (WWTP) is located near Carr Creek and sections of the wastewater collection system and the treated wastewater outfall are in proximity to the degrading shoreline.

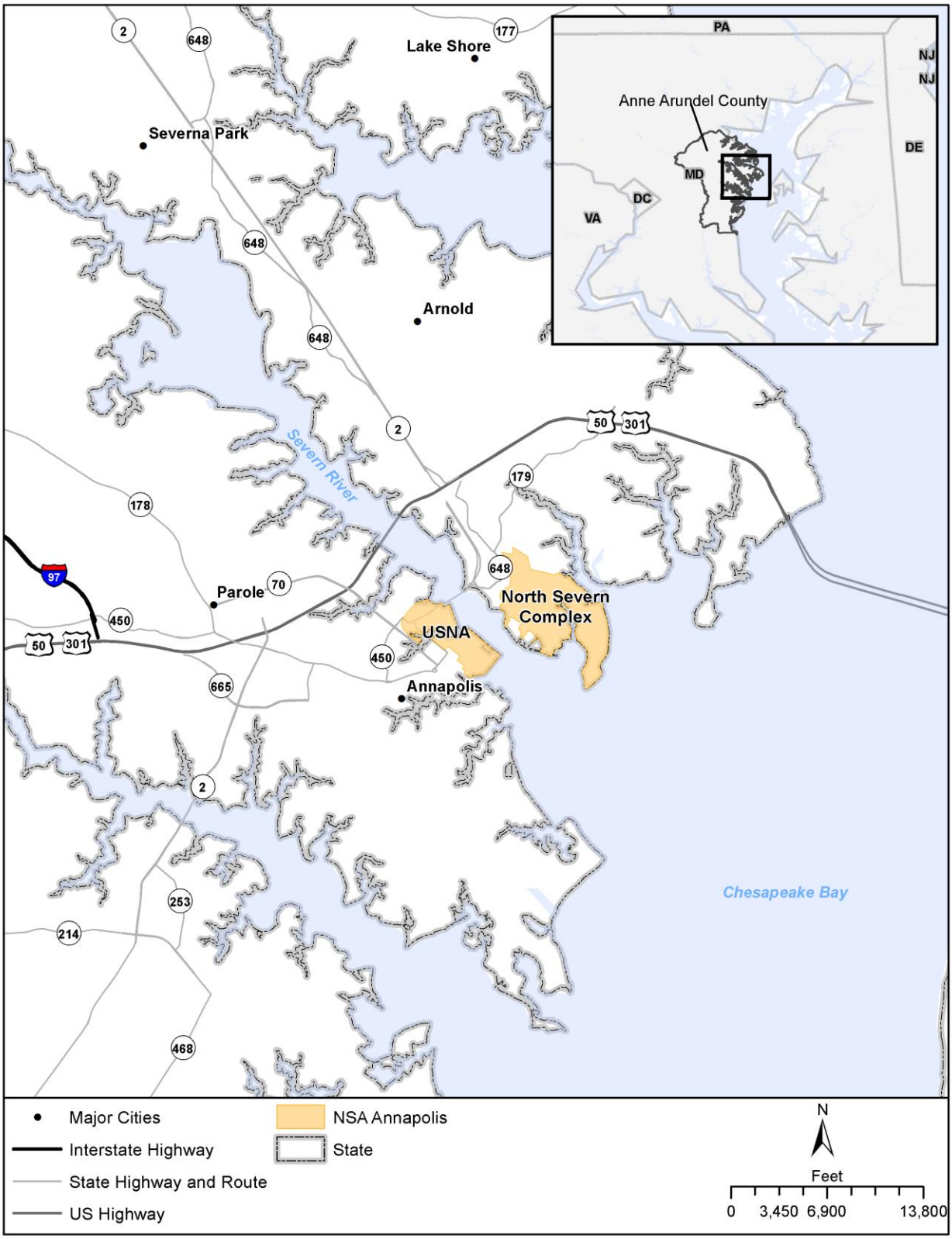

Figure 1. Location of the North Severn Complex

Figure 2. Proposed Extent of the North Severn Complex Shoreline Repair and Restoration

Figure 3. North Severn Complex Shoreline – 1847 to Present

Construction would likely begin in late 2015, and would be phased over a five-year period. Shoreline repair and restoration activities would not extend beyond the 1972 mapped shoreline boundary to prevent encroachment into Maryland's waters. NSA Annapolis has identified four alternative methods that are potentially feasible for the proposed action. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair and restoration. The project area for this EA has been divided into reaches (see Table 2-1 and Figure 4). These areas have been defined geographically, as well as based on the extent of erosion and potential restoration measures applicable.

Table 2-1. Descriptions of Reaches in the Project Area

Reach		Length (linear feet)	Description
A		9,160	Reach A includes the majority of the eastern and southern areas of Greenbury Point and is subject to some of the highest wave action, storm energy, and fetch in the project area, leading to extensive erosion. Portions of the eastern side of Greenbury Point included in Reach A have had some armoring placed at the toe of slope.
B		1,160	Reach B is located on the southwestern portion of Greenbury Point, which also exhibits extensive erosion; however, the wave energy and fetch is not as great as Reach A.
C		1,140	Reach C includes the shoreline outboard (on the creek side) of the berm (former dredge spoil lagoon). Reach C has been the subject of two investigations, the 2010 *Berm Rehabilitation Plan* and the 2012 *Berm Stabilization and Living Shoreline Project, Final Emergency Stabilization Work Plan*. Both reports provided plans for emergency stabilization measures to address the erosion of the berm in this reach.
D	**D1**	7,530	Reach D includes the shoreline of Carr Creek and has been divided into D1 and D2. Reach D1 was the subject of the *Carr Creek Shoreline Survey, Riparian Habitat Conceptual Restoration Design Report* in 2013, and Reach D2 includes the remainder of the Carr Creek shoreline adjacent and similar to D1, but not included in the survey. Carr Creek areas are experiencing erosion due to wave and storm energy and slope saturation.
	D2	1,600	
E		1,400	Reach E includes the area on the east side of the Carr Creek Marina and is also subject to high wave action, storm energy, and fetch.
F		3,510	Reach F includes Possum Point and the small boat launch and marina area in Mill Creek, which is experiencing erosion of the banks.
G		2,500	Reach G includes the remainder of the Mill Creek shoreline areas, which is experiencing erosion of the banks.
TOTAL		28,000	

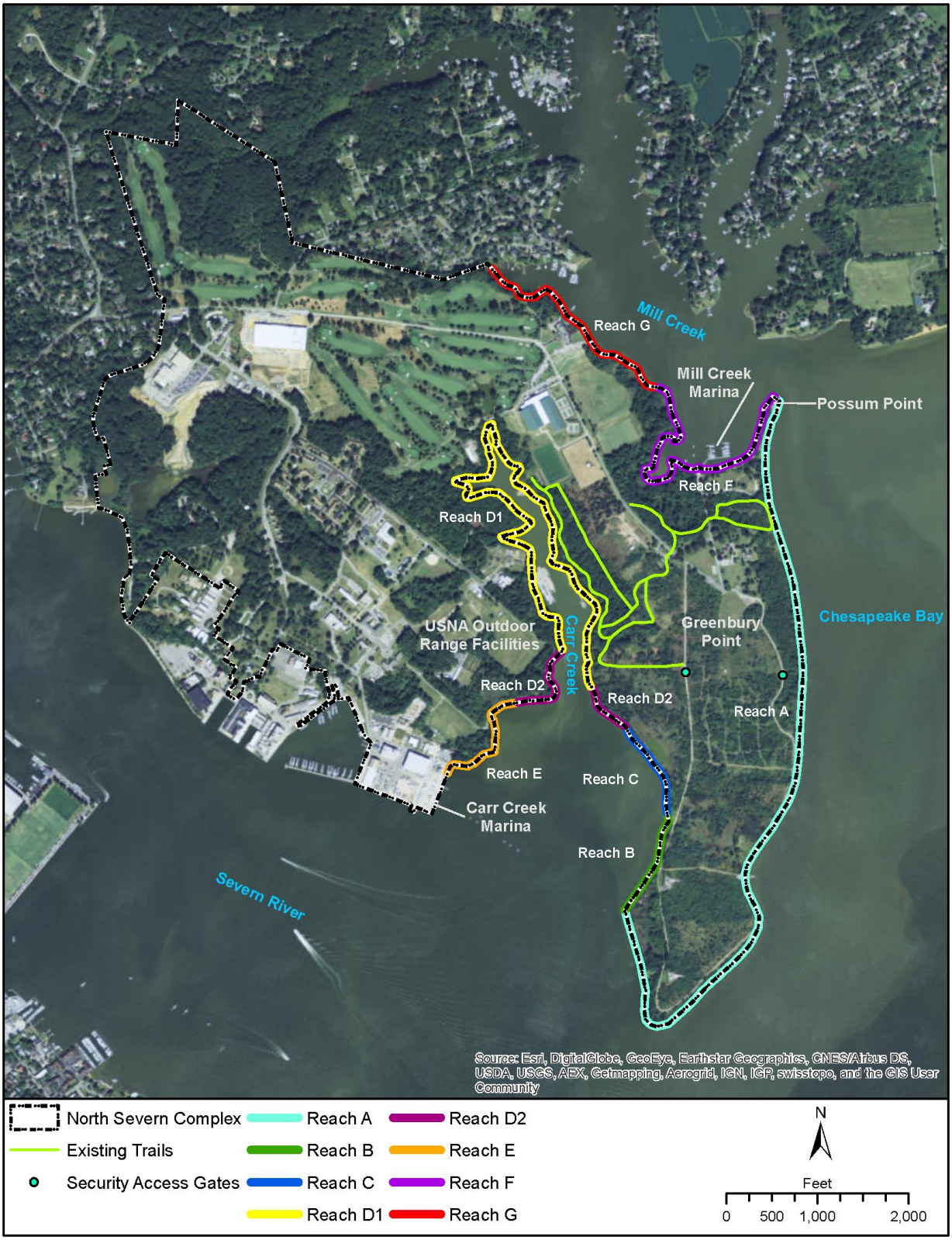

Figure 4. Location of Reaches in the Project Area

The Navy has prepared a Draft Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the four potentially feasible shoreline repair and restoration methods presented below in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. §§ 4321–4370h), the Council on Environmental Quality regulations for implementing NEPA (40 CFR Parts 1500–1508), DoN Procedures for Implementing NEPA (32 CFR Part 775), and the Chief of Naval Operations Instruction 5090.1D, *Environmental Readiness Program* and its implementing policy guidance contained in OPNAV M-5090.1, Reference (c), Chapter 10, *Environmental Readiness Program Manual* (January 2014).

Three action alternatives were evaluated in the EA along with the No Action Alternative. The three alternatives for implementing the proposed action include four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization with natural untreated hardwood logs, and 4) living shoreline. The shoreline reaches are the same under the three action alternatives. The three alternatives are described in the following sections and are summarized in Table 2-2. The table includes the proposed repair alternative for each reach.

Table 2-2. Summary of Proposed Action Alternatives

Alternative	Repair and Restoration Method by Reach
Alternative 1 – Hardened Structure/Revetment	Reaches A, B, C, D, E, F, and G – Hardened Structure/Revetment
Alternative 2 – Log Toe Stabilization	Reaches B, D, and G – Log Toe Stabilization Reaches A, E, and F – Alternative 1 Reach C – Sheet Pile
Alternative 3 – Living Shoreline (Preferred)	Reaches B, D, F, and G – Living Shoreline Reaches A and E – Alternative 1 Reach C – Alternative 2

Alternative 1 – Hardened Structure/Revetment

Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, C, D, E, F, and G. The hardened structure/revetment for this alternative includes 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope.

The work for the hardened structure/revetment would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.

Alternative 2 – Log Toe Stabilization

Alternative 2 would employ log toe stabilization along Reaches B, D, and G where potential wave energy is lower. Under Alternative 2, Reaches A, E, and F would be repaired using the hardened structure/revetment method as described under Alternative 1, and Reach C would be repaired using the sheet pile method.

The log toe stabilization method includes the placement of natural untreated hardwood logs at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. This measure would also include potential grading of the upper portions of the embankment to a less erosive slope, where slope erosion is occurring.

A detailed engineering analysis conducted for Reach C, which is adjacent to the berm (former dredge spoil lagoon), determined a sheet pile structure to be the most feasible measure for this site (NAVFAC Washington 2012). Alternative 2 would include installing a sheet pile structure on the Severn River side of the berm. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. The berm would be back-filled using suitable fill material.

The log toe stabilization and sheet pile structure would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints of the various work areas.

Alternative 3 – Living Shoreline (Preferred)

Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method, as described under Alternative 2.

Living shoreline techniques include the use of sills, groins, or breakwaters in combination with sand, and other natural materials. Living shoreline restoration includes the installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed, consisting of a trapezoidal stone structure, for the purpose of dissipating wave energy before waves reach the shore. This alternative would be utilized in areas with lower wave energy along portions of the Carr Creek and Mill Creek reaches where installation of this type of restoration measure would be most successful. This technique would also include potential grading of the upper portions of the embankment to a less erosive slope, where appropriate. This work would be accomplished either from on land, in the water, or a combination of the two depending on the land and water constraints in the various work areas.

No Action Alternative

The No Action Alternative would maintain the status quo. Under the No Action Alternative, the repair and restoration of the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay would not occur. Under this alternative, the shorelines would continue to erode and the safety and usefulness of the North Severn Complex mission-critical areas would decrease. Potential public safety risks from unstable bluffs along the shorelines and potential degradation of water quality would continue to exist.

2.1 PUBLIC PARTICIPATION

NSA Annapolis held a public scoping meeting for the North Severn shoreline repair and restoration project on July 30, 2014. A notice of the scoping meeting was published in *The Capital* for three consecutive days, with the first day of publication being 15 days in advance of the scheduled meeting. The scoping meeting was conducted in an open house format designed to inform the public about the proposed action and NEPA process, and allow the public to identify to Navy representatives issues and concerns they would like to see addressed in the EA.

The public had three ways to provide comments during the scoping period: 1) submit written comments during the public scoping meeting; 2) submit comments electronically to anna.lubetski@navy.mil; or 3) mail written comments to Anna Lubetski, Environmental, 1314 Hardwood Street, SE, Building 212, Washington, DC 20374. No comments were received during the scoping period from July 14, 2014 to August 14, 2014.

On January 11, 2015, the Navy released the Draft EA for a 45-day public comment period. The public comment period provides members of the community an opportunity to review the Draft EA and provide comments on the findings in the document. The Navy published a Notice of Availability of the Draft EA and public meeting in The Capital for three consecutive days, beginning on January 11, 2015. The Capital also interviewed the NAVFAC Washington Project Manager, Anna Lubetski, and published an article regarding the project on January 27, 2015. A copy of the Draft EA was made available at the Annapolis Regional Library at 1410 West Street in Annapolis, Maryland.

The public meeting was held on January 28, 2015 and was conducted in an open house format designed to provide the public an opportunity to ask questions or discuss concerns they might have after their review of the Draft EA with Navy representatives. A total of nine individuals signed in at the meeting.

During the public meeting, attendees were encouraged to submit written comments. During the public comment period, which began on January 11, 2015 and ended on February 27, 2015, written comments could be submitted electronically to anna.lubetski@navy.mil or mail written comments to Anna Lubetski, Environmental, 1314 Hardwood Street, SE, Building 212, Washington, DC 20374. A total of 38 comments were received during the public comment period. One comment expressed concern regarding traffic impacts to the Naval Academy Golf Course during the construction phases. Two comments expressed interest in being involved in the design, construction, and management of the shoreline repair and restoration. The majority of public comments pertained to the possibility of providing public shoreline access points as part of the shoreline repair and restoration. The comments referenced Executive Order (EO) 13508, *Chesapeake Bay Protection and Restoration*, specifically Section 202(e), to "expand public access to waters and open spaces of the Chesapeake Bay and its tributaries from Federal lands." In accordance with EO 13508, the National Park Service (NPS) prepared a *Final Chesapeake Bay Watershed Public Access Plan*, with a goal to increase public access to the Bay and its tributaries by adding 300 new public access sites by 2025.

NSA Annapolis currently provides a variety of ways for the public and/or DoD members/employees/dependents to access the shoreline of the Chesapeake Bay and its tributaries:

- Walking trails on Greenbury Point – several walking trails have been developed on and around Greenbury Point that include scenic vistas or viewing blinds for the Bay or its tributaries (see Figure 5). These areas are open to the public and DoD members/ employees/dependents from sunrise to sunset, as range operations (see Section 3.4-1, *Land Use* of the EA for further discussion) allow and force protection conditions allow.

- Fishing on Possum Point – a designated fishing area is located on Possum Point (see Figure 5). This area is open to DoD members/employees/dependents from sunrise to sunset, as force protection conditions allow. Fisherman must follow all the Maryland Department of Natural Resources (MDNR) regulations and are required to obtain their own fishing license(s) through MDNR.

Figure 5. North Severn Complex and Public Access

- Morale, Welfare, and Recreation (MWR) marinas and boat rentals – MWR operates two marinas for DoD members/employees/dependents, one located on Mill Creek and one located on Carr Creek (Figure 5). These marinas are used to dock, store, or launch privately-owned boats. MWR also rents boats and canoes/kayaks to DoD members/employees/ dependents. Larger rental boats are launched from the Carr Creek Marina and its associated boat ramp. Larger, privately-owned vessels are docked at the Mill Creek Marina. Smaller canoes and kayaks are launched from either the Carr Creek Marina or the Mill Creek Marina.

Table 2-3 discusses each reach being evaluated in this EA, and the shoreline access issues relating to each reach.

Table 2-3. Reaches and Shoreline Access Issues

Reach	Shoreline Access Issues
A	• No existing roads, parking or infrastructure to support boat access • Wind and wave action typically too severe to allow small boat operations
B	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
C	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
D	D1 • Leads to/in close proximity of the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access D2 • Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
E	• Within the SDZ for the USNA Outdoor Range Facilities • No existing roads, parking or infrastructure to support boat access
F	• In direct conflict with existing MWR operations
G	• No existing roads, parking or infrastructure to support boat access

In addition to the specific issues noted above, there are security concerns associated with unregulated public access to installation shoreline. Therefore, construction or permitting of additional access points (above what already exists) is neither planned nor appropriate.

The Navy mailed copies of the Draft EA to federal, state, and local agencies for their review and comment. The Navy also submitted copies of the Draft EA to the Maryland State Clearinghouse for distribution to additional state agencies for review and comment. Comments were received from the following agencies: MDNR, Maryland Department of the Environment (MDE), Maryland Department of Transportation, Maryland Department of Planning, Maryland Historical Trust (MHT), National Marine Fisheries Services (NMFS), NPS, U.S. Environmental Protection Agency (USEPA) Chesapeake Bay Program, the Chesapeake Conservancy, the Alliance for the Chesapeake Bay, the National Parks Conservation Association, the Severn River Commission, the Anne Arundel County Executive, and Congressman John Sarbanes. These agencies also commented on the need for public access and compliance with EO 13508. Several agencies were pleased that living shoreline is being considered as an alternative. MDE and MDNR agreed to work with the Navy to develop sustainable, cost-effective solutions that ensure the shoreline project is consistent with Maryland's enforceable policies. MHT and the Navy will complete Section 106 consultation and review of proposed actions as planning proceeds for individual Reaches of the project area. The MDNR, Wildlife Heritage Service, determined there are no

State or Federal records of rare, threatened or endangered species within the boundaries of the project site as delineated. NMFS identified several EFH conservation recommendations. Revisions have been made to Section 3.3, *Biological Resources,* with regard to EFH.

3.0 SUMMARY OF ANTICIPATED EFFECTS TO ENVIRONMENTAL RESOURCES

As assessed in the EA, the following resources have the potential to be affected by the proposed action: geology, topography, and soils; water resources; biological resources; land use; air quality; noise; transportation; infrastructure and utilities; cultural resources; human health and safety, and socioeconomic resources. The anticipated impacts to these environmental resources are discussed in detail in the following sections. As evaluated in the EA, temporary impacts to soils, water resources, biological resources, air quality, noise, and transportation would occur as a result of the proposed action during the construction phase, regardless of the alternative that may be implemented. Beneficial impacts would occur to the economy during the construction phase. The proposed action alternatives would have long-term beneficial impacts to soils, water resources, biological resources, transportation, and infrastructure and utilities by reducing shoreline erosion and sedimentation, and by reducing the potential safety risks from unstable bluffs along the shorelines. With the use of Best Management Practices (BMPs), and avoidance, minimization, and mitigation measures, none of the impacts associated with any of the alternatives for the proposed action would be significant.

3.1 GEOLOGY, TOPOGRAPHY, AND SOILS

Implementation of any of the proposed action alternatives would not have significant impacts to geology or topography; however, short-term impacts to soils would be expected as a result of construction activities (i.e., soil compaction prior to post-construction restoration, minor grading, temporary soil productivity reduction at construction staging and access areas, and limited displacement of river/creek bottom by revetments, if necessary). These impacts would be avoided and minimized through implementation of appropriate BMPs, such as erosion control barriers.

Impacts associated with the various alternatives would be the same, with the alternative utilized for any given reach determined according to suitability during the design stage. Shoreline repair and restoration efforts for all three alternatives would result in beneficial impacts because the topography would be stabilized. Shoreline soils would be protected from future erosion, and sedimentation in adjacent areas would be reduced. Additionally, the failing berm would be stabilized (under Alternatives 2 and 3) and the risk of the release of disposed dredge sediments reduced.

3.2 WATER RESOURCES

Implementation of any of the proposed action alternatives is not expected to result in significant impacts to water resources. Impacts to surface water associated with the various alternatives differ slightly according to the method used. Short-term adverse impacts to surface water quality during construction activity may occur during the building of revetments and the proposed sheet pile structure. However, completion of a sheet pile structure at the berm along Reach C (Alternatives 2 and 3) would result in a beneficial impact to surface water quality by preventing the release of contaminants into the river.

Potential adverse impacts to water resources along reaches B, D, and G under Alternative 2 would be less than those described under Alternative 1 because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope. Potential adverse impacts to surface

water under Alternative 3 would also be less than those described under Alternative 1 because the strategic placement of natural materials to stabilize the shoreline also improves water quality and enhances habitat (the extent dependent on type of living shoreline used). Impacts to surface waters under all three alternatives would be avoided and minimized through compliance with Clean Water Act and permit requirements.

Much of the construction would likely occur within the 100-year floodplain. The proposed alternatives would preserve existing topography in areas adjacent to the shoreline by restoring the shoreline slope to its original condition, which could improve floodplain capacity. In addition, the proposed use of revetments would not alter floodplain boundaries or function because revetments and sheet piles with culverts (Reach C) would still allow for water transfer. The design phase would determine which alternative would best prevent long-term adverse alteration of existing drainage patterns or creation or modification of flood hazard conditions.

There are no anticipated impacts to groundwater resources as a result of implementing any of the alternatives.

Under the proposed action, adverse impacts may occur to wetlands where wetlands would be covered with hardened material. The specific areas and types of wetlands impacted would be determined during the design phase. Wetlands may also be adversely affected during the installation of the living shoreline with the placement of a stabilizing structure and backfill. However, wetlands impacted by the installation of the living shoreline would be replaced with new marsh and wetland habitat behind the stabilizing structures. Preliminary calculations of potential wetland impacts, using the assumption that all wetlands within 75 feet of the shoreline could be impacted, reveal that approximately 4.1 acres of wetlands could be affected under proposed action. Wetlands would be protected through adherence to the Navy's *No Net Loss* policy, the Jurisdictional Determination process with the regulatory agencies, and permitting requirements that avoid and minimize adverse impacts to wetlands. Adverse impacts to wetlands during construction would be minimized and avoided through compliance with permit requirements and BMPs.

3.3 BIOLOGICAL RESOURCES

Note: Aquatic biological resources are discussed specifically under Section 4.2.6, *Living Aquatic Resources.*

No adverse impacts to federally-listed or state-listed species are anticipated. Special-status plant species are not found within the project area; therefore, no impacts are anticipated. In a letter dated June 29, 2015, USFWS concurred with the preferred alternative. No significant impacts to state-listed birds are expected because they are not known to nest within the project area. They are highly mobile and would avoid the area impacted by construction activity. If northern long-eared bats are identified within project reaches requiring tree clearing as the project moves forward, all tree-clearing activities will be restricted to occur outside the northern long-eared bat pupping season (June 1 to July 31).

Implementation of any of the proposed action alternatives would result in impacts to terrestrial vegetation during construction activities. Impacts would primarily occur during the installation of the revetments, addition of fill material, and utilization of heavy construction equipment. Establishment of construction staging areas, to be determined during the design phase, may also result in temporary impacts to vegetation, which would be minimized and avoided to the extent practicable. Trees, shrubs, and grasses may be removed, damaged, or trampled during the construction phase, with permanent loss of vegetation where land was covered by the stabilization measures. However, long-term impacts to vegetation as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be

reduced, thereby creating a stable environment for vegetation along the shoreline. With implementation of appropriate sedimentation and erosion control BMPs and terms and conditions of applicable permits, these short-term, localized impacts to terrestrial vegetation would not be significant.

Proposed construction activities under all of the proposed action alternatives would be phased over a five-year period. Project activities would result in short-term increases in noise levels with project areas temporarily displacing wildlife and migratory birds from the immediate area. Wildlife and migratory birds may experience short-term intermittent disturbance associated with noise from construction activities. Highly mobile species of wildlife would be temporarily displaced during construction activities. Smaller, or less mobile species, could be injured or experience direct mortality. While there could be an adverse impact to individual animals, these impacts are not expected to affect the stability of local population levels of these species. Habitat for wildlife may be lost temporarily and permanently (impacts to vegetation are described in the previous section), but the adverse impact of habitat loss on wildlife as a result of the proposed action is expected to localized and limited. With implementation of appropriate sedimentation and erosion control BMPs and terms and conditions of applicable permits, these short-term, localized impacts to wildlife and migratory birds would not be significant.

The installation of sheet piles with an impact pile hammer can produce underwater noise that can affect fish species. The number of sheet piles to be driven on any particular day or time would vary and pile driving would not occur for the entire duration of the project. Since sheet piles are proposed to be installed in the upland environment (Alternatives 2 and 3), noise impacts would likely be less than those for nearshore installation. Based on this information, the effects of pile driving on fish would not be significant.

There would be temporary impacts to essential fish habitat (EFH) during construction (see Section 4.2.6 for more detail). Re-establishment of the benthic substrate within the EFH (i.e., submerged aquatic vegetation) of temporarily damaged areas would naturally occur; however, monitoring and control measures may be necessary to ensure re-establishment is dominated by native species. Long-term impacts to EFH as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced, thereby improving the quality of EFH. With implementation of appropriate sediment and erosion control BMPs and compliance with applicable permits, these temporary, localized impacts to EFH would not be significant.

3.4 LAND USE

Implementation of any of the proposed action alternatives would be consistent with existing land use. There would be short-term impacts to land use for the duration of construction. Establishment of construction staging areas, to be determined during the design phase, may result in minor, temporary impacts to land use, which would be minimized and avoided to the extent practicable. Operation of the USNA Outdoor Range Facilities may also be temporarily impacted during construction activity, but construction could be planned around scheduled operation of the range facilities to reduce such temporary impacts (proposed shoreline repair and restoration measures along Reaches F and G would not impact operation of the range facilities).

3.5 AIR QUALITY

Implementation of any of the proposed action alternatives would not have significant impacts to air quality; pollutant emission resulting from the proposed repair and restoration activities are well below *de minimis* thresholds.

3.6 NOISE

Buildings or facilities that fall within a 200-foot radius of construction activities could be exposed to a temporary increase in noise levels (primarily due to grading, sheet pile driving, construction equipment operation). With implementation of appropriate noise attenuation measures (i.e., selection of quietest applicable pile driving method, installation of portable noise barrier, utilization of impact cushions on top of piles being driven by an impact hammer, utilization of noise bellow system, performance of work during daytime hours, and scheduling pile driving for less intrusive times [mid-morning to mid-afternoon], noise impacts to utilization of these buildings or facilities are not anticipated to be significant.

As discussed in Section 3.3, *Biological Resources*, the installation of sheet piles with an impact pile hammer can produce underwater noise that can affect fish species. The number of sheet piles to be driven on any particular day or time would vary and pile driving would not occur for the entire duration of the project. Since sheet piles are proposed to be installed in the upland environment, noise impacts would likely be less than those for nearshore installation. Based on this information, the effects of pile driving on fish would not be significant.

3.7 TRANSPORTATION

Implementation of any of the proposed action alternatives would result in minor impacts to vehicular and recreational boat traffic in the vicinity of the reaches during construction activity, but such impacts would not be significant. There would be no permanent impacts to transportation.

3.8 INFRASTRUCTURE AND UTILITIES

Implementation of any of the proposed action alternatives would have minimal to no impacts to water supply, wastewater, electrical supply, fiber optic/telecommunications, natural gas, or solid waste during construction activity. There would be no permanent adverse impacts to utilities or infrastructure, but there would be long-term beneficial impacts to the North Severn Complex perimeter roads.

3.9 CULTURAL RESOURCES

Impacts to archaeological resources are not anticipated under any of the proposed action alternatives. Fifteen previously recorded sites that are recommended for Phase II evaluation are located within 500 feet of the shoreline. In accordance with the NSA Annapolis *Integrated Cultural Resources Management Plan* (ICRMP), prior to the repair and restoration of the shoreline, Phase II evaluation would be completed at these sites. One National Register of Historic Places-eligible site, Site 18AN0944, is located within 100 feet of the proposed shoreline work. Should it be determined that there would be an adverse effect to Site 18AN0944 as a result of the undertaking, NSA Annapolis would develop a treatment plan to mitigate or protect this site. The Navy will consult with Maryland Historical Trust on its finding of No Adverse Effect.

There is the potential for temporary effects to the setting of the USNA during construction from machinery and equipment operating or being stored along the shoreline for all the alternatives, particularly related to potential in-water work. The Navy concluded, however, the effect would not be adverse to the integrity of the USNA historic district. Implementation of any of the alternatives is expected to have No Adverse Effect on historic architectural resources. The Navy will consult with Maryland Historical Trust on its finding of No Adverse Effect.

3.10 HUMAN HEALTH AND SAFETY

Implementation of any of the proposed action alternatives would have no impacts to human health and safety. Completion of a sheet pile structure at the berm along Reach C (Alternatives 2 and 3) would result in a beneficial impact to human health and safety by preventing the release of contaminants into the river.

3.11 SOCIOECONOMIC RESOURCES

Implementation of any of the proposed action alternatives would not have significant impacts to the population, but would have short-term beneficial impacts due to construction spending and long-term beneficial impacts to the tax base.

4.0 CONSISTENCY DETERMINATION

This section describes the expected effects, if any, of the proposed action with regard to the relevant Maryland CZMP enforceable policies as clarified by the MOU between the DoD and the State of Maryland. As shown by these analyses, the proposed action would be consistent to the maximum extent practicable with the policies. Specific Maryland enforceable coastal policies identified in the MOU for Federal Coastal Consistency Determinations by the DoD are <u>underlined</u> in the lists below.

4.1 GENERAL POLICIES

4.1.1 Core Policies

The proposed action would comply with the core policies of Maryland's enforceable coastal policies effective April 8, 2011, and the MOU dated May 8, 2013.

The proposed action would not affect:

- The degree of purity of air resources which will protect the health, general welfare, and property of the people of the State of Maryland
- Noise which may jeopardize health, general welfare, or property, or which degrades the quality of life (noise abatement measures would be implemented for the proposed action in accordance with internal DoD and military service component noise abatement policies)
- The unique ecological, geological, scenic, and contemplative aspects of State wild lands or their future use and enjoyment
- The safety, order, and natural beauty of State parks and reserves, forests, scenic preserves, parkways, historical monuments, or recreational areas
- Water appropriation and use
- Natural character and scenic value of rivers or waterways
- Scenic or wild rivers due to dams or other structures that would impede the natural flow
- The dune line along the Atlantic Coast
- The integrity and natural character of Assateague Island
- Non-tidal waters that dredge, fill, bulkhead, or change the shoreline; construct or reconstruct a dam; or create a waterway
- Soils such that soil erosion would occur that would impact natural resources and wildlife; alter flood control; prevent impairment of dams and reservoirs; maintain navigability of rivers and

harbors; affect the tax base, public lands, and the health, safety, and general welfare of the people of the State of Maryland
- The Port of Baltimore by introducing hazardous materials
- Operations on the Outer Continental Shelf

4.1.2 Water Resources

The proposed action would not affect water quality and is consistent with the following policies:

- No addition, introduction, leaks, spills, or emitting of liquid, gaseous, solid, or other substances that will pollute any waters of the State of Maryland
- Protection of waters of the State for water contact recreation, fish, and other aquatic life and wildlife, as well as shellfish harvesting and recreational trout waters
- No construction, installation, modification, extension, or alteration of an outlet that could cause or increase the discharge of pollutants into the waters of the State
- Use of best available technology for permitted discharges into State waters
- Control of thermal discharges
- Storage of pesticides in compliance with Department of Defense Instruction 4150.07, "DoD Pest Management Program"
- Development or redevelopment of land for residential, commercial, industrial, or institutional purposes shall use small-scale non-structural stormwater management practices and site planning that mimic natural hydrologic conditions
- Used oil would not be dumped into sewers, drainage systems, or waters of the State, or onto private or public land
- Toxic material or material with the potential for being toxic will be managed by applying for and complying with permits required under the Clean Water Act and relevant sections of Code of Maryland Regulations 26.08.03.01

4.1.3 Flood Hazards

All alternatives would result in construction within the 100-year frequency floodplain and below the water surface elevation of the 100-year flood. However, the proposed action would not adversely affect floodplain boundaries or function because revetments and sheet piles with culverts (Reach C) would still allow for water transfer. The installation of any of the alternatives would preserve existing topography in areas adjacent to the shoreline by modifying the shoreline slope so that it is closer to its original condition. This slope restoration could improve floodplain capacity.

The proposed action is consistent with the following policies:

- No projects in coastal tidal and non-tidal floodplains which would create additional flooding upstream or downstream, or which would have an adverse impact upon water quality or other environmental factors
- Floodplain encroachments would be designed to provide a minimum of 1 foot of freeboard above the elevation of the 100-year frequency flood event
- There would be no unlined earth channels or lined channels that would change the tractive force associated with the 2-year and the 10-year frequency flood events

- No Category II, III, or IV dams would be built
- No channelization will be used as a flood control technique
- The project will achieve the purposes intended

4.2 COASTAL RESOURCES

The proposed action would not affect the following coastal resources, as described in Maryland's enforceable coastal policies and clarified in the MOU between DoD and the State of Maryland:

4.2.1 The Chesapeake and Atlantic Coastal Bays Critical Area

Per the MOU, the DoD and State of Maryland agree to continue discussing appropriate measures to demonstrate consistency with Maryland's enforceable coastal policies related to the Chesapeake Bay and Atlantic Coastal Bays Critical Areas, including the development and maintenance of a List of *de minimis* and Environmentally Beneficial Activities (addressed in Section 1.04 of the MOU).

The entire project area is within Maryland's coastal zone. Therefore, consistency with the CZMA to the maximum extent possible must be ensured through implementation of the following processes and procedures:

- Adherence to CZMA and CZMA Maryland-DoD MOU practices
- Permit submittals and issuance (i.e., stormwater management plans, erosion control plans, and NPDES permits, as applicable)
- Adherence to Navy Low Impact Development Policy, the Energy Independence and Security Act Section 438, and the Maryland Department of the Environment (MDE's) Maryland Stormwater Management Guidelines for State and Federal Projects (2010), Maryland Stormwater Management Design Manual Volumes I and II (2009), and Erosion and Sediment Control Guidelines for State and Federal Projects (2004)

Impacts to coastal resources resulting from runoff during construction activities would be avoided and minimized by proper construction management and planning. NSA Annapolis would prepare a Soil Erosion and Sedimentation Control Plan and a stormwater management plan when proposed earth disturbance is more than 5,000 square feet or 100 cubic yards. These plans would be developed in accordance with Maryland soil erosion and sediment control guidelines. BMPs specific to the proposed construction site would be identified in these plans. Examples of such BMPs include: silt fences, silt or turbidity curtains, inlet and outlet protection, erosion control matting, sediment logs, construction entrances, temporary and permanent seeding, mulching, check dams, and other measures deemed appropriate for that specific action.

Implementation of appropriate sediment and erosion control BMPs during the construction phase would prevent adverse impacts to coastal resources from becoming significant. Long-term impacts to coastal resources as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced.

4.2.2 Tidal Wetlands

Per the MOU, the Department of Defense will consult with Maryland to ensure projects that may alter tidal wetlands are consistent to the maximum extent practicable with the intent of Maryland's Enforceable Coastal Policies. Maryland and the Department of Defense recognize that wetland impacts may be

unavoidable due to mission requirements. In instances where adverse wetland impacts cannot be avoided as a result of the proposed action, the Department of Defense and Maryland will work together to ensure any adverse effects to the Maryland Coastal Zone are minimized, any environmental benefits are maximized, and Department of Defense's operational flexibility is maximized.

The construction of revetments would permanently impact tidal wetlands located within the revetment area, as they would be covered with hardened material. The specific areas and types of tidal wetlands impacted would be determined during the design phase. The implementation of Alternative 2 would utilize log toe stabilization for Reaches B, D, and G and sheet piles for Reach C, and Alternative 3 would utilize living shoreline for Reaches B, D, F, and G and sheet piles for Reach C. Log toe stabilization and living shorelines would not require the armoring necessary for the hardened structure/revetments and sheet piles. Potential adverse impacts to tidal wetlands under Alternative 2 would be less than those described under Alternative 1 for Reaches B, D, and G because construction activity would be limited to the placement and anchoring of logs along the eroded toe of the shoreline slope. Tidal wetlands would be adversely affected during the installation of the living shoreline for Reaches B, D, F, and G (Alternative 3) during installation with the placement of a stabilizing structure and backfill. However, vegetation impacted by the installation of the living shoreline would be replaced with new marsh and wetland habitat behind the stabilizing structures.

Wetlands would be protected through adherence to the Navy's *No Net Loss* policy, the Jurisdictional Determination process with the regulatory agencies, and permitting requirements that avoid and minimize adverse impacts to wetlands. By submitting a Joint Permit Application under Clean Water Act Sections 404/401 to the appropriate regulatory agencies, the Department of Defense would demonstrate consistency with the substantive requirements of Maryland's Enforceable Coastal Policies.

4.2.3 Non-Tidal Wetlands

Per the MOU, the Department of Defense will consult with Maryland to ensure projects that may alter non-tidal wetlands are consistent to the maximum extent practicable with the intent of Maryland's Enforceable Coastal Policies. Maryland and the Department of Defense recognize that wetland impacts may be unavoidable due to mission requirements. In instances where adverse wetland impacts cannot be avoided as a result of the proposed action, the Department of Defense and Maryland will work together to ensure any adverse effects to the Maryland Coastal Zone are minimized, any environmental benefits are maximized, and Department of Defense's operational flexibility is maximized.

The specific areas and types of non-tidal wetlands impacted would be determined during the design phase. Wetlands would be protected through adherence to the Navy's *No Net Loss* policy, the Jurisdictional Determination process with the regulatory agencies, and permitting requirements that avoid and minimize adverse impacts to wetlands. By submitting a Joint Permit Application under Clean Water Act Sections 404/401 to the appropriate regulatory agencies, the Department of Defense would demonstrate consistency with the substantive requirements of Maryland's Enforceable Coastal Policies.

4.2.4 Forests

The extent of forest and woodland ranges from isolated tree stands to 80 acres. Much of the forested land within the project area occurs along the shoreline and consists of hardwood and a hardwood/pine mix. A 12-acre forest improvement stands containing a variety of native tree species is located at the southern tip of Greenbury Point.

Potential adverse impacts would occur during construction of hardened structures/revetments along Reaches A, B, C, D, E, F, and G under Alternative 1. These impacts to terrestrial vegetation would occur during the installation of the revetments, addition of fill material, and utilization of heavy construction equipment. Establishment of construction staging areas, to be determined during the design phase, may also result in temporary impacts to vegetation, which would be minimized and avoided to the extent practicable. Trees, shrubs, and grasses may be removed or damaged during the construction phase of Alternative 1, with permanent loss of vegetation where land was covered by the hardened structures/revetments. However, long-term impacts to vegetation as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced, thereby creating a stable environment for vegetation along the shoreline. Impacts to forest under Alternatives 2 (Reaches B, D, and G) and 3 (Reaches B, D, F, and G) would be similar, but potentially further minimized by less construction activity since these alternatives would not require the armoring necessary for Alternative 1. However, short-term impacts may be slightly greater for Alternatives 2 and 3 than for Alternative 1 for Reach C, where sheet piles would be constructed.

Per the MOU, the Department of Defense will demonstrate consistency with the underlying conservation goals of the Forest Conservation Act as embodied in Maryland's Enforceable Coastal Policies to the maximum extent practicable. For land-disturbing activities of 40,000 square feet or greater occurring on an installation, the Department of Defense will submit to Maryland either a negative determination with a finding of no effect to coastal uses or resources, or a consistency determination. If the Department of Defense proposes an action that will have reasonably foreseeable effects on uses or resources of Maryland's Coastal Zone, then the Department of Defense must be consistent to the maximum extent practicable with the substantive provisions of the Forest Conservation Act related to the reasonably foreseeable effects.

4.2.5 Historical and Archaeological Sites

Ten previously recorded sites that are recommended for Phase II evaluation are located in the vicinity of Reaches D1, F, and G. One NRHP-eligible site, Site 18AN0944, is located within 100 feet of the proposed shoreline work in Reach D1. There are no eligible or unevaluated archaeological sites in the vicinity of Reaches A, B, C, D2, and E.

The extent of cutting, grading, or earth moving within areas of known archaeological sites in Reaches D1, F, and F is not known at this time. Should Alternative 1 be selected for implementation, the Navy would prepare Archaeological Site Protection Requirements plans for Reaches D1, F, and G and submit them to the Maryland Historical Trust for review and concurrence. Therefore, with the provision of these plans, it is anticipated there would be No Adverse Effect to NRHP-listed or eligible archaeological resources under Alternative 1. The Maryland Historical Trust concurred with the finding of No Adverse Effect, and will review and concur on the Archaeological Site Protection Requirements plans for each Reach as the final design plans become available.

Per the MOU, the Department of Defense will continue to use procedures in accordance with the requirements of the National Historic Preservation Act that are consistent with Maryland's Historical Preservation Program. Maryland agrees that meeting the consultation requirements under the National Historic Preservation Act is sufficient to demonstrate consistency with Policies relating to historic preservation. In the event a tidal shore erosion project affects archaeological resources, the Department of Defense will continue to use the consultation procedures under the National Historic Preservation Act that are consistent with Maryland's Historic Preservation Program.

4.2.6 Living Aquatic Resources

Submerged aquatic vegetation (Reaches D1, D2, and possibly G) could also be impacted under Alternative 1. Direct, physical impacts could result during the construction activities as described above and through temporary increased sedimentation of surface waters. Implementation of appropriate sediment and erosion control BMPs would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation. Long-term impacts to submerged aquatic vegetation as a result of the proposed action would be beneficial because improved water quality would better support its growth.

Fish may avoid the area immediately surrounding construction as a result of in-water construction activity, increased noise, and a possible temporary decrease in water quality. To avoid and minimize adverse effects to the aquatic environment during anadromous fish spawning period, a restriction on in-water work would be observed between February 15 and June 15. Shellfish could be impacted in the short-term by increased sedimentation due to construction if they are located within the immediate area of the construction activity. Long-term impacts would be beneficial, with improved water quality following shoreline repair and restoration.

The Magnuson-Stevens Fishery Conservation and Management Act mandates habitat conservation for federally managed fish species by minimizing to the extent practicable any adverse effect on EFH for each federally managed species. EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 USC 1802[10]). Federal agencies must consult with the NMFS for any action that may adversely affect EFH. An adverse effect is defined as “any impact which reduces quality and/or quantity of EFH [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species’ fecundity), and site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of action” (50 CFR 600.810).

EFH has been designated and described for the following species in the Severn River and its tributaries:

- Atlantic Herring. Atlantic herring are a pelagic schooling species found at various depths depending on lifestage, season, and geographic location. EFH for adult Atlantic herring includes the seawater salinity zone of the Chesapeake Bay. Because the proposed action would occur entirely within the mixing salinity zone of the Severn River, this species would not be affected by the proposed action.
- Windowpane Flounder (*Scopthalmus aquosus*). EFH for juvenile and adult windowpane flounder includes bottom habitats with a substrate of mud or fine-grained sand, water temperatures below 77° Fahrenheit, and salinities between 5.5 and 36 parts per thousand (ppt).
- Summer Flounder (*Paralicthys dentatus*). Inshore EFH for summer flounder larvae include all the estuaries where summer flounder were identified as being present (rare, common, abundant, or highly abundant) in the Estuarine Living Marine Resources (ELMR) database, in the "mixing" (defined in ELMR as 0.5 to 25.0 ppt) and "seawater" (defined in ELMR as greater than 25 ppt) salinity zones. According to the ELMR database summer flounder larvae were rare-common in the Chesapeake Bay mixing salinity zone between December and April. EFH for juvenile and adult summer flounder includes bottom waters, including tidal guts. Juveniles may use estuarine habitats such as submerged aquatic vegetation beds and open bay areas as nursery areas, and adults generally inhabit shallow estuarine waters during the warmer months.
- Bluefish (*Pomatomus saltatrix*). Bluefish is a highly migratory, schooling pelagic species found along the Atlantic coast. EFH for juvenile and adult Bluefish includes the pelagic water column, and inland within the mixing and seawater zones with salinities between 0.5 and 25 ppt, and greater than 25 ppt, respectively.

- Coastal migratory pelagic species including king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculates*), and cobia (*Rachycentron canadum*). EFH has been designated for all life stages of these species in the Chesapeake Bay and Severn River and includes sandy shoals of capes and offshore bars, high-profile rocky bottom and barrier island ocean-side water, and all coastal inlets. EFH also includes estuaries and submerged aquatic vegetation for cobia.
- Red Drum (*Sciaenops occelatus*). EFH for the various life stages of red drum includes tidal inlets and creeks, salt marshes, submerged aquatic vegetation, and unconsolidated bottom.
- Red Hake (*Urophycis chuss*). Juvenile and adult red hakes are seasonal visitors in Chesapeake Bay that are common during the late winter and spring months. They occur in the deeper channels of the bay within the seawater salinity zone as well as the deep channels of Hampton Roads Harbor, and they are occasionally found in the upper bay, extending as far north as the Patuxent River. Because the proposed action would occur entirely within the mixing salinity zone of the Severn River, this species would not be affected by the proposed action.

EFH that is either important to the long-term productivity of one or more managed species populations or deemed to be particularly vulnerable to degradation may be identified by fishery management councils and NMFS as a Habitat Area of Particular Concern. Habitat Areas of Particular Concern are located within the project area for adult and juvenile summer flounder (Chesapeake Bay) and all life stages of red drum (all coastal inlets).

The summer flounder stock was declared rebuilt in 2010, and according to a 2013 benchmark stock assessment, the summer flounder stock is not overfished and overfishing is not occurring. The following passage is contained in the Draft 2014 Review of the Chesapeake Bay Summer Flounder Fishery Management Plan (MDNR 2014):

> "Summer flounder are subject to localized benthic habitat disruption from non-fishing activities (Mid-Atlantic Fishery Management Council and National Marine Fisheries Service 2013). Habitat disruptions arise from projects that disturb the benthos and/or water quality such as marine mining, dredging, and construction (such as piling installation). The habitat impacts from these activities are believed to be localized and the negative effects on the summer flounder stock are anticipated to be minimal (Mid-Atlantic Fishery Management Council and National Marine Fisheries Service 2013)."

Based on the healthy summer flounder stock in the Chesapeake and the stated minimal impacts to summer flounder habitat as a result of construction activities along the shoreline, impacts to the Habitat Area of Particular Concern for summer flounder in the project area are anticipated to be minimal and not significant.

In 2009, an Atlantic States Marine Fisheries Commission stock assessment found the red drum stock to be relatively stable and offered a conservative conclusion that overfishing is not occurring. Management efforts focus on submerged aquatic vegetation, which is important habitat to the red drum, and water quality (MDNR 2013). Submerged aquatic vegetation (Reaches D1, D2, and possibly G) could be impacted under Alternative 1, as described under Section 3.2.2, *Environmental Consequences* for Water Resources. However, implementation of appropriate sediment and erosion control BMPs would minimize and avoid potential impacts to submerged aquatic vegetation from construction-related sedimentation. Long-term impacts to submerged aquatic vegetation as a result of the proposed action would be beneficial because improved water quality would better support its growth. In addition, the juvenile and adult lifestages of red drum are mobile and would be expected to avoid areas with ongoing construction

activity. Suitable habitat and prey species would be found in adjacent non-disturbed areas, resulting in negligible impacts to red drum and their habitat, with long term benefits to red drum and their habitat.

With implementation of appropriate sediment and erosion control BMPs and the observation of a restriction on in-water work between February 15 and June 15, temporary impacts to EFH during construction would be minimized. Re-establishment of the benthic substrate within the EFH (i.e., submerged aquatic vegetation) of temporarily damaged areas would naturally occur; however, monitoring and control measures may be necessary to ensure re-establishment is dominated by native species. Long-term impacts to EFH as a result of the proposed action would be beneficial because shoreline erosion and sedimentation would be reduced, thereby improving the quality of EFH.

The installation of sheet piles with an impact pile hammer can produce underwater noise that can affect fish species (Alternatives 2 and 3). The number of sheet piles to be driven on any particular day or time would vary and pile driving would not occur for the entire duration of the project. Since sheet piles are proposed to be installed in the upland environment, noise impacts would likely be less than those for nearshore installation. Based on this information, the effects of pile driving on fish would not be significant.

No impacts are anticipated to the federally- and state-listed Atlantic sturgeon, shortnose sturgeon, or sea turtles as they are highly unlikely to be present within the project area. In a letter dated June 29, 2015, USFWS concurred with the preferred alternative. Once design plans are finalized, the Navy anticipates reinitiating consultation with NMFS, as necessary, to minimize potential adverse impacts.

4.3 COASTAL USES

4.3.1 Mineral Extraction

The proposed action does not involve mineral extraction activities.

4.3.2 Electrical Generation and Transmission

The proposed action does not involve electrical generation or transmission.

4.3.3 Tidal Shore Erosion Control

The proposed action proposes the use of log toe stabilization and living shoreline where possible (based on environmental factors such as wave energy and currents) and eliminated the use of an offshore breakwater or seawall/bulkhead from further analysis.

Per the MOU, when the Department of Defense determines that mission requirements or safety may be threatened by wildlife attracted to living shoreline habitats, less preferred alternatives for shoreline stabilization, such as hardened structures, should be considered consistent to the maximum extent practicable with this Policy, after consultation with Maryland. By submitting a Joint Permit Application under Clean Water Act Sections 404/401 to the appropriate regulatory agencies, the Department of Defense demonstrates consistency with the substantive requirements of Maryland's Enforceable Coastal Policies.

4.3.4 Oil and Natural Gas Facilities

The proposed action does not involve oil and natural gas facilities.

4.3.5 Dredging and Disposal of Dredged Material

The proposed action would not involve dredging activities or require the disposal of dredged material.

4.3.6 Navigation

The proposed action has no potential to affect navigation.

4.3.7 Transportation

The proposed action is not a transportation facility project.

4.3.8 Agriculture

The proposed action does not involve agricultural land management activities or agricultural operations.

4.3.9 Development

The proposed action is not a development project.

4.3.10 Sewage Treatment

The proposed action does not involve sewage treatment.

5.0 CONCLUSION

Based upon the description of the proposed action, the locations where the actions would occur, and the above discussion of the proposed action as it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland,* the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

6.0 REFERENCES

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APPENDIX B
AGENCY CORRESPONDENCE

TABLE OF CONTENTS

APPENDIX B – AGENCY CORRESPONDENCE

Coastal Zone Management Act Consultation

Date	From	To	Page
September 15, 2014	NSA Annapolis	MDE, Wetlands and Waterways Program	B-5
January 7, 2015	NSA Annapolis	MDE, Wetlands and Waterways Program	B-9
January 7, 2015	NSA Annapolis	MDE, Tidal Wetlands Division – Baltimore Office	B-11
January 7, 2015	NSA Annapolis	MDE, Nontidal Wetlands and Waterways Division	B-13
January 7, 2015	NSA Annapolis	MDNR, Chesapeake and Coastal Service	B-15

USFWS, NMFS, and MDNR Wildlife and Heritage Service Coordination

Date	From	To	Page
October 22, 2014	NSA Annapolis	MDNR, Wildlife and Heritage Service	B-17
October 22, 2014	NSA Annapolis	NMFS, Administrator of Northeast Region	B-25
October 22, 2014	NSA Annapolis	USFWS, Chesapeake Bay Field Office	B-33
November 26, 2014	NOAA Fisheries, Habitat Conservation Division, Annapolis Field Office	NAVFAC Washington	B-41
December 2, 2014	MDNR, Wildlife and Heritage Service	NAVFAC Washington	B-43
January 7, 2015	NSA Annapolis	MDNR, Wildlife and Heritage Service	B-45
January 7, 2015	NSA Annapolis	MDNR, Critical Area Commission for the Chesapeake & Atlantic Coastal Bays	B-47
January 7, 2015	NSA Annapolis	MDNR, Forest Service	B-49
January 7, 2015	NSA Annapolis	MDNR, Coastal and Marine Assessment	B-51
January 7, 2015	NSA Annapolis	NMFS, Administrator of Northeast Region	B-53
January 7, 2015	NSA Annapolis	USFWS, Chesapeake Bay Field Office	B-55
February 26, 2015	NMFS, Greater Atlantic Regional Fisheries Office	NAVFAC Washington	B-57
April 8, 2015	NSA Annapolis	NMFS, Greater Atlantic Regional Fisheries Office	B-61

Date	From	To	Page
May 29, 2015	NOAA Fisheries, Habitat Conservation Division, Annapolis Field Office	NAVFAC Washington	B-65
June 29, 2015	USFWS, Chesapeake Bay Field Office	NAVFAC Washington	B-67

USACE

Date	From	To	Page
October 22, 2014	NSA Annapolis	USACE, Chief, Maryland Section Southern	B-71
January 7, 2015	NSA Annapolis	USACE	B-79

Maryland State Clearinghouse Coordination

Date	From	To	Page
January 7, 2015	NSA Annapolis	Maryland State Clearinghouse, Maryland Department of Planning	B-81
February 13, 2015	Maryland State Clearinghouse, Maryland Department of Planning	NAVFAC Washington	B-83
March 25, 2015	MDE Science Services Administration	NAVFAC Washington	B-87

Section 106 Consultation

Date	From	To	Page
January 7, 2015	NSA Annapolis	Advisory Council on Historic Preservation	B-95
January 7, 2015	NSA Annapolis	State Historic Preservation Officer, Acting Director, Maryland Historical Trust	B-97
January 7, 2015	NSA Annapolis	Maryland Historical Trust, Administrator, Review and Compliance, Department of Planning, Crownsville Office	B-99
May 29, 2015	NSA Annapolis	State Historic Preservation Officer, Acting Director, Maryland Historical Trust	B-101

Interested PartiesB-47

Date	From	To	Page
January 7, 2015	NSA Annapolis	Richard Spencer, Anne Arundel County Severn River Commission	B-105
February 12, 2015	EPA, Chesapeake Bay Program	NAVFAC Washington	B-107
February 13, 2015	National Park Service	NAVFAC Washington	B-111
February 13, 2015	National Parks Conservation Association	NAVFAC Washington	B-113
February 24, 2015	Severn River Commission	NAVFAC Washington	B-115
February 25, 2015	Citizens Advisory Committee, Chesapeake Executive Council	NAVFAC Washington	B-117
February 26, 2015	Chesapeake Conservancy	NAVFAC Washington	B-119
February 27, 2015	Congress of the United States, House of Representatives, John P. Sarbanes	NAVFAC Washington	B-121

Coastal Zone Management Act Consultation

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-114
September 15, 2014

Elder Ghigiarelli
Deputy Program Administrator
Maryland Department of the Environment
Wetlands and Waterways Program
1800 Washington Boulevard, Suite 430
Baltimore, Maryland 21230-1708

Mr. Ghigiarelli:

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

The U.S. Department of the Navy is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential effects of the proposed repair and restoration of the shoreline of the North Severn Complex at Naval Support Activity (NSA) Annapolis located in Annapolis, Maryland. This letter is intended to initiate early consultation concerning coastal resources or uses that may be affected by this project.

The proposed action being evaluated in the EA includes repairing and restoring approximately 22,000 linear feet of shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay at the North Severn Complex (Enclosure 1). Substantial shoreline areas have been severely damaged or made vulnerable to erosion due to wave energy, storms, slope saturation, and other factors. The proposed action is needed to address the severe erosion that is resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The repair and restoration of the North Severn Complex shoreline would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion.

To facilitate the EA analysis, the project area for the shoreline has been divided into smaller segments, or Reaches. Enclosure 2 shows these Reaches, which have been defined geographically, as well as based on the extent of erosion and the applicability of potential restoration measures.

The EA will evaluate three action alternatives. The shoreline reaches are the same under the three action alternatives; however, because not all repair alternatives are suitable for all shoreline reaches, each alternative includes two or more repair methods. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair.

5090
Ser ENV-114
September 15, 2014

Construction work for any of the alternatives would be accomplished either from on land, in the water, or a combination of the two, depending on the land and water constraints, such as biological or cultural resources, in the various work areas. Construction would begin in late 2015, and would be phased over a five-year period.

The following describes the three action alternatives for implementing the proposed action. Enclosure 3 provides illustrations of the shoreline repair methods included in the action alternatives.

Alternative 1 - Hardened Structure/Revetment: Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, D, E, F, and G and sheet pile along Reach C. The hardened structure/revetment includes: 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. For Reach C, a sheet pile structure would be installed on the Severn River side of the berm of a former dredge spoil lagoon. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. Culverts would be installed to allow overflow from the lagoon. The berm would be back-filled using suitable fill material.

Alternative 2 - Log Toe Stabilization: Alternative 2 would employ log toe stabilization and restoration along Reaches B, D, and G where potential wave energy is lower. Reaches A, E, and F would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. For the log toe stabilization method, natural untreated hardwood logs would be placed at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Upper portions of the embankment may be graded to a less erosive slope where appropriate.

Alternative 3 - Living Shoreline: Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. Living shoreline restoration techniques under this alternative would include the use of sills, groins, or breakwaters in combination with sand and other natural materials, and installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed to dissipate wave energy. In addition, upper portions of the embankment may be graded to a less erosive slope where appropriate.

The potential environmental impacts of these three action alternatives and the No Action Alternative will be analyzed in the EA. Additionally, pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et

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5090
Ser ENV-114
September 15, 2014

seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy will be preparing a Federal Coastal Consistency Determination for the proposed action.

The Navy respectfully requests any comments or concerns on the proposed action and alternatives be provided no later than 30 days from receipt of this letter for consideration during preparation of the EA. Advanced notification of significant concerns would also be greatly appreciated. Please direct all written correspondence to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures:
1. North Severn Complex Shoreline Project Area
2. Definition of Reaches
3. Illustrations of Alternative Shoreline Repair Methods

Copies to:
Joe Abe, Maryland Department of Natural Resources
Lisa Hoerger, Critical Area Commission
Rick Ayella, Maryland Department of the Environment
Amanda Sigillito, Maryland Department of the Environment
Marian Honeczy, Maryland Department of Natural Resources
Elizabeth Cole, Maryland Historical Trust
Catherine McCall, Maryland Department of Natural Resources
Anna Lubetski, NAVFAC Washington Environmental

3

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DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-012
January 7, 2015

Elder Ghigiarelli
Federal Consistency Coordinator
Deputy Program Administrator
Maryland Department of the Environment
Wetlands and Waterways Program
1800 Washington Boulevard, Suite 430
Baltimore, MD 21230-1708

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Mr. Ghigiarelli,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-012
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-011
January 7, 2015

Rick Ayella
Division Chief
Maryland Department of the Environment
Tidal Wetlands Division - Baltimore Office
1800 Washington Boulevard
Baltimore, MD 21230-1718

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Mr. Ayella,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-010
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-016
January 7, 2015

Amanda Sigillito
Division Chief
Maryland Department of the Environment
Nontidal Wetlands and Waterways Division
1800 Washington Boulevard
Baltimore, MD 21230-1718

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Sigillito,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-016
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

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1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-010
January 7, 2015

Joe Abe
Coastal Policy Coordination Section Chief
Chesapeake and Coastal Service
Maryland Department of Natural Resources
580 Taylor Avenue, E-2
Annapolis, Maryland 21401

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Mr. Abe,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-011
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

USFWS, NMFS, and MDNR Wildlife and Heritage Service Coordination

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-134
October 22, 2014

Lori A. Byrne
Maryland Department of Natural Resources
Wildlife and Heritage Service
580 Taylor Avenue
Tawes Office Building E-1
Annapolis, Maryland 21401

Dear Ms. Byrne:

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

The U.S. Department of the Navy is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential effects of the proposed repair and restoration of the shoreline of the North Severn Complex at Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. This letter is intended to initiate early coordination with your agency on this project.

The proposed action being evaluated in the EA includes repairing and restoring approximately 28,000 linear feet of shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay at the North Severn Complex (Enclosure 1). Substantial shoreline areas have been severely damaged or made vulnerable to erosion due to wave energy, storms, slope saturation, and other factors. The proposed action is needed to address the severe erosion that is resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The repair and restoration of the North Severn Complex shoreline would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion.

To facilitate the EA analysis, the project area for the shoreline has been divided into smaller segments, or Reaches. Enclosure 2 shows these Reaches, which have been defined geographically, as well as based on the extent of erosion and the applicability of potential restoration measures.

The EA will evaluate three action alternatives. The shoreline reaches are the same under the three action alternatives; however,

5090
Ser ENV-134
October 22, 2014

because not all repair alternatives are suitable for all shoreline reaches, each alternative includes two or more repair methods. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair.

Construction work for any of the alternatives would be accomplished either from on land, in the water, or a combination of the two, depending on the land and water constraints, such as biological or cultural resources, in the various work areas. Construction would begin in late 2015, and would be phased over a five-year period.

The following describes the three action alternatives for implementing the proposed action. Enclosure 3 provides illustrations of the shoreline repair methods included in the action alternatives.

Alternative 1 - Hardened Structure/Revetment: Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, D, E, F, and G and sheet pile along Reach C. The hardened structure/revetment includes: 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. For Reach C, a sheet pile structure would be installed on the Severn River side of the berm of a former dredge spoil lagoon. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. Culverts would be installed to allow overflow from the lagoon. The berm would be back-filled using suitable fill material.

Alternative 2 - Log Toe Stabilization: Alternative 2 would employ log toe stabilization and restoration along Reaches B, D, and G where potential wave energy is lower. Reaches A, E, and F would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. For the log toe stabilization method, natural untreated hardwood logs would be placed at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Upper portions of the embankment may be graded to a less erosive slope where appropriate.

Alternative 3 - Living Shoreline: Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method and Reach C

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5090
Ser ENV-134
October 22, 2014

would be repaired using the sheet pile method, as described under Alternative 1. Living shoreline restoration techniques under this alternative would include the use of sills, groins, or breakwaters in combination with sand and other natural materials, and installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed to dissipate wave energy. In addition, upper portions of the embankment may be graded to a less erosive slope where appropriate.

The potential environmental impacts of these three action alternatives and the No Action Alternative will be analyzed in the EA. The Navy respectfully requests any comments or concerns you may have on the proposed action and alternatives so that we may address them during preparation of the EA. Please provide your comments no later than 30 days from receipt of this letter. Advanced notification of significant concerns would also be greatly appreciated. Please direct all written correspondence to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

Matthew R. Klimoski

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction

Enclosures: 1. North Severn Complex Shoreline Project Area
2. Definition of Reaches
3. Illustrations of Alternative Shoreline Repair Methods

Copies to:
Anna Lubetski, NAVFAC Washington Environmental

3

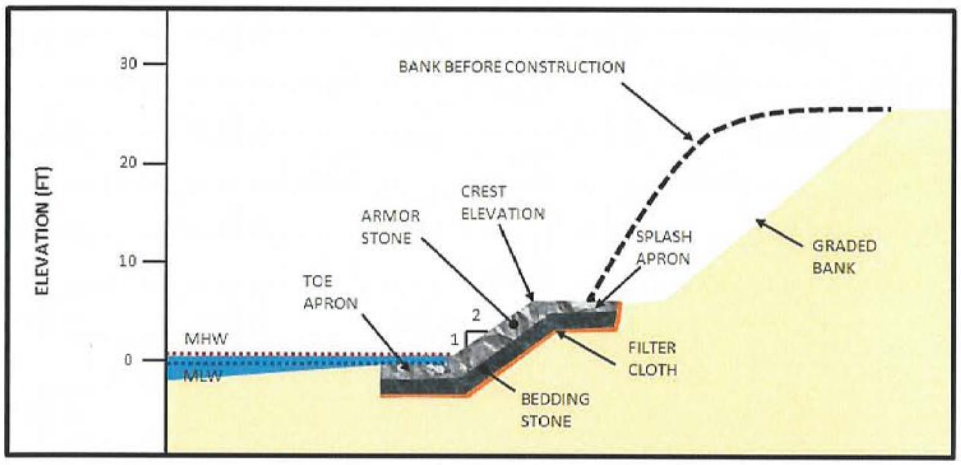
North Severn Complex Shoreline Project Area

Enclosure (1)

Definition of Reaches

Enclosure (2)

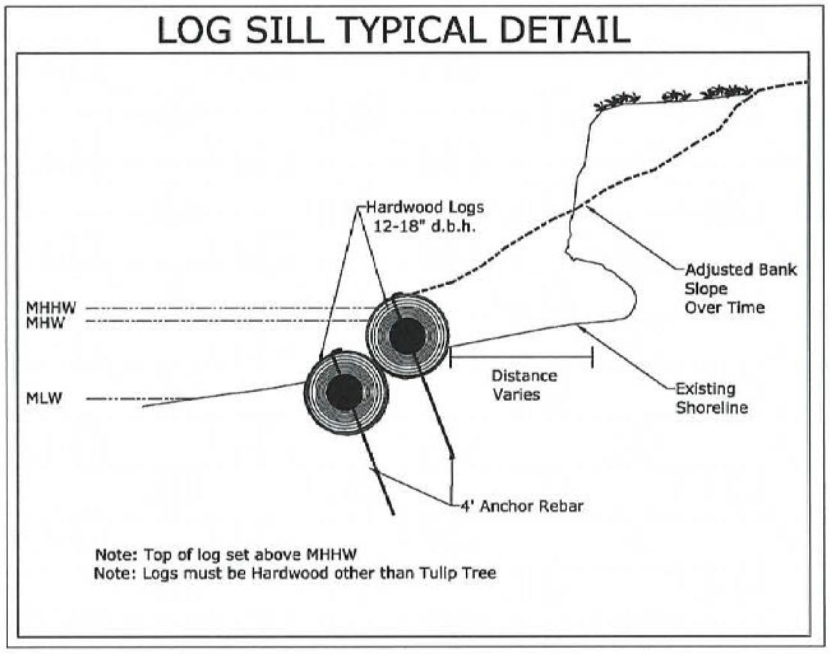
Illustrations of Alternative Shoreline Repair Methods



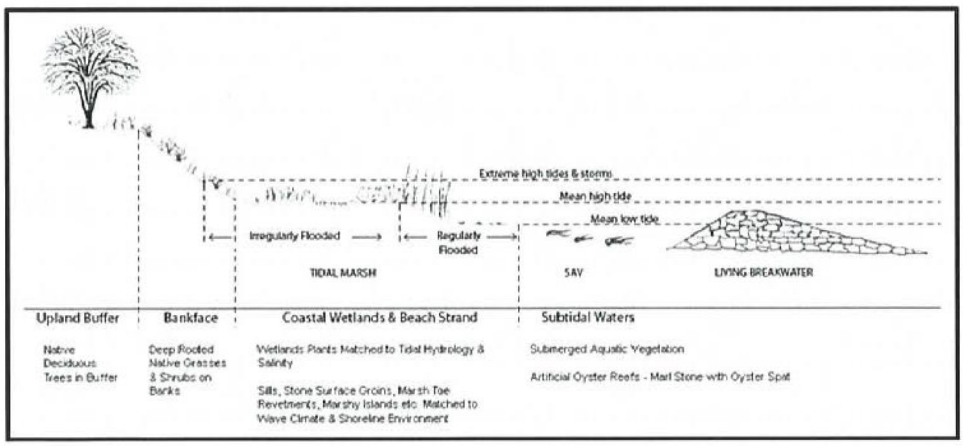
Typical Cross Section of Revetment

Typical Cross Section of Sheet Pile
(Sheet Pile can be seen at the Top of the Berm)

Enclosure (3)



Typical Detail of Log Toe Stabilization



Typical Living Shoreline Treatment

Enclosure (3)

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DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-135
October 22, 2014

Patricia Kurkul
Administrator of Northeast Region
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930-2298

Dear Ms. Kurkul:

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

The U.S. Department of the Navy is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential effects of the proposed repair and restoration of the shoreline of the North Severn Complex at Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. This letter is intended to initiate early coordination with your agency on this project.

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The EA will evaluate three action alternatives. The shoreline reaches are the same under the three action alternatives; however, because not all repair alternatives are suitable for all shoreline

5090
Ser ENV-135
October 22, 2014

reaches, each alternative includes two or more repair methods. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair.

Construction work for any of the alternatives would be accomplished either from on land, in the water, or a combination of the two, depending on the land and water constraints, such as biological or cultural resources, in the various work areas. Construction would begin in late 2015, and would be phased over a five-year period.

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Alternative 2 - Log Toe Stabilization: Alternative 2 would employ log toe stabilization and restoration along Reaches B, D, and G where potential wave energy is lower. Reaches A, E, and F would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. For the log toe stabilization method, natural untreated hardwood logs would be placed at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Upper portions of the embankment may be graded to a less erosive slope where appropriate.

Alternative 3 - Living Shoreline: Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under

2

5090
Ser ENV-135
October 22, 2014

Alternative 1. Living shoreline restoration techniques under this alternative would include the use of sills, groins, or breakwaters in combination with sand and other natural materials, and installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed to dissipate wave energy. In addition, upper portions of the embankment may be graded to a less erosive slope where appropriate.

The potential environmental impacts of these three action alternatives and the No Action Alternative will be analyzed in the EA. The Navy respectfully requests any comments or concerns you may have on the proposed action and alternatives so that we may address them during preparation of the EA. Please provide your comments no later than 30 days from receipt of this letter. Advanced notification of significant concerns would also be greatly appreciated. Please direct all written correspondence to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction

Enclosures: 1. North Severn Complex Shoreline Project Area
2. Definition of Reaches
3. Illustrations of Alternative Shoreline Repair Methods

Copies to:
Anna Lubetski, NAVFAC Washington Environmental

3

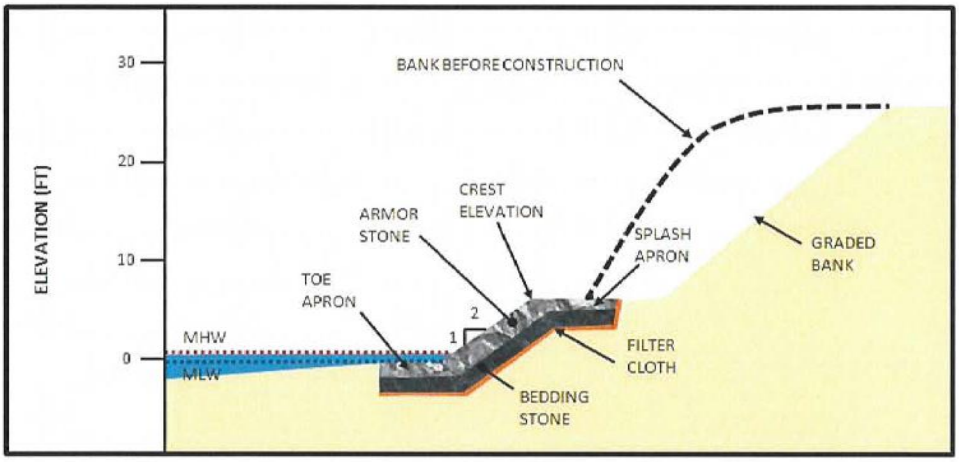
North Severn Complex Shoreline Project Area

Enclosure (1)

Definition of Reaches

Enclosure (2)

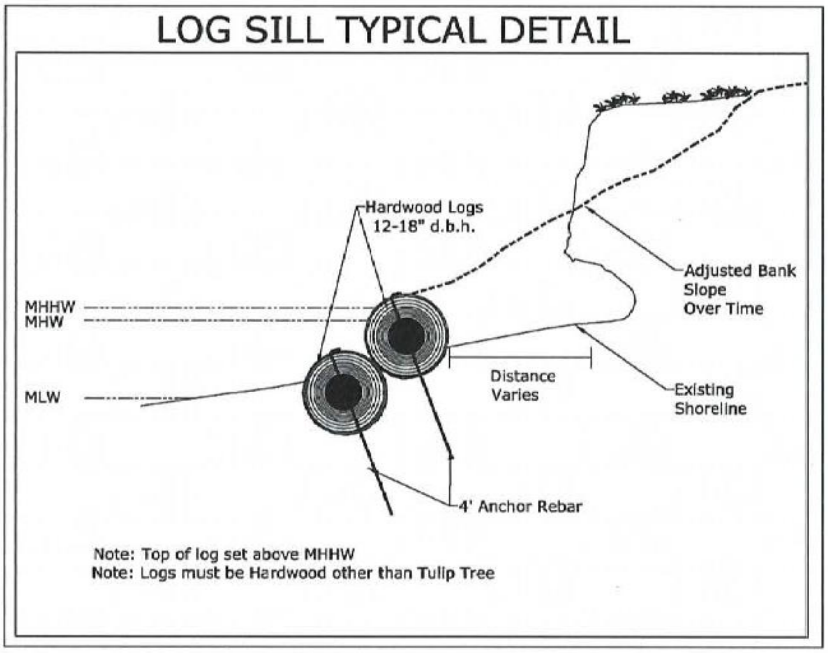
Illustrations of Alternative Shoreline Repair Methods



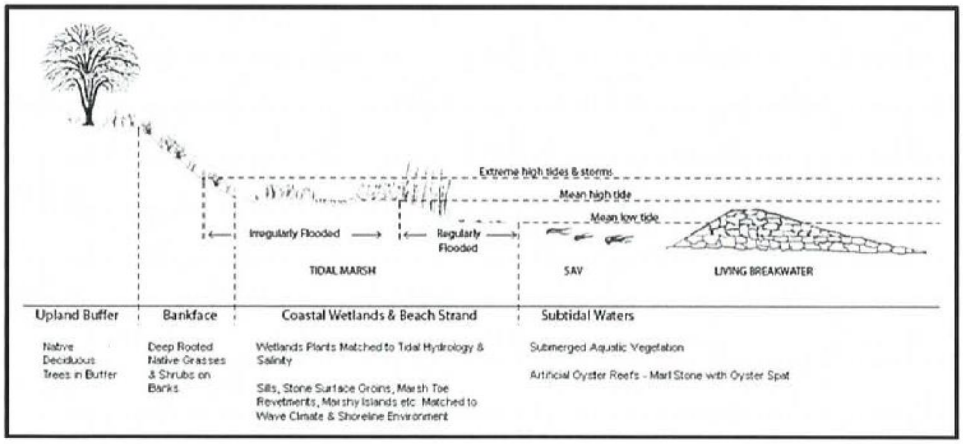
Typical Cross Section of Revetment

Typical Cross Section of Sheet Pile
(Sheet Pile can be seen at the Top of the Berm)

Enclosure (3)



Typical Detail of Log Toe Stabilization



Typical Living Shoreline Treatment

Enclosure (3)

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DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-137
October 22, 2014

Craig Koppie
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401-7307

Dear Mr. Koppie:

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

The U.S. Department of the Navy is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential effects of the proposed repair and restoration of the shoreline of the North Severn Complex at Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. This letter is intended to initiate early coordination with your agency on this project.

The proposed action being evaluated in the EA includes repairing and restoring approximately 28,000 linear feet of shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay at the North Severn Complex (Enclosure 1). Substantial shoreline areas have been severely damaged or made vulnerable to erosion due to wave energy, storms, slope saturation, and other factors. The proposed action is needed to address the severe erosion that is resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The repair and restoration of the North Severn Complex shoreline would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion.

To facilitate the EA analysis, the project area for the shoreline has been divided into smaller segments, or Reaches. Enclosure 2 shows these Reaches, which have been defined geographically, as well as based on the extent of erosion and the applicability of potential restoration measures.

The EA will evaluate three action alternatives. The shoreline reaches are the same under the three action alternatives; however,

5090
Ser ENV-137
October 22, 2014

because not all repair alternatives are suitable for all shoreline reaches, each alternative includes two or more repair methods. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair.

Construction work for any of the alternatives would be accomplished either from on land, in the water, or a combination of the two, depending on the land and water constraints, such as biological or cultural resources, in the various work areas. Construction would begin in late 2015, and would be phased over a five-year period.

The following describes the three action alternatives for implementing the proposed action. Enclosure 3 provides illustrations of the shoreline repair methods included in the action alternatives.

Alternative 1 - Hardened Structure/Revetment: Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, D, E, F, and G and sheet pile along Reach C. The hardened structure/revetment includes: 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. For Reach C, a sheet pile structure would be installed on the Severn River side of the berm of a former dredge spoil lagoon. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. Culverts would be installed to allow overflow from the lagoon. The berm would be back-filled using suitable fill material.

Alternative 2 - Log Toe Stabilization: Alternative 2 would employ log toe stabilization and restoration along Reaches B, D, and G where potential wave energy is lower. Reaches A, E, and F would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. For the log toe stabilization method, natural untreated hardwood logs would be placed at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Upper portions of the embankment may be graded to a less erosive slope where appropriate.

Alternative 3 - Living Shoreline: Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F, and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method and Reach C

2

5090
Ser ENV-137
October 22, 2014

would be repaired using the sheet pile method, as described under Alternative 1. Living shoreline restoration techniques under this alternative would include the use of sills, groins, or breakwaters in combination with sand and other natural materials, and installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed to dissipate wave energy. In addition, upper portions of the embankment may be graded to a less erosive slope where appropriate.

The potential environmental impacts of these three action alternatives and the No Action Alternative will be analyzed in the EA. The Navy respectfully requests any comments or concerns you may have on the proposed action and alternatives so that we may address them during preparation of the EA. Please provide your comments no later than 30 days from receipt of this letter. Advanced notification of significant concerns would also be greatly appreciated. Please direct all written correspondence to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction

Enclosures: 1. North Severn Complex Shoreline Project Area
2. Definition of Reaches
3. Illustrations of Alternative Shoreline Repair Methods

Copies to:
Anna Lubetski, NAVFAC Washington Environmental

3

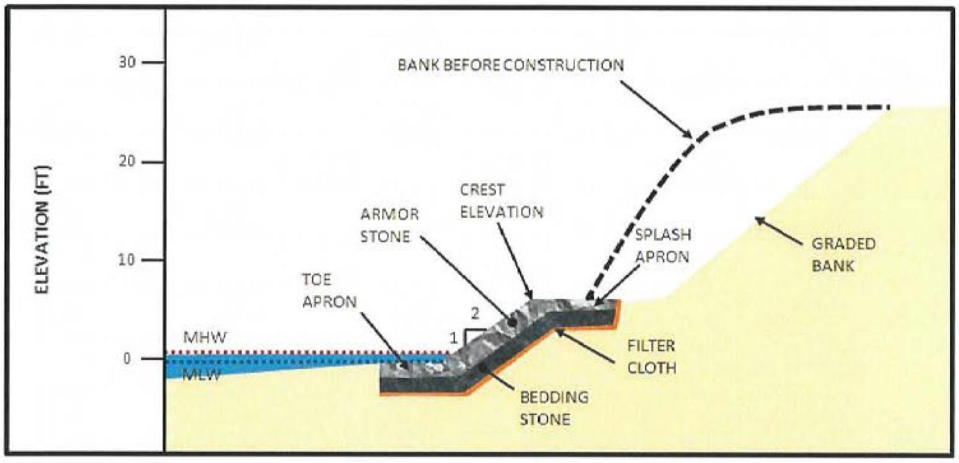
North Severn Complex Shoreline Project Area

Enclosure (1)

Definition of Reaches

Enclosure (2)

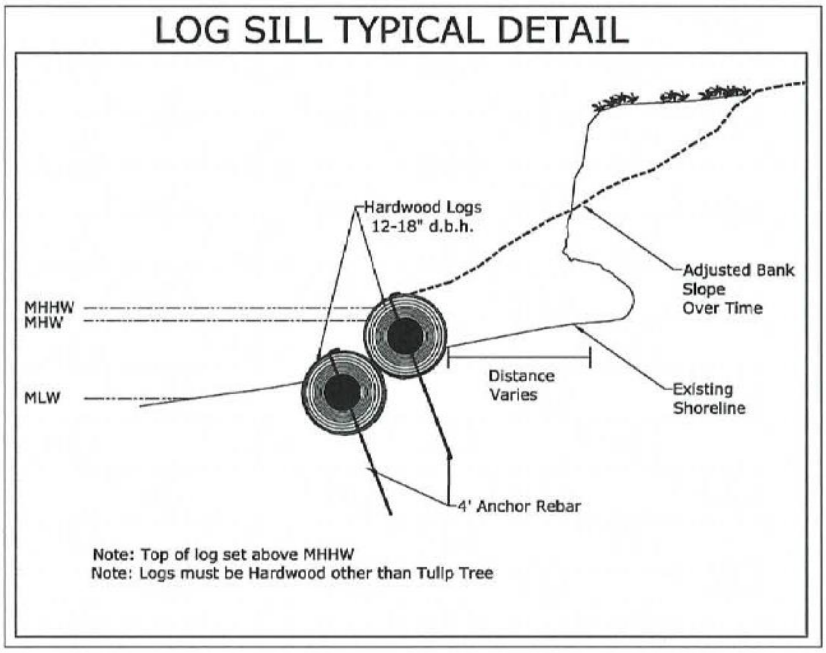
Illustrations of Alternative Shoreline Repair Methods



Typical Cross Section of Revetment

Typical Cross Section of Sheet Pile
(Sheet Pile can be seen at the Top of the Berm)

Enclosure (3)



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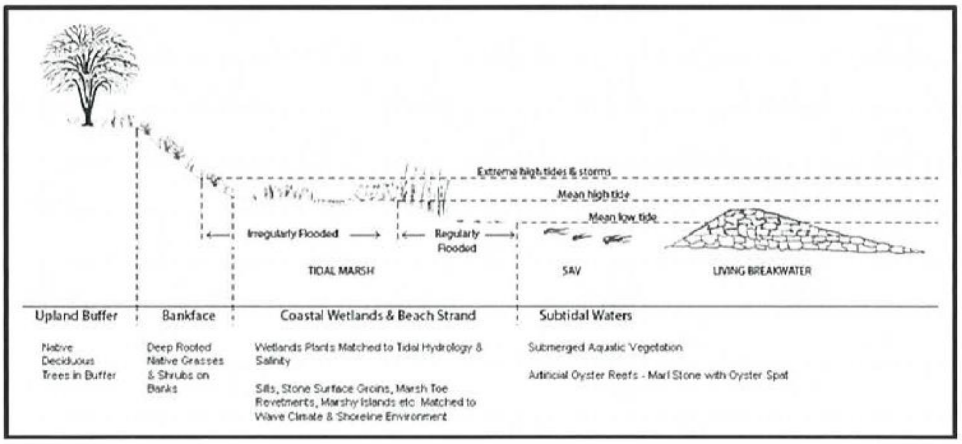

Typical Living Shoreline Treatment

Enclosure (3)

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NOAA Fisheries
Habitat Conservation Division
Annapolis Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

November 26, 2014

TO: Anna Lubetski
Naval Facilities Engineering Command Washington
Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C. 20374

SUBJECT: 5090 Ser ENV-135
Repair and Restoration of North Severn Shoreline
Anne Arundel County, Maryland

Kristy Beard
(Reviewing Biologist)

As you requested by letter received October 29, 2014, we have reviewed the information you provided regarding the three action alternatives to be considered in your Environmental Assessment (EA).

In preparation of your EA, we recommend you consider the long-term stability of the methods proposed in your alternatives. In particular, log toe stabilization has not been used often in this area in a saline setting, and is used more in a riverine or stream setting. The use of untreated logs would likely have a short lifespan before the work slumps and needs to be replaced or repaired. The use of treated logs would not be preferable, because they chronically leach by design. We support the use of more natural approaches where possible in the lower energy reaches, but encourage you to consider rock sills or rock toe protection in your NEPA analysis to improve the likelihood of long term stability if a structural component would be required in those sections.

We also offer the following preliminary comments pursuant to the Endangered Species Act, the Fish and Wildlife Coordination Act, and the Magnuson-Stevens Fishery Conservation and Management Act:

Endangered Species Act

No threatened or endangered species under the jurisdiction of the NMFS are known to occur in within the project area. As a result, further consultation by the federal action agency is not required. However should project plans change that would alter the basis for determination, or if a new species or critical habitat is designated, consultation should be reinitiated.

Fish and Wildlife Coordination Act

The Severn River provides habitat for a variety of NOAA trust resources. This waterway serves as nursery and forage area for anadromous fish, and herring and white and yellow perch spawning is documented to occur in the Severn River. Efforts should be made to avoid and minimize adverse effects to the aquatic environment. Best management practices should be used

to minimize the release of suspended sediment in the waterway. Time of year restrictions may be necessary for in-water work during spawning periods.

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated within the project area. Further EFH consultation by the federal action agency may be required as part of the federal permit process. For a listing of EFH and further information, please go to our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat. The website also contains information on descriptions of EFH for each species, guidance on the EFH consultation process including EFH assessments, and information relevant to other NMFS mandates. If you wish to discuss this further, please e-mail Kristy.Beard@noaa.gov or call 410-573-4542.

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, *Governor*
Anthony G. Brown, *Lt. Governor*
Joseph P. Gill, *Secretary*
Frank W. Dawson III, *Deputy Secretary*

December 2, 2014

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, DC 20374

RE: Environmental Review for Repair and Restoration of North Severn Shoreline at Naval Support Activity Annapolis, Mill Creek/Carr Creek/Seven River, Anne Arundel County, Maryland.

Dear Ms. Lubetski:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. This statement should not be interpreted however as meaning that rare, threatened or endangered species are not in fact present. If appropriate habitat is available, certain species could be present without documentation because adequate surveys have not been conducted.

We would also like to point out that the open waters that are adjacent to or part of the site are known historic waterfowl concentration areas. If there is to be any construction of water-dependent facilities please contact Larry Hindman of the WHS Service at (410) 221-8838 ext. 105 for further technical assistance regarding waterfowl. Please note that the utilization of state funds, or the need to obtain a state-authorized permit, may warrant additional evaluations that could lead to protection or survey recommendations by the Wildlife and Heritage Service.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2014.1689.aa
Cc: L. Hindman, DNR
K. Charbonneau, CAC

Tawes State Office Building – 580 Taylor Avenue – Annapolis, Maryland 21401

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DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-005
January 7, 2015

Lori Byrne
Maryland Department of Natural Resources
Wildlife and Heritage Service
580 Taylor Avenue
Tawes Office Building E-1
Annapolis, Maryland 21401

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Byrne,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. This letter is intended to initiate consultation concerning state listed threatened or endangered species that may occur within the proposed sites for this project.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command

5090
Ser ENV-005
January 7, 2015

Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-013
January 7, 2015

Lisa Hoerger
Regulations Coordinator
Department of Natural Resources
Critical Area Commission for the Chesapeake & Atlantic Coastal Bays
1804 West Street
Suite 100
Annapolis, MD 21401

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Hoerger,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-013
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-014
January 7, 2015

Marian Honeczy
Supervisor of Urban Programs & FCA Coordinator
Department of Natural Resources
Forest Service
Tawes State Office Building E1
580 Taylor Avenue
Annapolis, MD 21401-2397

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Honeczy,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

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The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-014
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

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Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-015
January 7, 2015

Catherine McCall
Division Director
Coastal and Marine Assessment
Maryland Department of Natural Resources
580 Taylor Avenue, E-2
Annapolis, MD 21401

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. McCall,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project.

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The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-015
January 7, 2015

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Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-008
January 7, 2015

Patricia Kurkul
Administrator of Northeast Region
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930-2298

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Kurkul,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-008
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-007
January 7, 2015

Craig Koppie
Chesapeake Bay Field Office
U.S. Fish and Wildlife Service
177 Admiral Cochrane Dr.
Annapolis, Maryland 21401

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Mr. Koppie,

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The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command

5090
Ser ENV-007
January 7, 2015

Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

FEB 26 2015

Anna Lubetski - Environmental
Naval Facilities Engineering Command Washington
1314 Harwood Street, SE, Building 212
Washington, D.C. 20374

SUBJECT: 5090 Ser ENV-135
Repair and Restoration of North Severn Shoreline; Anne Arundel County, Maryland

Thank you for providing your *Draft Environmental Assessment (EA) for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* for our review. The EA evaluates the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis. NSA Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay using four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization with natural untreated hardwood logs, and 4) living shoreline.

As you know, the Magnuson Stevens Fishery Conservation and Management Act (MSA) requires federal agencies such as the Navy to consult with us on any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect essential fish habitat (EFH) identified under the MSA. Because the in-water work proposed by the Navy will affect EFH, this process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments, lists the required contents of EFH assessments, and generally outlines each agency's obligations in this consultation procedure.

Our EFH regulations allow Federal agencies to incorporate an EFH assessment into documents prepared for other purposes including National Environmental Policy Act (NEPA) documents such as this draft EA, provided certain conditions are met. If an EFH assessment is contained in another document, it must be clearly identified as an EFH assessment and include all of the following mandatory elements including: (i) a description of the action, (ii) an analysis of the potential adverse effects of the action on EFH and the managed species, (iii) the Federal agency's conclusions regarding the effects of the action on EFH, and (iv) proposed mitigation, if applicable.

Your draft EA includes the majority of the required contents of an EFH assessment, but it is lacking a complete description of the action, including details such as design plans and information about the potential size, shape, and placement of structures. Without this information, we are unable to fully evaluate the potential impacts to habitat. Once you can provide us with a complete description of the action as part of your EFH assessment, you will

need to reinitiate consultation with us. We recognize that you are still determining your preferred alternative; therefore we are providing the following comments based on the limited information you provided.

General Comments

Alternative 1 would employ a hardened structure, or revetment, along all designated reaches (Reaches A, B, C, D, E, F, and G). The hardened structure/revetment for this alternative includes 1) armoring of the lower portions of the slope with riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. As described in Chapter 3 of the draft EA, the construction of revetments would permanently impact wetlands located within the revetment footprint, as they would be covered with hardened material. The specific areas and types of wetlands impacted would be determined during the design phase.

Without detailed design plans and information about the potential size, shape, and placement of structures, it is difficult to evaluate the potential impacts to habitat; however, armoring all designated reaches of the shoreline would lead to a loss of habitat functions along the shoreline. We encourage you to use more natural approaches where possible.

Alternative 2 would employ log toe stabilization along Reaches B, D, and G where potential wave energy is lower. The log toe stabilization method includes the placement of natural untreated hardwood logs at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Reaches A, E, and F would be repaired using a hardened structure/revetment method (the same method used under Alternative 1), and Reach C would be repaired using the sheet pile method.

Log toe stabilization has not been used often in this area in a saline setting, and is used more in a riverine or stream setting. The use of untreated logs would likely have a short lifespan before the work slumps and needs to be replaced or repaired. We support the use of more natural approaches where possible in the lower energy reaches, but encourage you to consider the lifespan of your methods. Increased long term stability would reduce the need for repairs in the future, and therefore reduce impacts to NMFS trust resources.

Alternative 3 would incorporate living shoreline restoration techniques in Reaches B, D, F, and G, where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method, as described in Alternative 1, and Reach C would be repaired using the sheet pile method. A breakwater may be installed, consisting of a trapezoidal stone structure, for the purpose of dissipating wave energy before waves reach the shore.

We support the use of more natural approaches where possible in the lower energy reaches. The use of sills, groins, or breakwaters in combination with sand, and other natural materials in the living shoreline locations would improve the likelihood of long term stability in sections where a structural component would be required. However, it is difficult to determine what habitat trade-offs would result from each of the Alternatives without detailed design plans and information about the potential size, shape, and placement of structures. The potential loss of shallow water

2

habitat and submerged aquatic vegetation (SAV) is of particular concern, and we are lacking information to evaluate the potential impacts.

Based on the information in your draft EA, we offer the following comments pursuant to the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act. Once design plans are available and you reinitiate consultation with us using a complete EFH assessment, we may have additional comments and recommendations.

Fish and Wildlife Coordination Act
The Severn River provides habitat for a variety of NOAA trust resources. This waterway serves as nursery and forage area for anadromous fish, and herring and white and yellow perch spawning is documented to occur in the Severn River. Efforts should be made to avoid and minimize adverse effects to the aquatic environment, including restriction of in-water work during anadromous fish spawning periods (February 15 – June 15). Best management practices should be used to minimize the release of suspended sediment in the waterway and are briefly described in the EA.

Magnuson Stevens Fishery Conservation and Management Act
The project area has been designated as essential fish habitat (EFH) for a number of federally managed species including bluefish (*Pomatomus saltatrix*), summer flounder (*Paralichthys dentatus*), and others. Based on salinity tolerances and ecology of federally managed species that occur in the Chesapeake Bay, only some of the species with designated EFH (described in the draft EA) are likely to occur in the project area.

Of the species you listed in the draft EA, it would be helpful to explain why EFH for certain species is or is not expected to be affected (e.g., EFH for adult Atlantic herring and red hake is designated in the seawater salinity zone of the Chesapeake Bay, therefore it would not be impacted because the project would occur in the mixing salinity zone). A complete list of species and life stages for which EFH has been designated can be found on our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat/. The website also contains information on descriptions of EFH for each species, guidance on the EFH consultation process including EFH assessments, and information relevant to other NMFS mandates.

EFH Conservation Recommendations
To minimize impacts to designated EFH, we offer the following EFH conservation recommendations pursuant to Section 305(b) (4) (A) of the MSA.

1. Installation of sheet piles using an impact hammer should not exceed NMFS interim criteria for pile driving (SPL_{peak} of 206 dB re 1 μPa and SEL_{cum} of 187 dB re 1μPa^2•s for fish ≥2 grams and 183 dB re 1 μPa^2•s for fish <2 grams (Popper et al 2014)) as described in the draft EA, Additional measures will be necessary to protect EFH if the noise criteria are exceeded.

Habitat Areas of Particular Concern (HAPC) are designated for summer flounder in the Chesapeake Bay and include all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed as well as loose aggregations, within adult and juvenile EFH.

3

The draft EA indicates that:

> "Within the project area, submerged aquatic vegetation is generally limited to the upper portions of Carr Creek and Mill Creek (NAVFAC Washington 2011a), which would correspond to Reach D1 and D2, which are along Car Creek. The upper portion of Mill Creek is outside the project area – Reach G is located along the bottom portion of Mill Creek but is assumed to have submerged aquatic vegetation because information is limited."

2. Efforts should be made to avoid and minimize impacts to HAPCs, including: designing the project to avoid placement of structures within the footprint of SAV or in a way that would cause scour impacts to SAV. For alternatives 2 and 3, gaps in structures should be included to allow water exchange and the movement of aquatic species.

Please note that Section 305(b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including a description of measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305(b) (4) (B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects pursuant to 50 CFR 600.920(k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for above determination.

If you wish to discuss this further, please e-mail Kristy.Beard@noaa.gov or call 410-573-4542. We look forward to your response to our EFH Conservation Recommendations and to working with you as this project developes further.

Sincerely,

Louis A. Chiarealla
Assistant Regional Administrator
for Habitat Conservation

4

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-064
April 8, 2015

Louis A. Chiarealla
Assistant Regional Administrator for
Habitat Conservation
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Mr. Chiarealla:

SUBJECT: REPAIR AND RESTORATION OF NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Thank you for your comments of February 26, 2015 with regards to the Navy's Draft Environmental Assessment (EA) for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland.

The purpose of this letter is to formally respond to the Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) conservation recommendations provided by the National Marine Fisheries Service (NMFS) in correspondence dated February 26, 2015. Your letter identified several EFH conservation recommendations as presented in the enclosed comment and response matrix. The Navy intends to comply with each of these recommendations to the extent practicable and the EFH conservation recommendations presented in your February 2015 correspondence along with Best Management Practices would be incorporated into the Plans and Specifications for the project, as appropriate. However, at this time, the preferred alternative has not been identified nor have any design details been finalized. Therefore, the Navy anticipates to reinitiate consultation with NMFS at a later date when the impacts of the proposed project are fully realized.

5090
Ser ENV-064
April 8, 2015

If you have any questions or need further information on this project, please contact Ms. Anna Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By direction of the Commanding Officer

Enclosure: Comment and Response Matrix

Copies to: Anna Lubetski, NAVFAC Washington Environmental

2

COMMENT AND RESPONSE MATRIX

Page	*Para*	*Sentence*	*Comment*	*Response*
1	4	1	Your Draft EA includes the majority of the required contents of an EFH Assessment, but it is lacking a complete description of the action, including details such as design plans and information about the potential size, shape, and placement of the structures.	Because the project is currently in the preliminary design stage, the types, size and placements of structures is currently unknown. Further consultation with NMFS would be initiated when the design details are finalized.
2	3	1	Alternative 1: Without detailed design plans and information about the potential size, shape and placement of the structures, it is difficult to evaluate the potential impacts to habitat; however, armoring all designated reaches of the shoreline would lead to a loss of habitat functions along the shoreline. We encourage you to use more natural approaches where possible	Because the project is currently in the preliminary design stage, the types, size and placements of structures is currently unknown. Further consultation with NMFS would be initiated when the design details are finalized.
2	5	1	Alternative 2: Log toe stabilization has not been used often in this area in a saline setting, and is used more in a riverine or stream setting. The use of untreated logs would likely have a short lifespan before the work slumps and needs to be replaced or repaired. We support your use of more natural approaches where possible in the lower energy reaches, but encourage you to consider the lifespan of your methods. Increased long term stability would reduce the need for repairs in the future, and therefore reduce impacts to NMFS trust resources	Because the project is currently in the preliminary design stage, the preferred method of shoreline stabilization has not been determined. Further consultation with NMFS would be initiated when the design details are finalized
2	7	1	Alternative 3: We support your use of more natural approaches where possible in the lower energy reaches. The use of sills, groins, or breakwaters in combination with sand, and other natural materials in the living shoreline locations would improve the likelihood of long term stability in sections where a structural component would be required. However, it is difficult to determine what habitat tradeoffs would result from each of the alternatives without detailed design plans and information about the potential size, shape and placement of the structures. The potential loss of shallow water habitat and Submerged aquatic vegetation (SAV) is of particular concern, and we are lacking information to evaluate the potential impacts.	Because the project is currently in the preliminary design stage, the types, size and placements of structures is currently unknown. The EA/EFH has been updated to state that impacts to SAV would be avoided to the maximum extent practicable and gaps would be incorporated into the design of the structures where appropriate. Further consultation with NMFS would be initiated when the design details are finalized.
3	3	3	Efforts should be made to avoid and minimize adverse effects to the aquatic community, including restriction of in water work during anadromous fish spawning periods (February 15 - June 15)	A restriction prohibiting in water work during anadromous fish spawning periods (February 15-June 15) has been added to the EA/EFH.
3	5	1	Of the species you listed in the draft EA, it would be helpful to explain why EFH for certain species is or is not expected to be affected (e.g., EFH for adult Atlantic herring and red hake is designated in the seawater salinity zone of the Chesapeake Bay, therefore it would not be impacted because the project would occur in the mixing salinity zone).	Additional details have been added for each species listed with EFH in the proposed project area, including explanations as to whether it would or would not be affected by the proposed action.
3	6-7	1	To minimize impacts to designated EFH, we offer the following EFH conservation recommendations pursuant to Section 305(b)(4)(A) of the MSA. 1. Installation of sheet piles using an impact hammer should not exceed NMFS interim criteria for pile driving (SPL peak of 206 dB re 1 uPa and SEL cum of 187 dB re 1uPa2's for fish $\geq$ 2 grams and 183 dB re 1 uPa2's for fish < 2 grams (Popper et al 2014)) as described in the draft EA. Additional measures will be necessary to protect EFH if the noise criteria are exceeded.	Comment noted. Additional minimization measures have been added to the EA/EFH.
4	2	1	Efforts should be made to avoid and minimize adverse effects to HAPCs, including: designing the project to avoid placement of structures within the footprint of SAV or in a way that would cause scour impacts to SAV. For Alternatives 2 and 3, gaps in structures should be included to allow water exchange and the movement of aquatic species	Because the project is currently in the preliminary design stage, the types, size and placements of structures is currently unknown. The EA/EFH has been updated to state that impacts to SAV would be avoided to the maximum extent practicable and gaps would be incorporated into the design of the structures where appropriate. Further consultation with NMFS would be initiated when the design details are finalized.
4	3	1	Please note that Section 305(b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH conservation recommendations, including a description of measures adopted by you for avoiding, mitigation of offsetting the impacts of the project on EFH.	Avoidance, minimization and mitigation measures have been identified for potential impacts to EFH, where known. Further consultation with NMFS would be initiated when the design details are finalized.

From: Kristy Beard - NOAA Federal
To: Lubetski, Anna M CIV NAVFAC Washington
Cc: Sadlon, William P CIV NAVFAC Washington; Markos, Wendy B CIV Navfac Wash, PWD Annapolis
Subject: Re: North Severn Shoreline EA
Date: Friday, May 29, 2015 8:47:05

Thanks Anna. I do not have additional comments, and will not be providing another letter in response to your changes. I look forward to continuing the consultation process as you determine your final design plans.

Thanks!
Kristy

On Mon, May 11, 2015 at 1:37 PM, Lubetski, Anna M CIV NAVFAC Washington <anna.lubetski@navy.mil> wrote:

Kristy,

We sent the attached letter on 8 April 2015 in response to the comments received from NMFS on 26 February 2015. We wanted to follow-up with you to see if the comments were adequately addressed in the EA and whether there will be another letter in response to these changes. Please let me know if you have any additional comments, and thank you for your time.

V/R,
Anna

Anna Lubetski
Natural Resources Specialist
NAVFAC Washington
1314 Harwood Street SE
Bldg 212
Washington Navy Yard
Washington, DC 20374
[P] 202.685.8479
[F] 202.685.0615
[DSN] 325.8479
anna.lubetski@navy.mil

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Kristy Beard
Marine Habitat Resource Specialist
Habitat Conservation Division

NOAA Fisheries
177 Admiral Cochrane Drive
Annapolis, MD 21401
410-573-4542

http://www.nmfs.noaa.gov/ <http://www.nmfs.noaa.gov/pr/>

From: Koppie, Craig
To: Lubetski, Anna M CIV NAVFAC Washington; Chris Guy; Julie Thompson
Subject: Re: North Severn Shoreline EA
Date: Monday, June 29, 2015 11:13:18

Ms. Lubetski,

This is in reply to your request for review and comments for the Draft EA- Repair and Restoration of the North Severn shoreline at Naval Support Activity Annapolis. The Greenbury Point peninsula provides an array of benefits to aquatic and terrestrial life including recreational opportunities for the local urban community. The Service is in support of a combination of all three Alternatives currently being proposed to reduce shoreline erosion at Carr Creek, Mill Creek and Greenbury Point peninsula.

We concur with the Navy's plan to implement Alternative 1- Hardened Structure (rip-rap) along Reach A, the eastern side of Greenbury Point, where wave action is greatest and continues to erode the shoreline. Alternative 2, Log Toe Stabilization and Alternative 3, Living Shoreline, would reconcile for shallow aquatic habitat loss in Reaches B,
C, and D1-D2. The use of natural substrate (logs) for anchoring and retaining bank stability along with marsh grass planting would accelerate natural, regenerative processes to restore shallow bay-marsh habitats of Car Creek and Mill Creek.

We appreciate the opportunity to comment on the draft EA and look forward to witnessing a successful shoreline restoration project once completed.

On Mon, Jun 29, 2015 at 7:26 AM, Lubetski, Anna M CIV NAVFAC Washington <anna.lubetski@navy.mil> wrote:

Craig,

I was out of the office on Friday. I am in today, please let me know when is a good time for you to discuss the North Severn Shoreline EA.

Thanks,
Anna

-----Original Message-----
From: Koppie, Craig [mailto:craig_koppie@fws.gov]
Sent: Friday, June 26, 2015 12:04 PM
To: Lubetski, Anna M CIV NAVFAC Washington
Cc: Chris Guy
Subject: Re: North Severn Shoreline EA

Anna,

Good morning. I left you a voice mail today regarding the Draft EA review for the repair and restoration of the North Severn Shoreline at Naval Support Activity Annapolis. If you are in the office today, would you please give me a call to discuss. Otherwise, lets talk on Monday so I can send you our response at that time. Thanks, Craig

On Wed, Jun 10, 2015 at 11:46 AM, Lubetski, Anna M CIV NAVFAC Washington <anna.lubetski@navy.mil> wrote:

Mr. Koppie and Mr. Guy,

The Chesapeake Bay Field Office website lists you both as Military Base issues points of contacts. I am following up with you both on the below email. Could you please send any questions/comments, or confirm the Service does not have any comments on the EA to me by 15 June 2015?

V/R,
Anna

-----Original Message-----
From: Lubetski, Anna M CIV NAVFAC Washington
Sent: Monday, May 11, 2015 2:46 PM
To: 'Koppie, Craig'
Cc: Sadlon, William P CIV NAVFAC Washington; Markos, Wendy B CIV Navfac Wash, PWD Annapolis
Subject: North Severn Shoreline EA

Mr. Koppie,

I am contacting you to follow-up on the attached letter that was sent to your office on 7 January 2015 regarding the Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis in Annapolis, MD. Since we have not received a response from your office, we wanted to confirm you had no comments on the proposed project. If you have additional questions, or to confirm you have no comments, please contact me by 18 May 2015.

V/R,
Anna Lubetski

Anna Lubetski
Natural Resources Specialist
NAVFAC Washington
1314 Harwood Street SE
Bldg 212
Washington Navy Yard
Washington, DC 20374
[P] 202.685.8479
[F] 202.685.0615
[DSN] 325.8479
anna.lubetski@navy.mil

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Craig Koppie
Eagle/Raptor Biologist
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Craig_Koppie@fws.gov
410/573-4534

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Craig Koppie
Eagle/Raptor Biologist
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Craig_Koppie@fws.gov
410/573-4534

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USACE

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO
5090
Ser ENV-136
October 22, 2014

Kathy Anderson
Chief, Maryland Section Southern
U.S. Army Corps of Engineers
P.O. Box 1715
10 S. Howard Street
Baltimore, MD 21203-1715

Dear Ms. Anderson:

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

The U.S. Department of the Navy is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) to evaluate the potential effects of the proposed repair and restoration of the shoreline of the North Severn Complex at Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. This letter is intended to initiate early coordination with your agency on this project.

The proposed action being evaluated in the EA includes repairing and restoring approximately 28,000 linear feet of shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay at the North Severn Complex (Enclosure 1). Substantial shoreline areas have been severely damaged or made vulnerable to erosion due to wave energy, storms, slope saturation, and other factors. The proposed action is needed to address the severe erosion that is resulting in vertical embankments, threats to infrastructure, and degradation of water quality. The repair and restoration of the North Severn Complex shoreline would help to protect the loss of mission-critical areas, and reduce damage from ongoing erosion.

To facilitate the EA analysis, the project area for the shoreline has been divided into smaller segments, or Reaches. Enclosure 2 shows these Reaches, which have been defined geographically, as well as based on the extent of erosion and the applicability of potential restoration measures.

5090
Ser ENV-136
October 22, 2014

The EA will evaluate three action alternatives. The shoreline reaches are the same under the three action alternatives; however, because not all repair alternatives are suitable for all shoreline reaches, each alternative includes two or more repair methods. The alternative method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair.

Construction work for any of the alternatives would be accomplished either from on land, in the water, or a combination of the two, depending on the land and water constraints, such as biological or cultural resources, in the various work areas. Construction would begin in late 2015, and would be phased over a five-year period.

The following describes the three action alternatives for implementing the proposed action. Enclosure 3 provides illustrations of the shoreline repair methods included in the action alternatives.

Alternative 1 - Hardened Structure/Revetment: Alternative 1 would employ a hardened structure, or revetment, along Reaches A, B, D, E, F, and G and sheet pile along Reach C. The hardened structure/revetment includes: 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. For Reach C, a sheet pile structure would be installed on the Severn River side of the berm of a former dredge spoil lagoon. To strengthen the berm, sheet piles would be driven into the existing berm using an impact hammer. Culverts would be installed to allow overflow from the lagoon. The berm would be back-filled using suitable fill material.

Alternative 2 - Log Toe Stabilization: Alternative 2 would employ log toe stabilization and restoration along Reaches B, D, and G where potential wave energy is lower. Reaches A, E, and F would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. For the log toe stabilization method, natural untreated hardwood logs would be placed at the undercut toe of slope to repair the slope toe. The logs would be anchored with rebar. Upper portions of the embankment may be graded to a less erosive slope where appropriate.

Alternative 3 - Living Shoreline: Under Alternative 3, living shoreline restoration techniques would be utilized in Reaches B, D, F,

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5090
Ser ENV-136
October 22, 2014

and G where potential wave energy is lower. Reaches A and E would be repaired using the hardened structure/revetment method and Reach C would be repaired using the sheet pile method, as described under Alternative 1. Living shoreline restoration techniques under this alternative would include the use of sills, groins, or breakwaters in combination with sand and other natural materials, and installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed to dissipate wave energy. In addition, upper portions of the embankment may be graded to a less erosive slope where appropriate.

The potential environmental impacts of these three action alternatives and the No Action Alternative will be analyzed in the EA. The Navy respectfully requests any comments or concerns you may have on the proposed action and alternatives so that we may address them during preparation of the EA. Please provide your comments no later than 30 days from receipt of this letter. Advanced notification of significant concerns would also be greatly appreciated. Please direct all written correspondence to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction

Enclosures: 1. North Severn Complex Shoreline Project Area
2. Definition of Reaches
3. Illustrations of Alternative Shoreline Repair Methods

Copies to:
Anna Lubetski, NAVFAC Washington Environmental

3

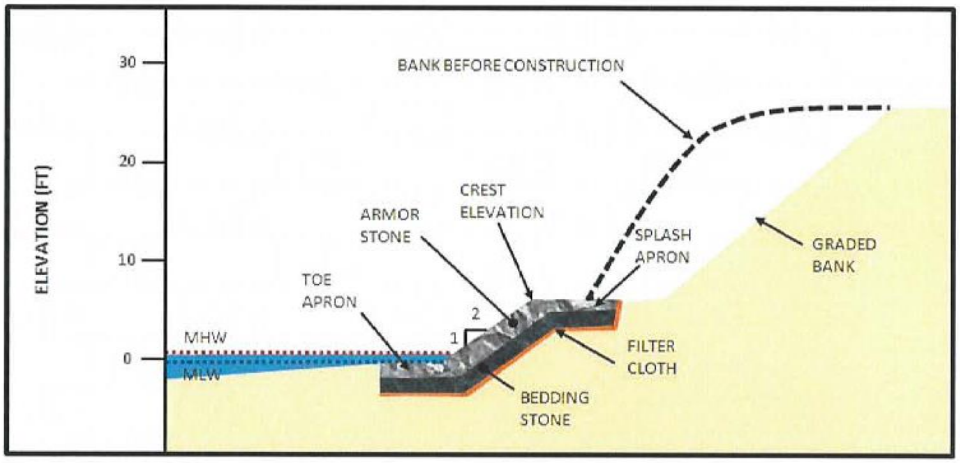
North Severn Complex Shoreline Project Area

Enclosure (1)

Definition of Reaches

Enclosure (2)

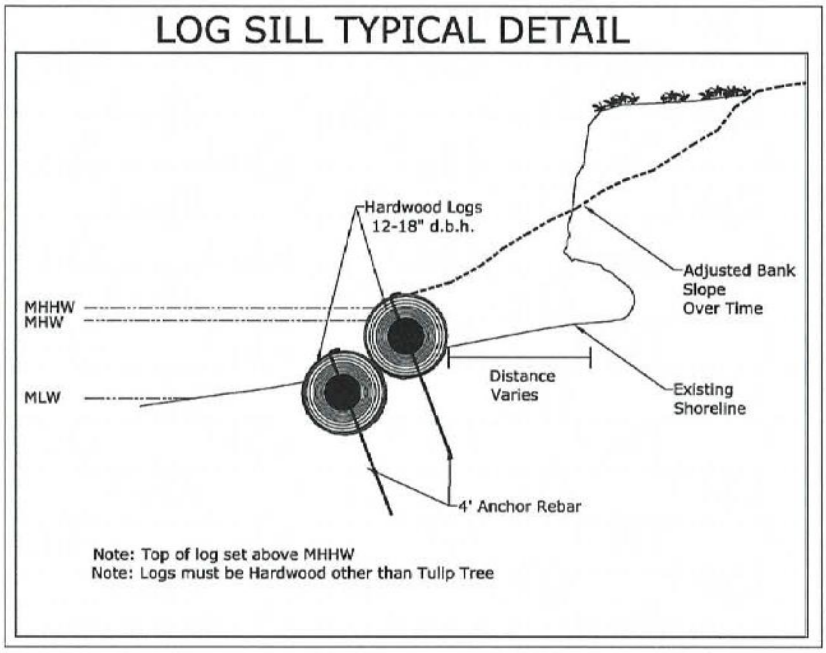
Illustrations of Alternative Shoreline Repair Methods



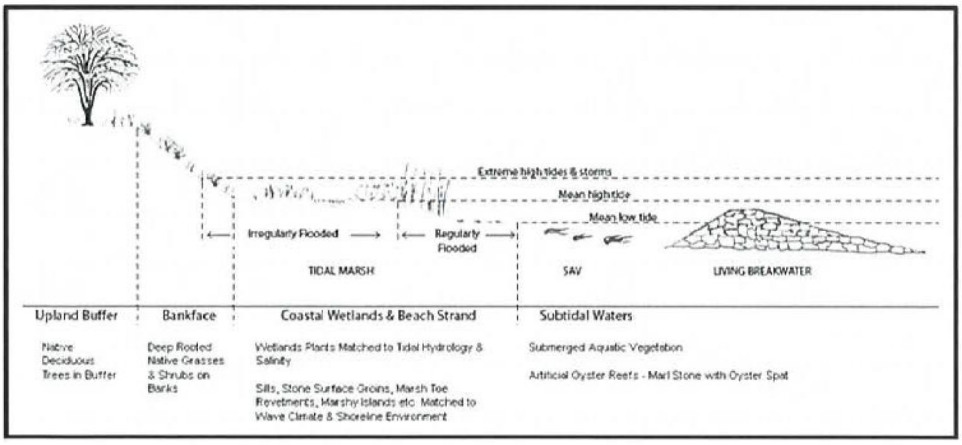
Typical Cross Section of Revetment

Typical Cross Section of Sheet Pile
(Sheet Pile can be seen at the Top of the Berm)

Enclosure (3)



Typical Detail of Log Toe Stabilization



Typical Living Shoreline Treatment

Enclosure (3)

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DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-004
January 7, 2015

Kathy Anderson
U.S. Army Corps of Engineers
P.O. Box 1715
10 S. Howard Street
Baltimore, MD 21203-1715

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Anderson,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-004
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

Maryland State Clearinghouse Coordination

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-006
January 7, 2015

Linda Janey
Maryland State Clearinghouse
Maryland Department of Planning
301 West Preston Street, Suite 1101
Baltimore, Maryland 21201

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Janey,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-006
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: 9 copies of the Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

Maryland Department of Planning

Sustainable Attainable

February 13, 2015

Ms. Anna Lubetski
Naval Facilities Engineering Command Washington
Department of the Navy
1314 Harwood Street, SE, Building 212
Washington, DC 20374

STATE CLEARINGHOUSE RECOMMENDATION

State Application Identifier: MD20150112-0024
Applicant: Department of the Navy
Project Description: Draft Environmental Assessment: The Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis
Project Location: Anne Arundel County
Approving Authority: U.S. Department of Defense DOD/NAVY
Recommendation: Consistent with Qualifying Comment(s)

Dear Ms. Lubetski:

In accordance with Presidential Executive Order 12372 and Code of Maryland Regulation 34.02.01.04-.06, the State Clearinghouse has coordinated the intergovernmental review of the referenced project. This letter constitutes the State process review and recommendation based upon comments received to date. This recommendation is valid for a period of three years from the date of this letter.

Review comments were requested from the Maryland Department(s) of Natural Resources, Transportation, the Environment, the Maryland Department of Planning, including the Maryland Historical Trust; and Anne Arundel County. As of this date, the Maryland Department of the Environment; and Anne Arundel County have not submitted comments. **This recommendation is contingent upon the applicant considering and addressing any problems or conditions that may be identified by their review. Any comments received will be forwarded.**

The Maryland Department(s) of Transportation and the Maryland Department of Planning found this project to be consistent with their plans, programs and objectives.

The Department of Transportation stated that "as far as can be determined at this time, the subject has no unacceptable impacts on plans or programs."

The Maryland Department(s) of Natural Resources and Maryland Historical Trust found this project to be generally consistent with their plans, programs and objectives, but included certain qualifying comments summarized below.

The Maryland Department(s) of Natural Resources, Maryland Department of Environment and Critical Area staff are presently reviewing the Environment Assessment (EA) for this significant 28,000 foot shoreline rehabilitation project. The group will be developing joint recommendations and suggestions to optimally balance habitat conservation, habitat

Lawrence J. Hogan, Jr., Governor
Boyd K. Rutherford, Lt. Governor

David R. Craig, Secretary

301 West Preston Street - Suite 1101 - Baltimore - Maryland - 21201
Tel: 410.767.4500 - Toll Free: 1.877.767.6272 - TTY users: Maryland Relay - Planning.Maryland.gov

Ms. Anna Lubetski
February 13, 2015
Page 2
State Application Identifier: **MD20150112-0024**

restoration, water quality, shoreline protection, technical feasibility, costs and variable energy and structural conditions. This interagency team looks forward to working with the Navy to develop sustainable, cost-effective solutions that ensure the shoreline projects are consistent with Maryland's enforceable policies to the maximum extent practicable while accommodating the needs of multiple stakeholders along the Severn River and the Greenbury Point area.

The Maryland Historical Trust stated that the Navy will complete the Section 106 consultation and review of proposed actions with the Maryland Historical Trust as planning proceeds for individual segments of the project. (BC 201500138)

Any statement of consideration given to the comments(s) should be submitted to the approving authority, with a copy to the State Clearinghouse. The State Application Identifier Number must be placed on any correspondence pertaining to this project. The State Clearinghouse must be kept informed if the approving authority cannot accommodate the recommendation.

Please remember, you must comply with all applicable state and local laws and regulations. If you need assistance or have questions, contact the State Clearinghouse staff person noted above at 410-767-4490 or through e-mail at nasrin.rahman@maryland.gov. **Also please complete the attached form and return it to the State Clearinghouse as soon as the status of the project is known.** ***Any substitutions of this form must include the State Application Identifier Number.*** **This will ensure that our files are complete.**

Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary

LCJ:NR
cc:

Greg Golden - DNR	Tina Quinichette - MDOT	Peter Conrad - MDPL
Amanda Degen - MDE	Debra Falconer - ANAR	Beth Cole - MHT

15-0024_CRR.CLS.doc

Maryland Department of Planning

Sustainable Attainable

PROJECT STATUS FORM

Please complete this form and return it to the State Clearinghouse upon receipt of notification that the project has been approved or not approved by the approving authority.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2305

DATE: _____
(Please fill in the date form completed)

FROM: _____
(Name of person completing this form.)

PHONE: ____-____-_____
(Area Code & Phone number)

RE: **State Application Identifier:** **MD20150112-0024**
Project Description: Draft Environmental Assessment: The Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis

PROJECT APPROVAL

This project/plan was: ☐ **Approved** ☐ **Approved with Modification** ☐ **Disapproved**

Name of Approving Authority: _____ **Date Approved:** _____

FUNDING APPROVAL

The funding (if applicable) has been approved for the period of:

_____, 201____ **to** _____, 201____ **as follows:**

Federal $:	**Local $:**	**State $:**	**Other $:**
_____	_____	_____	_____

OTHER

☐ *Further comment or explanation is attached*

Lawrence J. Hogan, Jr., Governor
Boyd K. Rutherford, Lt. Governor

David R. Craig, Secretary

MDPCH-1F

301 West Preston Street - Suite 1101 - Baltimore - Maryland - 21201
Tel: 410.767.4500 - Toll Free: 1.877.767.6272 - TTY users: Maryland Relay - Planning.Maryland.gov

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Johnson, Jaclyn

From:	Lubetski, Anna M CIV NAVFAC Washington <anna.lubetski@navy.mil>
Sent:	Thursday, March 26, 2015 2:52 PM
To:	Johnson, Jaclyn; Markos, Wendy B CIV Navfac Wash, PWD Annapolis; Sadlon, William P CIV NAVFAC Washington; Clark, Katharine E CIV Navfac Wash, PWD Annapolis
Cc:	Klimoski, Matthew R CIV Navfac Wash, PWD Annapolis
Subject:	FW: Clearinghouse Review & Recommendation: MD20150112-0024
Attachments:	15-0024_MDE-Additional-Comments.pdf
Signed By:	anna.lubetski@navy.mil

FYI

-----Original Message-----
From: Nasrin Rahman -MDP- [mailto:nasrin.rahman@maryland.gov]
Sent: Wednesday, March 25, 2015 3:41 PM
To: Lubetski, Anna M CIV NAVFAC Washington
Subject: Re: Clearinghouse Review & Recommendation: MD20150112-0024

Comments received from Maryland Department of Environment:

"I apologize for MDE's late response to the above-referenced project. Our comments are enclosed and our response code is R1.

Any solid waste including construction, demolition and land clearing debris, generated from the subject project, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible. Contact the Solid Waste Program at (410) 537-3315 for additional information regarding solid waste activities and contact the Waste Diversion and Utilization Program at (410) 537-3314 <tel:%28410%29%20537-3314> for additional information regarding recycling activities."

For Additional Information see attachment.

Nasrin Rahman, mgr.
Maryland Department of Planning
State Clearinghouse, Redistricting
301 West Preston Street
Baltimore MD 21201
Phone # 410.767.4211
Fax # 410.767.4480

1

nasrin.rahman@maryland.gov

On Sat, Feb 14, 2015 at 11:31 AM, Nasrin Rahman -MDP- <nasrin.rahman@maryland.gov> wrote:

Please see attached the Letter of Recommendation for the above Project. If you have any question, please let me know. Thanks.

Nasrin Rahman, mgr.
Maryland Department of Planning
State Clearinghouse, Redistricting
301 West Preston Street
Baltimore MD 21201
Phone # 410.767.4211
Fax # 410.767.4480
nasrin.rahman@maryland.gov

TO: State Clearinghouse E-MIRC Reviewers

Clearinghouse has completed the intergovernmental review of the following project, which was provided to you for comment. A copy of the close out letter, including any attachments, has been placed in the documents folder which can be accessed by clicking http://webapps.mdp.state.md.us/apps/EMIRC_Files/MD20150112-0024.zip or through the document link attached to the database record. This is a 14 MB file. Since the review is now complete, the record should appear in the Completed section of your project listings. No hard copy of this close out letter or attachments will be sent.

Review and Recommendation

Date: 2/13/2015

Recommendation: Consistent with Qualifying Comment(s)

Applicant(s): Department of the Navy

Project Description: Draft Environmental Assessment: The Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis

Location(s): Anne Arundel County;

Again, thank you for continued attention and participation in the Maryland Intergovernmental Review and Coordination (MIRC) process which helps to enhance the opportunities for project funding, minimize delays during project implementation, and ensure transparency by providing the opportunity to be made aware of and to comment on direct development in the State of Maryland.

2

Nasrin Rahman, Planner
nasrin.rahman@maryland.gov
410-767-4211

Linda Janey, Assistant Secretary
MDP.Clearinghouse@maryland.gov
410-767-4490

3

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Draft Environmental Assessment:

The Repair and Restoration of the North Severn Shoreline

at Naval Support Activity Annapolis

Maryland Department of the Environment - Science Services Administration

REVIEW FINDING: R1 Consistent with Qualifying Comments

(MD20150112-0024)

The following additional comments are intended to alert interested parties to issues regarding water quality standards. The comments address:

A. Water Quality Impairments: Section 303(d) of the federal Clean Water Act requires the State to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the substances causing the impairments. A TMDL is the maximum amount of a substance that can be assimilated by a waterbody such that it still meets water quality standards.

Planners should be aware of existing water quality impairments identified on Maryland's 303(d) list. The Project is situated in the Severn River watershed, identified by the MD 8-digit code 02131002 which is currently impaired by several substances and subject to regulations regarding the Clean Water Act.

Planners may find a list of nearby impaired waters by entering the 8-digit basin code into an on-line database linked to the following URL: http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/303d.aspx.

This list is updated every even calendar year. Planners should review this list periodically to help ensure that local decisions consider water quality protection and restoration needs. **Briefly, the current impairments that are relevant to the Project include the following:**

Severn River (02131002):

Nutrients:	**Tidal. A TMDL was written and approve by EPA.**
Sediments:	**Tidal. A TMDL was written and approve by EPA.**
Biological:	**Tidal, Non-tidal. A TMDL is pending development.**
Bacteria:	**Tidal. A TMDL was written and approve by EPA.**
PCB:	**Tidal. A TMDL is pending development.**

B. TMDLs: Development and implementation of the any Plan should take into account consistency with TMDLs developed for the impaired waterbodies referenced above. Decisions made prior to the development of a TMDL should strive to ensure no net increase of impairing substances. TMDLs are made available on an updated basis at the following web site:
http://www.mde.state.md.us/programs/Water/TMDL/CurrentStatus/Pages/Programs/WaterPrograms/TMDL/Sumittals/index.aspx

Special protections for high-quality waters in the local vicinity, which are identified pursuant to Maryland's anti-degradation policy;

C. Anti-degradation of Water Quality: Maryland requires special protections for waters of very high quality (Tier II waters). The policies and procedures that govern these special waters are commonly called "anti-degradation policies." This policy states that "proposed amendments to county plans or discharge permits for discharge to Tier II waters that will result in a new, or an increased, permitted annual discharge of pollutants and a potential impact to water quality, shall evaluate alternatives to eliminate or reduce discharges or impacts." These permitted annual discharges are not just traditional Point Sources, it can include all discharges such as Stormwater.

Currently, Tier II waters are not present in the area surrounding the project.

Planners should be aware of legal obligations related to Tier II waters described in the Code of Maryland Regulations (COMAR) 26.08.02.04 with respect to current and future land use plans. Information on Tier II waters can be obtained online at: http://www.dsd.state.md.us/comar/comarhtml/26/26.08.02.04.htm and policy implementation procedures are located at http://www.dsd.state.md.us/comar/comarhtml/26/26.08.02.04-1.htm

Planners should also note that since the Code of Maryland Regulations is subject to periodic updates. A list of Tier II waters pending Departmental listing in COMAR can be found, with a discussion and maps for each county, at the following website:
http://www.mde.state.md.us/programs/Water/TMDL/Water%20Quality%20Standards/Pages/HighQualityWatersMap.aspx

ADDITIONAL COMMENTS

Chesapeake Bay TMDL
With the completion of the Chesapeake Bay TMDL, the Chesapeake Bay Program Office (CBPO) will be able to provide loading data at a more refined scale than in the past. MDE will be able to use the CBPO data to estimate pollution allocations at the jurisdictional level (which will include Federal Facilities) to provide allocations to the Facilities. These allocations, both Wasteload (WLA) and Load Allocation (LA) could call for a reduction in both Point Sources and Nonpoint Sources. Facilities should be aware of reductions and associated implementation required by WIPs or FIPs.

Stormwater
The project should consider all Maryland Stormwater Management Controls. Site Designs should consider all Environmental Site Design to the Maximum Extent Practicable and "Green Building" Alternatives. Designs that reduce impervious surface and BMPs that increase runoff infiltration are highly encouraged.

Further Information:
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Pages/Programs/WaterPrograms/SedimentandStormwater/swm2007.aspx

Environmental Site Design (Chapter 5):
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/MarylandStormwaterDesignManual/Documents/www.mde.state.md.us/assets/document/chapter5.pdf

Redevelopment Regulations:
http://www.dsd.state.md.us/comar/comarhtml/26/26.17.02.05.htm

Draft Environmental Assessment:
The Repair and Restoration of the North Severn Shoreline
at Naval Support Activity Annapolis
Anne Arundel County
MD20150112-0024
Ridout Creek
Mill Creek
Minnow Creek
Marress Pond
Weems Creek
Severn River
02131002
US Naval Academy Golf Club
NORTH SEVERN COMPLEX
Carr Creek
College Creek
St John's College
USNA
Approximate Project Area
ANNAPOLIS
Spa Creek
Back Creek
02139998
Truxtun Park
Legend
Streams
MD High Quality Waters
MD High Quality Waters
8-digit Watershed
Map Date: 2/4/2014 Drawn By: MDE SSA-NFL
Lat: 38°59'11.37"N Long: 76°27'55.03"W
Elevation: 21
Miles
Kilometers
Data Sources:
Google Earth- US Geological Survey
Imagery - MD iMap 2.0
Streams - State Highway Administration, USGS
Watersheds: 8-digit - MD Dept. of the Environment
N
MDE
MARYLAND

Section 106 Consultation

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-018
January 7, 2015

Katharine Kerr
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Kerr,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-018
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-019
January 7, 2015

Elizabeth Hughes
State Historic Preservation Officer
Acting Director, Maryland Historical Trust
100 Community Place
Crownsville, MD 21032-2023

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Hughes,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland. Kimberly Hickey of NSA Annapolis will be contacting you with specific information about potential effects to archaeological resources.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-019
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-020
January 7, 2015

Elizabeth J. Cole
Administrator, Review & Compliance
Department of Planning
Maryland Historical Trust - Crownsville Office
100 Community Place
Crownsville, MD 21032-2023

SUBJECT: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Ms. Cole,

The Navy is proposing to repair and restore 28,000 linear feet of shoreline along the property of Naval Support Activity (NSA) Annapolis that borders sections of Carr Creek, Mill Creek, the Severn River, and the Chesapeake Bay.

Pursuant to Section 307 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1451 et seq., as amended, and its implementing regulations at 15 CFR Part 930, Subpart C, and in accordance with the Memorandum of Understanding between the State of Maryland and the United States Department of Defense, the U.S. Department of the Navy is submitting its Federal Coastal Consistency Determination for this project. Kimberly Hickey of NSA Annapolis will be contacting you with specific information about potential effects to archaeological resources.

Under Section 307 of the CZMA, federal agencies must determine whether their activities have a direct or indirect foreseeable effect over coastal uses or resources of states with approved coastal management programs. If no coastal effects are foreseeable, a negative determination is warranted. If effects are foreseeable, then a determination of consistency with the enforceable policies of the approved plan is required. The State of Maryland has a federally approved Coastal Zone Management Plan (CZMP), which was last updated in 2011.

The enclosed Federal Coastal Consistency Determination includes a description of the referenced proposed action, the locations where the actions would occur, and a discussion of the proposed action as

5090
Ser ENV-020
January 7, 2015

it relates to the State of Maryland's enforceable coastal policies and the environmental analysis included in the *Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland* (Enclosure 2). Based on the information contained in the Federal Coastal Consistency Determination, the Navy has determined the proposed action, for any of the action alternatives, is consistent to the maximum extent practicable with the enforceable policies of the Maryland CZMP.

Pursuant to 15 CFR § 930.41, the Navy respectfully requests written concurrence with or objection to this Consistency Determination, or a written request for an extension of 15 days or less, from the Maryland Department of the Environment within 60 days from receipt of this determination. The Navy will presume Maryland's concurrence if its response is not received within 60 days from receipt of this determination. Please direct the state's response to:

Naval Facilities Engineering Command Washington
ATTN: Anna Lubetski, Environmental
1314 Harwood Street, SE, Building 212
Washington, D.C., 20374

If you have any questions concerning this Consistency Determination, please contact Ms. Lubetski via phone at (202) 685-8479, or email at Anna.Lubetski@navy.mil.

Sincerely,

Matthew R. Klimoski, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosures: 1. Federal Coastal Consistency Determination
2. Draft EA for Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

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F Navy

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

RECEIVED
MAY 29 2015
BY:

IN REPLY REFER TO

5090
Ser ENV-075
May 29, 2015

EJR/TJN

Ms. Elizabeth Hughes
State Historic Preservation Officer
Acting Director
Maryland Historical Trust
100 Community Place
Crownsville, Maryland 21032-2023

Attn: Ms. Beth Cole

SUBJECT: REQUEST FOR SECTION 106 CONSULTATION: REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE, NAVAL SUPPORT ACTIVITY ANNAPOLIS

AN Co.

Dear Ms. Hughes:

Naval Support Activity (NSA) Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River and the Chesapeake Bay. The proposal includes repair and restoration of approximately 28,000 linear feet of shoreline at the North Severn Complex, which has been experiencing shoreline erosion for decades. The shoreline has been divided into "reaches" based on geography and the extent of erosion and potential repair and restoration methods applicable. See enclosure 1 for: Table ES-1 Description of Reaches in Project Area, and Figure ES-1 Location of Reaches in the Project Area.

NSA Annapolis identified four feasible alternative repair and restoration methods for the Environmental Assessment. Reference Navy series letter ENV-006 dated January 7, 2015 to the Maryland State Clearinghouse, subject: *Draft Environmental Assessment for the repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis*. NSA Annapolis has selected Alternative 3 as the Preferred Alternative. Alternative 3 consists of Hardened Structure/Revetment in Reaches A and E; Living Shoreline in Reaches B, D, F and G; and Sheet Pile installations in Reach C.

Hardened Structure/Revetment

Hardened structure/revetment includes 1) armoring of the lower portions of the slope utilizing riprap (or similar) of appropriate size; 2) a geotextile fabric underlay for stabilization and erosion control; and 3) grading of the upper portions of the embankment to a less erosive slope. See enclosure 2 for Figure 2-2 Typical Cross Section of Revetment. No eligible or unevaluated sites are located in vicinity of this treatment.

Navy will coordinate 106 for proposed sections as development
[illegible] 7/21/15 Further coordination needed re protection plans

5090
Ser ENV-075
May 29, 2015

Living Shoreline

Living shoreline techniques include the use of sills, groins, or breakwaters in combination with sand, and other natural materials. Living shoreline restoration includes the installation of marsh and riparian plants for stabilization and to create/improve upland and wetland habitat. A breakwater may be installed, consisting of a trapezoidal stone structure, for the purpose of dissipating wave energy before waves reach the shore. See enclosure 2 for Figure 2-5 Typical Living Shoreline Treatment.

Living Shoreline installation has the potential to effect archaeological resources through planting of native, deciduous trees in the upland buffer and planting of deep rooted native grasses and shrubs on banks. Archaeological Site Protection Requirements will be prepared for sites in areas where Living Shorelines are proposed.

Sheet Pile

Sheet pile structures are created by driving sheet piles into existing berms using an impact hammer. Culverts are then installed to allow overflow, and the berm is backfilled. See enclosure 2 for Figure 2-4 Typical Sheet Pile Structure. No eligible for unevaluated sites are located in the vicinity of this treatment.

Below is the list of reaches along with the proposed treatment, potentially affected archaeological sites, and proposed avoidance measures. See enclosure 3 for an excerpt of archeological probability maps.

Reach A

- Hardened Structure/Revetment
- No eligible or unevaluated sites in vicinity

OK 18AN91 – Not Eligible
18AN1410 - Not Eligible

Reach B

- Living Shoreline
- No eligible or unevaluated sites in vicinity OK

Reach C (the berm of a former dredge spoil lagoon)

- Sheet Pile
- No eligible or unevaluated sites in vicinity OK

Reach D2

- Living Shoreline
- Sites 18AN1030 and 18AN1031 have been evaluated and determined not eligible for inclusion in the National Register (Katz, 2014). OK

2

5090
Ser ENV-075
May 29, 2015

Reach D1

- Living Shoreline
- Sites 18AN1117, 18AN1116, 18AN1115, 18AN92, 18AN1112, QF18, QF19, 18AN160 (all unevaluated), and 18AN944 (NR eligible)
- Stabilization of 4291f of undercut shoreline north of and along Site 18AN1113 has been addressed as part of the Carr Creek Shoreline Stabilization project (MHT log #201403890)
- Site 18AN1114 was evaluated as part of a regional effort and determined not eligible for inclusion in the National Register (Stehling, 2012)
- Archaeological Site Protection Requirements to be prepared by Navy and concurred upon by SHPO prior to start of construction

2pe need to see plans for work + protection requirements to ensure avoidance

Reach E

- Hardened Structure/Revetment
- No eligible or unevaluated sites in vicinity

OK

Reach F

- Living Shoreline
- Site 18AN528 (unevaluated)
- Archaeological Site Protection Requirements to be prepared by Navy and concurred upon by SHPO prior to start of construction

2pe

Reach G

- Living Shoreline
- Site 18AN340 (unevaluated)
- Archaeological Site Protection Requirements to be prepared by Navy and concurred upon by SHPO prior to start of construction

2pe

We anticipate no cutting, grading or earth moving within areas of known archaeological sites in Reaches D1, F and G. The Navy is requesting concurrence on no adverse effect conditional upon Navy preparation and Maryland Historical Trust review and concurrence with Archaeological Site Protection Requirements plans for Reaches D1, F and G. See enclosure 4 for a sample Archaeological Site Protection Requirement plan. In accordance with Section 106 of the National Historic Preservation Act of 1966 as amended, and the Criteria of Adverse Effect (36 CFR Part 800.5); the Navy request your review of and concurrence with this method of treatment. If you need additional information or would like to request a site visit, contact Kimberly Hickey at kimberly.hickey@navy.mil or (410) 293-1116. Please send all

3

5090
Ser ENV-075
May 29, 2015

correspondence to PWD Annapolis, 181 Wainwright Road, Stop 21A, Annapolis, MD 21402.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By direction

Enclosures: 1) Reach descriptions & locations (Table ES-1, Figure ES-1)
2) Typical treatments (Figures 2-2, 2-4 and 2-5)
3) Excerpt of archeological probability map
4) Sample Archaeological Site Protection Requirement plan

Copy to: Preservation Assistance and Heritage Areas, National Park Service Northeast (Attn: D. Montagna)

The Maryland Historical Trust has determined that repair and restoration of the North Severn shoreline will have no adverse effect to historic properties. (*)

Beth Cole Date 7/21/2015
Maryland Historical Trust Preservation Office

(*) Conditioned upon Navy submittal of its Archeological Site Protection Plans to the MHT/MDSHPO for review and comment prior to construction work in Reach D1, Reach F and Reach G.

4

Interested Parties

DEPARTMENT OF THE NAVY
NAVAL SUPPORT ACTIVITY ANNAPOLIS
58 BENNION ROAD
ANNAPOLIS MD 21402

IN REPLY REFER TO:
5090
Ser ENV-009
January 7, 2015

Richard Spencer
Anne Arundel County Severn River Commission
44 Calvert Street
Annapolis, MD 21401

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS, LOCATED IN ANNAPOLIS, MARYLAND

Mr. Spencer,

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 et seq.), Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the Navy's Procedures for Implementing NEPA (32 CFR Part 775), and the Environmental Readiness Program Manual, Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Reference (c), Chapter 10, the Department of the Navy has prepared a Draft EA to evaluate the potential environmental impacts of repairing and restoring approximately 28,000 linear feet of shoreline at the North Severn Complex of Naval Support Activity (NSA) Annapolis, located in Annapolis, Maryland.

The Department of the Navy invites your participation in the review of the Draft EA and is soliciting comments regarding the document. Enclosed is a copy of the Draft EA for your review. A public meeting will be held between 7:00 p.m. and 9:00 p.m. at Loews Annapolis Hotel on January 28, 2015.

Comments on the Draft EA may be submitted at the public meeting, via e-mail to anna.lubetski@navy.mil, or via U.S. mail, postmarked by February 27, 2015, to Naval Facilities Engineering Command Washington, ATTN: Anna Lubetski, Environmental, 1314 Harwood Street, SE, Building 212, Washington, D.C. 20374.

5090
Ser ENV-009
January 7, 2015

The Department of the Navy thanks you for your interest and participation in the public comment period. If you have any questions or need further information on this project, please contact Ms. Lubetski at (202) 685-8479.

Sincerely,

MATTHEW R. KLIMOSKI, P.E.
Environmental Division Director
By Direction of the Commanding Officer

Enclosure: Draft Environmental Assessment for the Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis, located in Annapolis, Maryland

Copies to: Wendy Markos, Public Works Department Annapolis

2

Johnson, Jaclyn

From:	Lubetski, Anna M CIV NAVFAC Washington <anna.lubetski@navy.mil>
Sent:	Thursday, February 12, 2015 2:56 PM
To:	Johnson, Jaclyn; Markos, Wendy B CIV Navfac Wash, PWD Annapolis; Clark, Katharine E CIV Navfac Wash, PWD Annapolis
Cc:	Sadlon, William P CIV NAVFAC Washington; Klimoski, Matthew R CIV Navfac Wash, PWD Annapolis
Subject:	FW: Comments from the National Park Service Concerning the Draft EA for Repair and Restoration of the North Severn Shoreline
Attachments:	Letter to Anna Lubetski Feb 13 2015.pdf
Signed By:	anna.lubetski@navy.mil
Importance:	High

Received the below email this afternoon regarding the Shoreline EA.

V/R,
Anna

-----Original Message-----
From: DiPasquale, Nicholas [mailto:dipasquale.nicholas@epa.gov]
Sent: Thursday, February 12, 2015 2:48 PM
To: Lubetski, Anna M CIV NAVFAC Washington
Cc: Hunt, Charles; charliestek@gmail.com; MSL49@aol.com
Subject: FW: Comments from the National Park Service Concerning the Draft EA for Repair and Restoration of the North Severn Shoreline
Importance: High

Dear Ms. Lubetski:

I am the Director of the Chesapeake Bay Program Office for USEPA. My office coordinates the Chesapeake Bay Partnership. The Chesapeake Bay Program is a regional partnership that leads and directs Chesapeake Bay restoration and protection. Bay Program partners <http://www.chesapeakebay.net/about/partners> include federal and state agencies, local governments, non-profit organizations and academic institutions. Staff members work at the Bay Program's Annapolis, MD and at partner organizations throughout the Bay watershed. In June, 2014 the Partnership (WV, NY, DE, MD, PA, VA and DC) issued a new Chesapeake Bay Watershed Agreement which includes a Public Access outcome of 300 additional access sites throughout the watershed. The outcome is also contained in the President's Executive Order 13508, which EPA also coordinates.

I write in support of the comments submitted by Charles Hunt, Superintendent of the National Park Service Chesapeake Office, which is the lead on the Public Access goal and outcome in the Executive Order and under the 2014 Chesapeake Bay Watershed Agreement. The Annapolis area has a limited number of public access sites. As an avid kayaker myself, I also support the incorporation of a public access site as part of the Repair and Restoration of the North Severn Shoreline Project at the Naval Support Activity Annapolis.

I appreciate your consideration of this request and would be pleased to meet with appropriate officials to discussion this opportunity in greater detail.

Very respectfully,

1

Nicholas A. DiPasquale, Director

Chesapeake Bay Program Office

410 Severn Ave Suite 109

Annapolis, MD 21403

Tel: 410.267.5710

Cell: 443.786.1722

E-mail: dipasquale.nicholas@epa.gov

Web: http://www.chesapeakebay.net

From: Hunt, Charles [mailto:charles_hunt@nps.gov]
Sent: Thursday, February 12, 2015 1:24 PM
To: anna.lubetski@navy.mil
Cc: DiPasquale, Nicholas
Subject: Comments from the National Park Service Concerning the Draft EA for Repair and Restoration of the North Severn Shoreline

Dear Ms. Lubetski:

Please see our attached comments. Thank you for the opportunity to comment on your project.

Sincerely,

Chuck Hunt

--

Chuck Hunt

Superintendent

Captain John Smith Chesapeake National Historic Trail

2

National Park Service | Chesapeake

410 Severn Avenue, Suite 314

Annapolis MD 21403

410-260-2471

<http://www.nps.gov/subjects/centennial/images/NPS-Centennial-E-Mail-Signature-11-24-14.jpg>

3

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United States Department of the Interior

NATIONAL PARK SERVICE
Chesapeake
Captain John Smith Chesapeake National Historic Trail
410 Severn Avenue, Suite 314
Annapolis, MD 21403

February 13, 2015

Anna Lubetski, Environmental
Naval Facilities Engineering Command Washington
1314 Harwood Street SE, Building 212
Washington D. C. 20374

Dear Ms. Lubetski:

The National Park Service – Chesapeake has reviewed the Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activities Annapolis. We were pleased to note the proposed use of a living shoreline as a means of bank stabilization as part of Alternative 3. Where suitable, the living shoreline technique offers the greatest protection for the health and natural resources of the Bay, and as such we express our support for Alternative 3 as the preferred alternative.

If Alternative 3 is chosen and living shorelines are incorporated, we note another potential benefit—the living shorelines may also offer the opportunity to enhance needed public access to the waters of the Chesapeake Bay. Such action would be in harmony with Executive Order 13508 (Chesapeake Bay Protection and Restoration) issued by President Obama. The Strategy for Protecting and Restoring the Chesapeake Bay Watershed released in response to the Executive Order contains a key goal of providing 300 new public water access sites by 2025. Thus, if additional public access was deemed appropriate for some areas of this site, it could help meet both the need for water access and the 300 site goal.

With this thought in mind, we have identified three areas which may be suitable for the provision of a hand carry launch for paddle craft. These are based on looking at the shoreline project, a Google earth map of the site, and the Bay Watershed Public Access Plan. The first is a small existing marina with launch ramp on Browns Cove behind Possum Point. Depending on its current programmed use, it may be possible to allow the public to park and use the ramp area and small adjacent beach to launch hand carry paddle craft.

Second, the Public Access Plan shows a potential site on Providence Cove just off of Mill Creek. This could be a good location for a small soft launch site for paddle craft. It is in the upper part of Reach G in the shoreline stabilization plan and is slated for a living shoreline, thus, this would seem compatible. Needs would be a stable walkway to the water and a parking area for at least 6 cars.

The third site would be in the upper part of Carr Creek in Reach D1. There may be an area here where a soft launch for paddle craft could be placed. This area is also slated for a living shoreline and a parking area with walkway to the water would need to be developed.

While we recognize that security concerns may prevent additional public use of this area, with the amount of shoreline involved in this proposed project, the need for additional public access to the Bay, and the opportunity that the use of living shorelines creates for the incorporation of soft launches for paddle craft, we encourage that the concept be considered. Should you have any questions or if I can be of any additional help, please let me know.

Sincerely,

Superintendent

cc: Nicholas A. DiPasquale, Director, U.S. EPA Chesapeake Bay Program Office

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Edward Stierli
Chesapeake Field Representative
National Parks Conservation Association
777 6th Street, N.W., #700
Washington, D.C. 20001

February 13, 2015

Anna Lubetski, Environmental
Naval Facilities Engineering Command Washington
1314 Harwood Street SE, Building 212
Washington, D.C. 20374

Dear Ms. Lubetski,

On behalf of the National Parks Conservation Association (NPCA), we appreciate the opportunity to comment on the proposed Repair and Restoration of the North Severn Shoreline at Naval Support Activity Annapolis. The Severn River and the Chesapeake Bay are both segments of the Captain John Smith National Historical Trail, an approximately 3,000-mile long water trail that traces the historic routes of Captain John Smith who from 1607-1609 charted the lands and waters of the Chesapeake.

The nonpartisan NPCA, with its more than 1 million members and supporters across the country, is the only national non-profit organization dedicated to protecting and enhancing America's national parks for current and future generations. NPCA is also the leader of the "Freedom to Float" coalition, which includes more than 300 businesses, organizations, and individuals dedicated to promoting public access for recreation and community stewardship while preserving treasured waters and natural landscapes in the Chesapeake watershed.

NPCA supports Alternative 3. We applaud the Navy's plan to plant living shorelines along the five miles of banks around the Naval Academy. Living shorelines offers great protection for the healthy and natural resources of the Chesapeake Bay, and it is a wise decision to protect infrastructure from the impacts of climate change and sea level rise.

We request that the Navy also include the possibility of another potential benefit—public water access to the waters of the Chesapeake Bay. Living shorelines created as a result of Alternative 3 involve the creation of marsh and riparian plants for stabilization to create upland and wetland habitat. The grading creates a less

777 6th Street, NW, Suite 700 | Washington, DC 20001-3723 | P 202.223.6722 | F 202.872.0960 | npca.org

erosive slope, which where appropriate, provides the opportunity to create designated areas to launch personal paddle craft.

NPCA, along with the National Park Service and its partners, are working to meet the goals outlined by Executive Order 13508 (Chesapeake Bay Protection and Restoration) issued by President Obama. The Department of the Navy—Navy Public Works Center, has been a key stakeholder to implementing this Executive Order, as well as a participating agency within the Department of Defense to the Chesapeake Bay Program. A key part of the Executive Order is providing 300 new public water access sites by 2025—which areas of this site, if deemed appropriate, would help reach this goal.

We request that the Navy consider allowing public water access for hand-carried personal paddle craft at three identified sites. The Chesapeake Bay Watershed Public Access Plan, for which the Navy was a stakeholder, identifies a potential access site on Providence Cove just off Mill Creek. It is in the upper part of "Reach G" and could be a good location for a small soft launch site.

The second potential opportunity for public access is at the existing marina with launch ramp on Browns Cove behind Possum Point. This would be an additional site in which the public would be allowed to park and use the ramp and adjacent beach to launch hand-carried personal watercraft.

A third opportunity for public access is in the upper part of Carr Creek (Reach D1). This area has been proposed for living shoreline and it could present a location for a soft launch for hand-carried personal watercraft. Parking and a walkway would need to be developed.

We appreciate the Navy's efforts to propose living shorelines for the North Severn shoreline, as well as the Chesapeake Bay and hope that public access will also be evaluated. Public water access is both extremely limited and in high-demand in the Annapolis area, and given the amount of shoreline involved in this proposed project—we encourage new access to be considered. This will enhance the value of the living shoreline being proposed and allow visitors to experience the Captain John Smith Chesapeake National Historic Trail, the Bay's natural beauty, and maritime history.

Thank you for the opportunity to comment, and please feel free to contact me should you have any questions.

Sincerely,

Edward Stierli
Field Representative, Chesapeake & Virginia Program

777 6th Street, NW, Suite 700 | Washington, DC 20001-3723 | **P** 202.223.6722 | **F** 202.872.0960 | npca.org

the Severn River Commission

February 24, 2015

Ms. Anna Lubetski
Naval Facilities Engineering Command Washington Environmental
1314 Harwood St. SE, Building 212
Washington, DC 20374

Ref. Environmental Assessment for the Repair and Restoration of the North Severn Shoreline

Dear Ms. Lubetski,

The Severn River Commission is pleased to comment favorably on the subject EA. We find it to be a comprehensive analysis of the potential impacts of the various options considered for the different reaches of the shoreline.

We would appreciate being kept informed as implementation decisions are under discussion in the future.

We are appreciative of the fact that the US Navy is prepared to make commitments to the preservation of NSAA natural resources, as exemplified by this report and the previously released INRMP, and is willing, in these times of tight budgets, to expend scarce resources on such non-mission critical projects.

As an advisory body to Annapolis City, Anne Arundel County, and Maryland State governments on issues regarding the environment of the Severn River watershed, the commission stands ready to assist the NSAA in any way we can.

Sincerely,

Lina Vlavianos

Lina Vlavianos
Chair, Severn River Commission
http://www.aacounty.org/severnriver

Cc: Bob Whitcomb, Vice Chair, Severn River Commisson
Jim Burdick
Dick Spencer
Kurt Riegel
Scott Hymes, Maryland Department of Natural Resources

P.O. Box 6675, Heritage Complex, Annapolis, Maryland 21401

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February 25, 2015

Ms. Anna Lubetski
Naval Facilities Engineering Command Washington
13 14 Harwood Street SE, Building 212
Washington D. C. 20374

Dear Ms. Lubetski:

It has come to our attention that the Department of the Navy is proposing to repair and restore approximately five miles of eroding shoreline at the North Severn Complex of Naval Support Activity known as Greenbury Point in Annapolis, Maryland. We are writing to urge you to incorporate public water access into this project and to ensure that the project is constructed in the most environmentally sound manner possible, utilizing living shoreline techniques.

The Citizens Advisory Committee – known under the acronym CAC -- is a broad- based citizens' organization appointed by the Governors of Maryland, Pennsylvania and Virginia, the Mayor of the District of Columbia and the Board of Directors of the Alliance for the Chesapeake Bay. Established in 1984, CAC provides advice and assistance to the Chesapeake Executive Council in implementing Chesapeake watershed restoration plans and goals. The CAC has been a strong proponent of improving public access to the waters of the Chesapeake region as a means of better connecting and engaging citizens in the watershed restoration and protection effort. We remain concerned that less than two percent of the watershed's 11,600 miles of tidal shoreline is publicly accessible. Access in the Annapolis area is especially limited.

We believe the Federal government -- and particularly the Department of Defense, which has such a huge presence along the shorelines of the Chesapeake -- should set an example in providing citizens living in and visiting the watershed with enhanced opportunities for enjoying the natural, cultural and recreational wonders of the Chesapeake. By including public water access as part of a living shoreline restoration project at Greenbury Point, the Navy has an important opportunity to make a contribution to the Chesapeake watershed's access goals. We hope you will give this proposal every consideration.

Sincerely,

Charlie Stek
Chair, Citizens Advisory Committee

Cc: Nick DiPaquale

Jessica M. Blackburn, CAC Coordinator
612 Hull Street, Suite 101C | Richmond, VA 23224 | 804/775-0953 | 804/775-0954 (fax) | jblackburn@allianceforthebay.org

Chesapeake Bay Program
A Watershed Partnership

Alliance for the Chesapeake Bay

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Saving the Chesapeake's Great Rivers and Special Places

716 Giddings Avenue, Suite 42
Annapolis, MD 21401
www.chesapeakeconservancy.org
443.321.3610

Chesapeake Conservancy
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EXECUTIVE DIRECTOR
Joel Dunn

February 26, 2015

Anna Lubetski, Environmental
Naval Facilities Engineering Command Washington
1314 Harwood Street SE, Building 212
Washington, D.C. 20374

Dear Ms. Lubetski:

On behalf of the Chesapeake Conservancy, I am writing in response to the Draft Environmental Assessment for Repair and Restoration of the North Severn Shoreline at Naval Support Activities Annapolis. We are supportive of Alternative 3 and the use of living shorelines in the restoration of this site. We also urge you to consider incorporating public water access into the shoreline restoration project.

The Chesapeake Conservancy's mission is to strengthen the connection between people and the watershed, conserve the landscapes and special places that sustain the Chesapeake's unique natural and cultural resources, and encourage the exploration and celebration of the Chesapeake as a national treasure. We believe that connecting people to the Bay through public water access is vital to ensure the watershed's health and instill an appreciation and enjoyment of the Chesapeake's most cherished natural and cultural resources. Based in Annapolis, Maryland, we have a keen interest in increasing access for the local community.

Less than two percent of the Chesapeake watershed's 11,600 miles of tidal shoreline is publicly accessible, and this accessibility is especially lacking in the Annapolis area. The Conservancy, along with numerous local, state, and federal partners, are actively working to address this need and expand access to the Bay and its tributaries. Including public water access in the Greenbury Point shoreline restoration project would allow the Navy to contribute to the watershed access goals outlined in the *Strategy for Protecting and Restoring the Chesapeake Bay Watershed* (a response to President Obama's Executive Order 13508) and the new Ch*esapeake Bay Watershed Agreement*, both of which include the addition of 300 new public water access sites by 2025.

The Department of Defense has a particularly large presence along the shorelines of the Chesapeake and is positioned well to be an example in providing citizens in the region with increased opportunities for experiencing the Chesapeake's natural, cultural, and recreational resources. We recognize expanding public use may affect security concerns for the Navy; however, we see a tremendous opportunity for meeting public need for water access along this approximately 5 miles of restored shoreline, and we hope you will consider this idea. We stand ready to work with you, should you decide to pursue this avenue, to create public access in the most environmentally sound manner possible.

Sincerely,

Joel Dunn
Executive Director

cc: Charles Hunt, Superintendent, National Park Service Chesapeake Bay Office
Charlie Stek, Chair, Citizens Advisory Committee

JOHN P. SARBANES
3RD DISTRICT, MARYLAND

COMMITTEE ON
ENERGY AND COMMERCE

2444 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-4016
FAX: (202) 225-9219

Congress of the United States
House of Representatives
Washington, DC 20515–2003

www. sarbanes.house.gov

February 27, 2015

Ms. Anna Lubetski, Environmental
Naval Facilities Engineering Command Washington
1314 Harwood Street SE, Building 212
Washington D.C. 20374

Dear Ms. Lubetski,

As the Department of the Navy proceeds with its proposal to repair and restore the North Severn Shoreline at Naval Support Activity Annapolis, I urge you to use living shoreline techniques wherever appropriate. I also urge you to use this project as an opportunity to incorporate public access points on Greenbury Point, providing members of the community with better access to use and enjoy Mill Creek, Carr Creek, the Severn River and the Chesapeake Bay.

The Navy's efforts to restore the North Severn Shoreline and prevent further erosion will protect mission critical areas and infrastructure while preventing further water quality degradation. By adopting Alternative 3 as the repair method and using living shorelines, the Navy can stabilize Greenbury Point and enhance the health of our coastal areas. The natural banks of living shorelines provide critical wetland habitat for native species and improve water quality by filtering sediment and other pollutants.

Living shorelines also offer the opportunity to help citizens and visitors of Annapolis reach our coastal waters. Public access points encourage better investment in local conservation by making it easier to connect with the Chesapeake watershed and learn about its economic and recreational importance to our community. Understanding the security concerns presented by greater public use of the Naval Support Activity Annapolis complex, I encourage you to examine where it may be possible and appropriate to add public access sites and foster stronger local engagement with the Chesapeake.

I appreciate your consideration of this matter, and I thank you for your efforts to restore and protect Maryland's important coastline along the Chesapeake Bay.

Sincerely,

John P. Sarbanes
Member of Congress

600 BALTIMORE AVENUE
SUITE 303
TOWSON, MD 21204
(410) 832-8890
FAX: (410) 832-8898

44 CALVERT STREET
SUITE 349
ANNAPOLIS, MD 21401
(410) 295-1679
FAX: (410) 295-1682

3901 NATIONAL DRIVE
SUITE 220
BURTONSVILLE, MD 20866
(301) 421-4078
FAX: (301) 421-4079

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APPENDIX C
AIR QUALITY

TABLE OF CONTENTS

APPENDIX C – AIR QUALITY

AIR QUALITY CONFORMITY APPLICABILITY ANALYSIS C-3
RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY C-27

AIR QUALITY CONFORMITY APPLICABILITY ANALYSIS FOR THE REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE AT NAVAL SUPPORT ACTIVITY ANNAPOLIS,

ANNAPOLIS, MARYLAND

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TABLE OF CONTENTS

1.0 INTRODUCTION C-7

1.1 Project Description C-7

1.2 Air Quality C-8

1.3 Federal Requirements C-8

2.0 METHODOLGY C-8

3.0 PROCEDURE AND CALCULATIONS C-9

3.1 Emissions Calculations C-9

3.2 Construction Equipment C-11

3.3 Assumptions C-11

4.0 RESULTS AND CONCLUSION C-11

ATTACHMENT 1: AIR EMISSIONS CALCULATION TABLES C-13

List of Tables

Table 1. Criteria Pollutant *de Minimis* Emission Rates C-8

Table 2. Maximum Estimated Annual Emissions Compared to *de Minimis* Thresholds C-11

ACRONYMS AND ABBREVIATIONS

CAA	Clean Air Act
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
g	grams
g/hp-hr	grams per horse power hour
GCR	General Conformity Rule
hp	horse power
lb(s)	pound(s)
MOVES	Motor Vehicle Emissions Simulator
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NSA	Naval Support Activity
$PM_{2.5}$	particulate matter with a diameter of 2.5 microns or less
PM_{10}	particulate matter with a diameter less than 10 microns
SF	square feet
SIP	State Implementation Plan
SO_2	sulfur dioxide
USEPA	United States Environmental Protection Agency
USNA	United States Naval Activity
VOC(s)	volatile organic compound(s)

1.0 INTRODUCTION

The Clean Air Act (CAA) requires federal actions in air pollutant nonattainment or maintenance areas to conform to the applicable State Implementation Plan (SIP). The SIP is designed to achieve or maintain an attainment designation of air pollutants, as defined by the National Ambient Air Quality Standards (NAAQS). The regulations governing this requirement are found in 40 Code of Federal Regulations (CFR) Part 93, also known as the General Conformity Rule (GCR). The threshold (*de minimis*) emission rates have been established for actions with the potential to have significant air quality impacts. A project/action that would be located in an area designated as nonattainment or a maintenance area and exceeding the *de minimis* thresholds must have a general conformity determination prepared to address significant impacts.

Pursuant to the requirements of the GCR, this document was prepared to determine the applicability of the GCR to the proposed action to conduct shoreline repair and restoration at the North Severn Complex of NSA Annapolis, located in Annapolis, Maryland. The proposed shoreline activities would affect approximately 28,000 linear feet of shoreline along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay.

The purpose of the proposed action is to mitigate and eliminate significant shoreline areas that are eroding at a dramatic pace, resulting in vertical embankments, threats to infrastructure, and degradation of water quality.

NSA Annapolis is in the Metropolitan Baltimore Intrastate Air Quality Control Region (40 CFR § 81.28). This Air Quality Control Region is designated as nonattainment for the 8-hour ozone and the annual $PM_{2.5}$ (particulate matter less than 2.5 microns) standards. Thus, the *de minimis* thresholds for the ozone precursor pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOCs) apply, as well as $PM_{2.5}$ and its precursor sulfur dioxide (SO_2).

Potential emissions that could result from the proposed action were calculated for all applicable criteria pollutants emitted for every year during which the construction activities would occur; however, the conformity analysis focused on VOCs, NO_x, $PM_{2.5}$, and SO_2.

1.1 PROJECT DESCRIPTION

NSA Annapolis is proposing to repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. The proposal includes repair and restoration to approximately 28,000 linear feet of shoreline. The project area has been divided into Reaches. These areas have been defined geographically, as well as based on the extent of erosion and potential restoration measures applicable. NSA Annapolis has identified four repair and restoration methods that are potentially feasible for the proposed action. The method deemed most feasible would be based on site conditions, environmental impact, and practicability of implementing the repair and restoration. The three alternatives for implementing the proposed action include four potentially feasible repair and restoration methods: 1) hardened structure or revetment, 2) sheet pile, 3) log toe stabilization, and 4) living shoreline. The shoreline reaches are the same under the three action alternatives; however, two of the action alternatives include three repair methods. Project construction for each of the alternatives was assumed to occur in a single year in order to assess the worst-case scenario under each of the three alternatives. In reality, activities would occur as funding becomes available, regardless of the alternative implemented.

1.2 AIR QUALITY

Air quality is defined as the ambient air concentrations of specific criteria pollutants determined by the United States Environmental Protection Agency (USEPA) to be of concern to the health and welfare of the general public. These criteria pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), SO_2, particulate matter less than 10 microns (PM_{10}), $PM_{2.5}$, and lead. Two types of NAAQS have been established by the USEPA for these criteria air pollutants. Primary ambient air quality standards are designed to protect public health with an adequate margin of safety. Secondary ambient air quality standards are designed to protect public welfare-related values including property, materials, and plant and animal life. The maximum primary and secondary standards (concentrations) of criteria pollutants are listed in 40 CFR Part 50, and apply throughout the U.S.

1.3 FEDERAL REQUIREMENTS

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The CAA places responsibility on individual states to achieve and maintain the NAAQS through USEPA-approved SIPs.

Under the GCR (40 CFR Part 93, Subpart B), emissions of criteria pollutants and their precursors (the ozone precursors VOCs and NOx, $PM_{2.5}$, the $PM_{2.5}$ precursor SO_2, and PM_{10}) that are associated with a proposed action that is in a nonattainment area for a given pollutant must be below *de minimis* emission rates for that pollutant to be exempt from a formal conformity determination. *De minimis* rates for the NAAQS pollutants of concern are listed in Table 1. Proposed actions that contribute less than these amounts and have no other conformity requirements are exempt from the GCR. Proposed actions that exceed the pollutant *de minimis* thresholds in any given year must undergo a detailed analysis and a formal conformity determination is required. Finally, mitigation would be required if the detailed analysis indicates an exceedance of the *de minimis* levels for any of the pollutants of concern.

Table 1. Criteria Pollutant *de minimis* Emission Rates

	***de minimis* Thresholds in Tons/Year**	
	Criteria Pollutant	**Precursor**
VOCs	-	50[1]
NO_x	-	100
$PM_{2.5}$	100	-
SO_2	-	100
PM_{10}	100	-

Source: 40 CFR § 93.153
[1]The Metropolitan Baltimore Air Quality Control Region is located in an ozone transport region and the VOC threshold is reduced to 50 tons/year.

2.0 METHODOLGY

In accordance with 40 CFR Part 93, Subpart B, the incremental increase in emissions above the existing conditions has been considered and includes reasonably foreseeable direct and indirect emissions. The total of direct and indirect emissions from the proposed action has been evaluated to assess whether or not it would exceed any of the applicable *de minimis* thresholds.

Emissions resulting from the proposed action were estimated based on the expected number, type, and duration of construction operations on an annual basis to complete the proposed action. According to preliminary estimates, the proposed action would require at a minimum, the equipment identified in Attachment 1.

As a worst-case scenario, all of the shoreline repair and restoration activities were assumed to occur within a single year, for each of the alternatives.

3.0 PROCEDURE AND CALCULATIONS

The following procedures were used to determine the applicability of the GCR. Direct and indirect emissions and reasonably foreseeable emissions are defined in the following paragraphs. Emissions are caused by the federal action if they would otherwise not occur in the absence of the federal action. Reasonably foreseeable direct and indirect emissions can be estimated based on acceptable techniques using assumptions about the type and quantity of equipment to be used.

Direct emissions: Direct emissions are caused by the action itself, such as the reasonably foreseeable emissions from the construction of a facility on government property.

Indirect emissions: Those emissions that are caused by the federal action, but that may occur later in time and/or may be farther removed in distance from the federal action itself but are still reasonably foreseeable. Typically, indirect emissions will include two types: (1) emissions from mobile sources that are associated with the federal action but that are not owned or operated by the federal agency (e.g., delivery trucks); and (2) emissions from the actions of private entities under a federal lease, permit, or approval.

3.1 EMISSIONS CALCULATIONS

Operation emissions calculations performed for the proposed action includes heavy duty diesel construction equipment, marine vehicles and heavy duty highway vehicles, such as delivery trucks. Emissions associated with commuting construction workers were not included because the workers would likely be employed elsewhere in the region if not working on the proposed action projects.

Non-road diesel engine emissions were calculated as follows:

$$EP = EF \times HP \times LF \times h \times CF$$

Where:
EP = emissions per pollutant in pounds (lbs)
EF = Emission Factor (grams per horse power hour [g/hp-hr])
HP = engine horse power (hp)
LF = engine load factor
h = total hours operated
CF = conversion factor for grams (g) to lb

On-road engine emissions for road travel were calculated as follows:

$$EP = T \times S \times EF$$

Where:
EP = emissions per pollutant in lbs
T = time in hours
S = speed in miles per hour (mph)
EF = pollutant emission factor in lbs/mile

Watercraft emissions were calculated as follows:

$E_{pollutant} = Zh \times F \times (1 + dh \times A/UL) \times HP \times LF \times h$

Zh = model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when the engine is new)
F = fuel correction factor (for NOx and PM) which accounts for emission reductions from burning cleaner fuel
dh = horsepower and pollutant specific engine deterioration factor, which is the % increase of emission factors at the end of the useful life of the engine
A = the age of the engine when the emissions are estimated
UL = the vessel type and engine use specific engine useful life
HP = rated horsepower of the engine
LF = vessel type and engine use specific engine load factor
H = number of operating hours of the engine

This method was used to calculated emissions for work boats, tugs, and self-propelled scows.

Hydrocarbon emissions are converted to VOCs using the diesel factor of 1.053 from *USEPA's Conversion Factors for Hydrocarbon Emission Components*, July 2010.

The tugboat used in the demolition phase is assumed to be equipped with a single 500-hp propulsion engine. All other (larger) tugboats are assumed to be equipped with two engines. This is based on the *California Harbor Craft Emission Inventory Database*, which indicates that the average number of propulsion engines for tugboats is 1.92.

SO_2 emissions were calculated based on *Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, from Technical Support Document for Rulemaking to Consider the Adoption of Proposed Regulations to Reduce emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline, California Air Resources Board (CARB)*, September 2007:

$F_c = HP \times LF \times h \times BSFC$

F_c = fuel consumed
HP = rated horsepower of engine
h = number of operating hours
LF = load factor
BSFC = brake specific fuel consumption rate; 184 g/hp-hr was estimated from manufacturers' marine engine data

Attachment 1 contains the complete calculations for all of the equipment included in the proposed action.

3.2 CONSTRUCTION EQUIPMENT

Construction equipment used is based on similar types of projects that routinely occur. Additionally, equipment data were obtained from the *USEPA's Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling* (2010), and *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition* (2010). Equipment productivity rates were obtained from *National Estimator 2010*, published by the Craftsman Book Company. Emission factors for delivery trucks are from the *USEPA's Motor Vehicle Emissions Simulator (MOVES) 2010* model. Marine vehicle (tugboats) emissions are derived from *Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, from Technical Support Document for Rulemaking to Consider the Adoption of Proposed Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated within California Waters and 24 Nautical Miles of the California Baseline (CARB)*, September 2007.

3.3 ASSUMPTIONS

The construction assumptions and details can be found in Tab D of Attachment 1. References for the analysis can be found in Tab E of Attachment 1.

4.0 RESULTS AND CONCLUSION

Total emissions were calculated for construction under each of the alternatives. The conformity determination considers the scenario that would generate the maximum emissions. Comparing the maximum scenario to the general conformity *de minimis* thresholds evaluates the worst case air quality emissions for the proposed action. For construction, 2016 was used as the single year of maximum emissions, though it is unlikely all activities under any alternative would occur in a single year. The maximum estimated emissions are provided in Table 2.

Table 2. Maximum Estimated Annual Emissions Compared to *de Minimis* Thresholds

Construction Activity	Tons/Year			
	VOCs	NO_x	$PM_{2.5}$	SO_2
Alternative 1 - Hardened Structure	0.14	1.05	0.09	0.09
Alternative 2 – Log Toe/ Hardened Structure/Sheet Pile	0.11	0.97	0.07	0.09
Alternative 3 – Living Shoreline/Hardened Structure/Sheet Pile	0.20	1.50	0.13	0.09
de minimis Thresholds	50	100	100	100

As indicated in Table 2, the emissions generated as a result of implementation of the proposed action under any of the alternatives would not exceed the GCR *de minimis* threshold levels for VOCs, NOx, $PM_{2.5}$, or SO_2. Based on the maximum annual emission estimates identified in Table 2, a general conformity determination is not required because the total maximum annual direct and indirect emissions for the proposed action are below the *de minimis* thresholds.

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Attachment 1:
Air Emissions Calculation Tables

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TAB A. NSA Annapolis Shoreline Repair and Restoration Air Emission Calculations - Alternative 1.

Hardened Structure/Revetment - Reach A, B, C, D, E, F, and G

840,000 square feet total area of disturbance
280,000 square feet of rip rap and geotextile placement
20,741 cubic yards of rip rap (2 ft depth)
62,222 square yards of grading
10 acres of clearing
55 Barge Round Trips for rip rap

Table 1. Land Clearing **10.5** Acres

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Dozer	122	145	0.58	0.38	1.41	4.17	0.12	0.30	0.29	536
Loader/Backhoe	122	87	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
Small Backhoe	122	55	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
				VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CO_2 lb
			Dozer	8.51	31.94	94.25	2.60	6.68	6.48	12,097
			Loader w/ integral Backhoe	7.02	36.06	31.15	0.73	5.22	5.06	3,393
			Small backhoe	4.44	22.80	19.69	0.46	3.30	3.20	2,145

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	VOC lb/mile	CO lb/mile	NOx lb/mile	SO_2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	CO_2 lb/mile
Dump Truck	56	230	35	0.0015	0.0080	0.0361	0.0000	0.0015	0.0015	3.4385
				VOC lb	CO lb	NOx lb	SO2 lb	PM lb	PM2.5 lb	CO_2 lb
			Dump Truck	2.97	15.70	70.40	0.04	2.94	2.85	6,711
			Subtotal in lbs	23	106	215	4	18	18	24,347
			Clearing Grand Total in Tons	**0.01**	**0.05**	**0.11**	**0.00**	**0.01**	**0.01**	
			Clearing Grand Total in Metric Tons							**11.0**

Table 2. Fill and Grading 20,741 Cubic Yards Fill 62,222 Square Yards Grading

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Long Reach Excavator	314	290	0.59	0.34	1.21	4.03	0.12	0.22	0.22	536
Tracked Dozer	52	130	0.59	0.38	1.41	4.17	0.12	0.30	0.29	536
				VOC lb	CO lb	NOx lb	SO2 lb	PM lb	PM2.5 lb	CO_2 lb
			Excavator	40.77	143.34	477.66	13.66	26.41	25.62	63,513
			Backhoe/loader	3.30	12.40	36.59	1.01	2.60	2.52	4,697
			Subtotal in lb:	**44**	**156**	**514**	**15**	**29**	**28**	**68,210**
			Filling/Grading Grand Total in Tons	**0.02**	**0.08**	**0.26**	**0.01**	**0.01**	**0.01**	
			Filling/Grading Grand Total in Metric Tons							**31**

Table 5. Barge Trips 55 Total Round Trips

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	312	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206
	312	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206

Off-road Equipment	VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	105.99	537.88	685.33	80.02	74.00	68.08	1.38	0.28	34,114
	105.99	537.88	685.33	80.02	74.00	68.08	1.38	0.28	34,114
Tons/year:	**0.11**	**0.54**	**0.69**	**0.08**	**0.07**	**0.07**			
CO_2e Metric tons/year:									**68**

Table 6. Total Emissions for Alternative 1.

VOC	CO	NOx	SO2	PM	PM2.5	CO_2
0.14	0.67	1.05	0.09	0.10	0.09	110

TAB B. NSA Annapolis Shoreline Repair and Restoration Air Emission Calculations - Alternative 2.

Log Toe Stabilization - Reach B, D, and G

319,750 square feet total area of disturbance
28,422 square yards of grading
2,558 Total number of 10' logs required
4,737 Cubic yards back fill
5 Barge loads of logs

Hardened Structure/Revetment - Reach A, E, and F

422,100 square feet total area of disturbance
140,700 square feet of rip rap and geotextile placement
10,422 cubic yards of rip rap (2 ft depth)
31,267 square yards of grading
4.6 acres of clearing
28 Barge Round Trips for rip rap

Sheet Pile - Reach C

1,140 Feet sheet pile
0.5 acres of clearing
2,533 square yards of grading
422 cubic yards of back fill
4 Barge Round Trips for sheet pile
0.7 barge load of sheet pile fill

2.0 Barges for equipment

Table 1. Land Clearing 4.6 acres

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Dozer	53	145	0.58	0.38	1.41	4.17	0.12	0.30	0.29	536
Loader/Backhoe	53	87	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
Small Backhoe	53	55	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
				VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CO_2 lb
			Dozer	3.73	13.99	41.29	1.14	2.93	2.84	5,300
			Loader w/ integral Backhoe	3.08	15.80	13.65	0.32	2.29	2.22	1,487
			Small backhoe	1.95	9.99	8.63	0.20	1.44	1.40	940

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	VOC lb/mile	CO lb/mile	NOx lb/mile	SO_2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	CO_2 lb/mile
Dump Truck	24	230	16	0.0015	0.0080	0.0361	0.0000	0.0015	0.0015	3.4385
				VOC lb	CO lb	NOx lb	SO2 lb	PM lb	PM2.5 lb	CO_2 lb
			Dump Truck	0.60	3.19	14.29	0.01	0.60	0.58	1,362
			Subtotal in lbs	9	43	78	2	7	7	9088
			Clearing Grand Total in Tons	**0.00**	**0.02**	**0.04**	**0.00**	**0.00**	**0.00**	
			Clearing Grand Total in Metric Tons							**4.1**

Table 2. Fill and Grading 15,581 Cubic Yards Fill 62,222 Square Yards Grading

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Long Reach Excavator	236	290	0.59	0.34	1.21	4.03	0.12	0.22	0.22	536
Tracked Dozer	52	130	0.59	0.38	1.41	4.17	0.12	0.30	0.29	536
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb	**PM2.5** lb	**CO_2** lb
			Excavator	30.63	107.69	358.84	10.26	19.84	19.25	47,714
			Backhoe/loader	3.30	12.40	36.59	1.01	2.60	2.52	4,697
			Subtotal in lb:	**34**	**120**	**395**	**11**	**22**	**22**	**52,411**
			Site Prep Grand Total in Tons	**0.02**	**0.06**	**0.20**	**0.01**	**0.01**	**0.01**	
			Site Prep Grand Total in Metric Tons							**24**

Table 3. Crane Work 12 Barges Unloading geotextiles, sheetpile walls and unloading/placing culverts

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Barge Crane	92	213	0.58	0.40	1.57	4.57	0.12	0.32	0.31	536
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb	**PM2.5** lb	**CO_2** lb
			Crane	9.95	39.54	114.97	2.90	8.04	7.79	13,488
			Crane Work Grand Total in Tons	**0.00**	**0.02**	**0.06**	**0.00**	**0.00**	**0.00**	
			Crane Work Grand Total in Metric Tons							**6**

Table 4. Sheet Pile Installation 1,140 feet

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Impact Hammer	52	180	0.59	0.38	1.47	4.34	0.12	0.31	0.30	536
Barge Crane	63	213	0.58	0.40	1.57	4.57	0.12	0.32	0.31	536
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM** lb	**PM2.5** lb	**CO_2** lb
			Impact Hammer	4.68	17.94	52.94	1.41	3.73	3.61	6,536
			Barge Crane	6.73	26.75	77.77	1.96	5.44	5.27	9,123
			Subtotal in lb:	**11**	**45**	**131**	**3**	**9**	**9**	**15,659**
			Sheet Pile Installation Grand Total in Tons	**0.01**	**0.02**	**0.07**	**0.00**	**0.00**	**0.00**	
			Sheet Pile Installation Total in Metric Tons							**7**

Table 5. Barge Trips 39 Total Round Trips

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	222	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206
	222	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206

Off-road Equipment	VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	75.40	382.68	487.58	80.02	52.65	48.44	0.98	0.20	24,271
	75.40	111.99	382.68	80.02	52.65	48.44	0.98	0.20	24,271
Tons/year:	**0.08**	**0.25**	**0.44**	**0.08**	**0.05**	**0.05**			
CO_2e Metric tons/year:									**49**

Table 6. Total Emissions for Alternative 2.

VOC	CO	NOx	SO2	PM	PM2.5	CO_2
0.11	0.37	0.79	0.09	0.08	0.07	90

TAB C. NSA Annapolis Shoreline Repair and Restoration Air Emission Calculations - Alternative 3.

Living Shoreline - Reach B, D, F, and G

407,500 square feet total area of disturbance
36,222 square yards of onshore grading
12,074 cubic yards of rip rap for breakwater
6,037 Back fill
10 Barge loads of fill
32 Barge loads of rip rap for breakwater

Hardened Structure/Revetment - Reach A and E

316,800 square feet total area of disturbance
105,600 square feet of rip rap and geotextile placement
7,822 cubic yards of rip rap (2 ft depth)
23,467 square yards of grading
3.8 acres of clearing
32 Barge Round Trips for rip rap

Sheet Pile - Reach C

1,140 Feet sheet pile
0.5 acres of clearing
2,533 square yards of grading
422 cubic yards of back fill
4 Barge Round Trips for sheet pile
0.7 barge load of sheet pile fill

2 Barges Equipment

Table 1. Land Clearing 3.8 acres

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Dozer	44	145	0.58	0.38	1.41	4.17	0.12	0.30	0.29	536
Loader/Backhoe	44	87	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
Small Backhoe	44	55	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692

	VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CO_2 lb
Dozer	3.08	11.56	34.11	0.94	2.42	2.35	4,378.12
Loader w/ integral Backhoe	2.54	13.05	11.27	0.26	1.89	1.83	1,228.03
Small backhoe	1.61	8.25	7.13	0.17	1.19	1.16	776.34

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	VOC lb/mile	CO lb/mile	NOx lb/mile	SO_2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	CO_2 lb/mile
Dump Truck	20	230	16	0.0015	0.0080	0.0361	0.0000	0.0015	0.0015	3.4385

	VOC lb	CO lb	NOx lb	SO2 lb	PM lb	PM2.5 lb	CO_2 lb
Dump Truck	0.50	2.63	11.80	0.01	0.49	0.48	1,125
Subtotal in lbs	8	35	64	1	6	6	7508
Clearing Grand Total in Tons	**0.00**	**0.02**	**0.03**	**0.00**	**0.00**	**0.00**	
Clearing Grand Total in Metric Tons							**3.4**

Table 2. Fill and Grading 14,281 Cubic Yards Fill 62,222 Square Yards Grading

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Long Reach Excavator	216	290	0.59	0.34	1.21	4.03	0.12	0.22	0.22	536
Tracked Dozer	52	130	0.59	0.38	1.41	4.17	0.12	0.30	0.29	536
				VOC lb	**CO lb**	**NOx lb**	**SO2 lb**	**PM lb**	**PM2.5 lb**	**CO_2 lb**
			Excavator	28.07	98.70	328.90	9.41	18.19	17.64	43,733.05
			Backhoe/loader	3.30	12.40	36.59	1.01	2.60	2.52	4,696.88
			Subtotal in lb:	**31**	**111**	**365**	**10**	**21**	**20**	**48,430**
			Site Prep Grand Total in Tons	**0.02**	**0.06**	**0.18**	**0.01**	**0.01**	**0.01**	
			Site Prep Grand Total in Metric Tons							**22**

Table 3. Crane Work 6 Barges Unloading geotextiles, sheetpile walls and unloading/placing culverts

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Barge Crane	48	213	0.58	0.40	1.57	4.57	0.12	0.32	0.31	536
				VOC lb	**CO lb**	**NOx lb**	**SO2 lb**	**PM lb**	**PM2.5 lb**	**CO_2 lb**
			Crane	5.17	20.53	59.69	1.51	4.17	4.05	7,002.51
			Crane Work Grand Total in Tons	**0.00**	**0.01**	**0.03**	**0.00**	**0.00**	**0.00**	
			Crane Work Grand Total in Metric Tons							**3**

Table 4. Sheet Pile Installation 1,140 feet

Off-road Equipment	Hours	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Impact Hammer	52	180	0.59	0.38	1.47	4.34	0.12	0.31	0.30	536
Barge Crane	63	213	0.58	0.40	1.57	4.57	0.12	0.32	0.31	536
				VOC lb	**CO lb**	**NOx lb**	**SO2 lb**	**PM lb**	**PM2.5 lb**	**CO_2 lb**
			Impact Hammer	4.68	17.94	52.94	1.41	3.73	3.61	6,536.05
			Barge Crane	6.73	26.75	77.77	1.96	5.44	5.27	9,123.27
			Subtotal in lb:	**11**	**45**	**131**	**3**	9	9	**15,659**
			Sheet Pile Installation Grand Total in Tons	**0.01**	**0.02**	**0.07**	**0.00**	**0.00**	**0.00**	
			Sheet Pile Installation Total in Metric Tons							**7**

Table 5. Barge Trips 81 Total Round Trips

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	HC-ZH g/hp-hr	HC-DR g/hp-hr^2	CO-ZH g/hp-hr	CO-DR g/hp-hr^2	NOx-ZH g/hp-hr	NOx-DR g/hp-hr^2	Fc g	PM10 g/hp-hr	PM10-ZH g/hp-hr^2	CH_4 g/gal fuel	N_2O g/gal fuel	CO_2 g/gal fuel
Tug - propulsion	458	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206
	458	375	0.50	0.68	0.44	3.73	0.25	5.10	0.21	1.21E+07	0.67	0.15	0.41	0.08	10,206

Off-road Equipment	VOC lb	CO lb	NOx lb	SO2 lb	PM10 lb	PM2.5 lb	CH_4 kg	N_2O kg	CO_2 kg
Tug - propulsion	155.64	789.85	1,006.38	80.02	108.67	99.98	2.03	0.41	50,095
	155.64	789.85	1,006.38	80.02	108.67	99.98	2.03	0.41	50,094.95
Tons/year:	**0.16**	**0.79**	**1.01**	**0.08**	**0.11**	**0.10**			
CO_2e Metric tons/year:									**101**

ıble 6. Shoreline Vegetation

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO_2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	CO_2 g/hp-hr
Loader/Backhoe	187	87	0.21	1.43	7.35	6.35	0.15	1.06	1.03	692
				VOC lb	**CO lb**	**NOx lb**	**SO2 lb**	**PM10 lb**	**PM2.5 lb**	**CO_2 lb**
			Loader/ Backhoe	10.77	55.26	47.73	1.12	7.99	7.75	5,200

On-road Equipment	Hours of Operation	Engine HP	Speed (mph)	VOC lb/mile	CO lb/mile	NOx lb/mile	SO_2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	CO_2 lb/mile
Delivery Truck	112	230	40	0.0015	0.0080	0.0361	0.0000	0.0015	0.0015	3.4385
				VOC lb	**CO lb**	**NOx lb**	**SO2 lb**	**PM lb**	**PM2.5 lb**	**CO_2 lb**
			Delivery Truck	6.82	36.03	161.59	0.08	6.74	6.53	15,405
			Subtotal in lbs	18	91	209	1	15	14	20,605
			Vegetation Grand Total in Tons	**0.01**	**0.06**	**0.19**	**0.00**	**0.01**	**0.01**	
			Vegetation Grand Total in Metric Tons							**16.3**

Table 7. Total Emissions for Alternative 3.

VOC	CO	NOx	SO2	PM	PM2.5	CO_2
0.20	0.96	1.50	0.09	0.14	0.13	153

TAB D. NSA Annapolis Shoreline Repair and Restoration Air Emission Calculations - Assumptions

Reach Length Estimates:*

Reach A =	9160	Feet	partially wooded - assume 75%
Reach B =	1160	"	wooded
Reach C =	1140	"	wooded
Reach D1 =	7530	"	wooded
Reach D2 =	1600	"	wooded
Reach E =	1400	"	wooded
Reach F =	3510	"	partially wooded - assume 50%
Reach G =	2500	"	partially wooded - assume 50%
	28000		

*From email, J. Johnson, 8 October to L. Hamilton

Alternative 1. *Hardened Structure/Revetment*

Hardened Structure/Revetment: A, B, C, D, E, F and G				28,000 Feet
A, B, D, E, F & G				
Riprap installation - lower slope	assume	10	ft width	long reach excavator
Geotextile installation - lower slope	assume	10	ft width	crane
Grading - upper slope	assume	20	ft width	tracked dozer

Alternative 2. *Log Toe Stabilization*

Log Toe Stabilization: B, D and G				12,790 Feet
Hardened Structure/Revetment (Alt 1): A, E and F				14,070 Feet
Sheet Pile - Reach C				1,140 Feet
B, D, and G				
Install logs 12-18" dbh untreated logs				
Grading - upper slope				
Log installation - lower slope	assume	3	ft width	crane
backfill behind logs	assume	5	ft width	long reach excavator
Grading of backfill and remaining slope	assume	20	ft width	tracked dozer

A, E, F & G - Riprap, geotextile, grading as per Alt 1

Sheet Pile - Reach C	1,140	Feet
Sheet pile installation using impact hammer		
Culvert installation	Crane	
Backfill	long reach excavator	

Alternative 3 . *Living Shoreline*

Living Shoreline: B, D, F and G				16,300 Feet
Hardened Structure/Revetment (Alt 1): A and E				10,560 Feet
Sheet Pile - Reach C				1,140 Feet
B, D, F and G				
Install Breakwater			long reach excavator	
Add "fill" - sand, soil	5	ft width	long reach excavator	
Onshore Grading	20	ft width	tracked dozer	

Breakwater comprised of riprap

Tide =	1.5	ft
breakwater dimensions	12,074	cubic yards of rip rap (2 ft top, 8 ft base, 4 ft height trapezoid X 16,300)
Fill required estimate	6,037	cubic yards of fill (2 X 5 X 16300)

Vegetation: assume	6	flatbed trucks/acre
	9	acres total
	56	trucks of plants for living shoreline construction

A, E -Riprap, geotextile, grading as per Alt 1

C - Sheet pile, culvert and grading as per Alt 2

Barge can carry	1,500	tons of cargo
Distance from Baltimore to Annapolis (by boat):	31	miles (statute)
	5,460	square feet of cargo area on standard 195 X 35 barge
	5.6	hours for round trip journey

Revetment Rip rap

2	tons per cubic yard of rip rap
750	tons of rip rap per barge load
41,481	total tons of rip rap required for Alternative 1
55	total barge loads required for Alternative 1
20,844	total tons of rip rap required for Alternative 2
28	total barge loads required for Alternative 2
24,148	total tons of rip rap required for Alternative 3
32	total barge loads required for Alternative 3

Geotextile

1	roll
246	feet long
19.6	feet wide
1,382	pounds per roll
57	rolls of geotextile for Alternative 1
39	tons of material for Alternative 1
29	rolls of geotextile for Alternative 2
20	tons of material for Alternative 2
21	rolls of geotextile for Alternative 2
15	tons of material for Alternative 2

Sheet pile

2.4	feet width of each panel
16	ft length
25.73	lb/square foot of panel
61.1	lb/ft for each pile
480	sheet pile panels required for Section C
38	square feet per panel
978	weight of each panel
235	tons of panels for Section C
115	panels per barge
4	barge trips

Log toe stabilization

10	foot minimum log lengths
1.3	feet average diameter
13.3	square feet per log
546	logs per barge load
2,558	Total number of logs required using double layer
4.7	Barge loads of logs

Sheetpile berm backfill

422	cubic yards
0.7	barge load

Log toe backfill

4,737	cubic yards
7.8	barge load

Living Shoreline backfill

6,037	cubic yards of fill
607	cubic yard capacity of one barge
10	barge loads of fill

Equipment used:

impact hammer for sheet pile installation	180 HP			
Barge -mounted crane	213 HP			
Barge -mounted long reach excavator	321 HP	2.2 CY /bucket	2.00 min/bucket	
Tugboat	375 HP X 2			
tracked dozer	130 HP	20 SY/min		

2.2	CY/bucket	100	sy
9428	bucket loads	5	min
2.00	min/bucket		
314	hrs		

175 feet sheetpile installed /day

TAB E. REFERENCES

California Resources Board. 2007. Appendix B: Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, from Technical Support Document for Rulemaking to Consider the Adoption of Proposed Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline. September.

Craftsman Book Company. 2010. National Estimator. Carlsbad, CA.

USEPA. 2010a. Conversion Factors for Hydrocarbon Emission Components. Report No. NR-002d. July.

USEPA. 2010b. Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition. NR-009d. July.

USEPA. 2010c. Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. Report No. NR-005d. July.

USEPA. 2010d. Motor Vehicle Emission Simulator (MOVES) 2010.

USEPA. 2010e. NONROAD 2010 Model.

RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY FOR REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE OF NAVAL SUPPORT ACTIVITY ANNAPOLIS, ANNAPOLIS, MARYLAND

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GENERAL CONFORMITY RULE - RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

REPAIR AND RESTORATION OF THE NORTH SEVERN SHORELINE

PROPOSED ACTION

Action Proponent:	Naval Support Activity Annapolis
Proposed Action Name:	Repair and Restoration of the North Severn Shoreline
Location:	Naval Support Activity Annapolis, located in Annapolis, Maryland
Project Construction Begin Date:	Not determined
Project Construction End Date:	Not determined
Proposed Action Point of Contact:	Department of the Navy, Naval Facilities Engineering Command (NAVFAC) Washington
Proposed Action Summary:	Repair and restore the shoreline of the North Severn Complex along Mill Creek, Carr Creek, the Severn River, and the Chesapeake Bay. The proposal includes repair and restoration to approximately 28,000 linear feet of shoreline.

The Clean Air Act requires federal actions in air pollutant nonattainment or maintenance areas to conform to the applicable State Implementation Plan. The State Implementation Plan is designed to achieve or maintain an attainment designation of air pollutants as defined by the National Ambient Air Quality Standards. The regulations governing this .requirement are found in 40 Code of Federal Regulations (CFR) Part 93, also known as the "General Conformity Rule," which applies to federal actions occurring in regions designated as nonattainment or areas subject to maintenance plans. The threshold (*de minimis*) emission rates have been established for actions with the potential to have significant air quality impacts. A project/action that would be located in an area designated as nonattainment and exceeding the *de minimis* thresholds must have a general conformity determination prepared to address significant impacts.

NSA Annapolis is in the Metropolitan Baltimore Intrastate Air Quality Control Region (40 CFR § 81.28). This Air Quality Control Region is designated as nonattainment for the 8-hour ozone and the annual $PM_{2.5}$ (particulate matter less than 2.5 microns) standards. Thus, the *de minimis* thresholds for the ozone precursor pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), as well as $PM_{2.5}$ and its precursor sulfur dioxide (SO_2), apply to the conformity applicability analysis.

Air Emissions Summary:

Diesel engine mobile emission sources associated with construction activities were assessed. The estimated maximum emissions from construction equipment and vehicles are estimated and summarized in Table 1. Based on the maximum annual emission estimates identified in Table 1, a

general conformity determination is not required because the total maximum annual direct and indirect emissions for the proposed action are below the *de minimis* thresholds.

Table 1. Maximum Estimated Emissions for Shoreline Repair and Restoration Alternatives

Construction Activity	Tons/Year			
	VOCs	NO_x	$PM_{2.5}$	SO_2
Alternative 1 - Hardened Structure	0.14	1.05	0.09	0.09
Alternative 2 – Log Toe/ Hardened Structure/Sheet Pile	0.11	0.79	0.07	0.09
Alternative 3 – Living Shoreline/Hardened Structure/Sheet Pile	0.20	1.50	0.13	0.09
[1]*de minimis* Thresholds	[2]50	100	100	100

[1]40 CFR § 93.153
[2]The Metropolitan Baltimore Intrastate Air Quality Control Region is located in an ozone transport region and the VOC threshold is reduced to 50 tons/year.

Supporting documentation and emission estimates can be found in Section 3.5, *Air Quality*, and Appendix C, *Air Quality*, of the Environmental Assessment.

Date RONA Prepared: 2014

RONA Prepared By: NAVFAC, Washington

RONA Approval

KLIMOSKI.MATTHEW.R.1204834543 Digitally signed by KLIMOSKI.MATTHEW.R.1204834543
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=KLIMOSKI.MATTHEW.R.1204834543
Date: 2015.04.15 14:48:27 -04'00'

15 April 2015

Signature Date