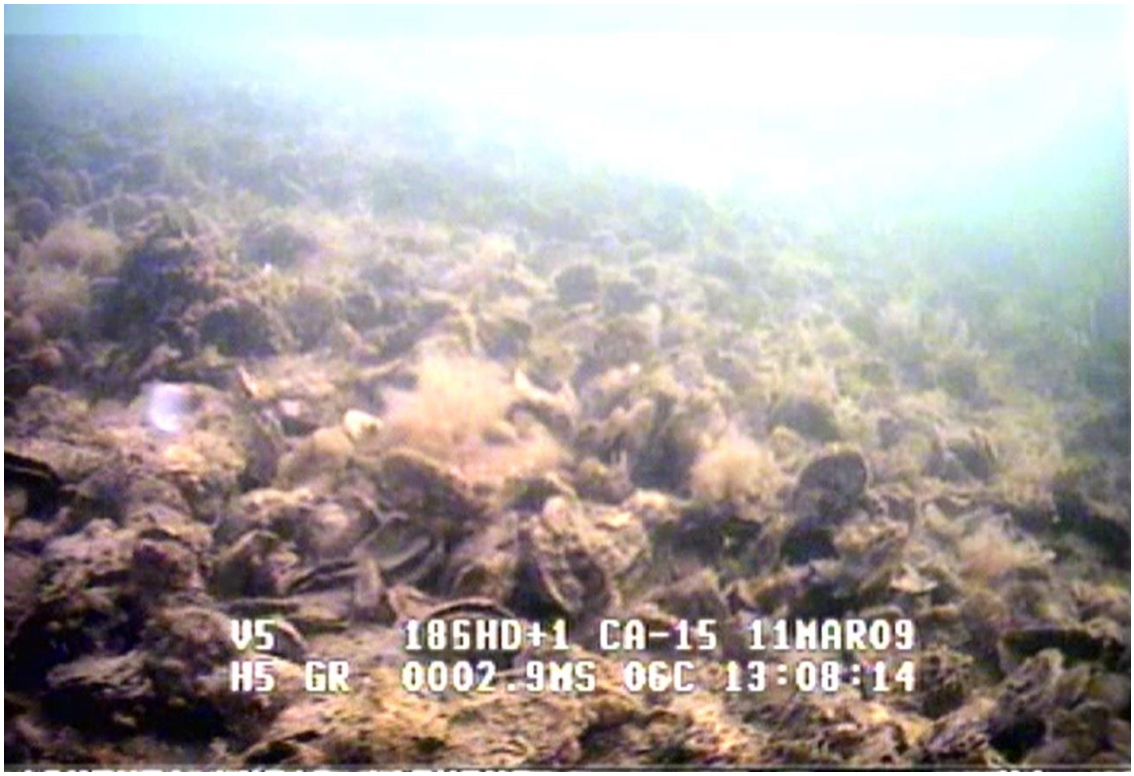
Chesapeake Bay Oyster Restoration Program
Great Wicomico River
Supplemental Environmental Assessment



US Army Corps of Engineers ®

Norfolk District
803 Front Street
Norfolk, VA 23510

Virginia Marine Resources Commission
380 Fenwick Road
Fort Monroe, VA 23651

January 2023

DRAFT FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER PROGRAM

GREAT WICOMICO RIVER SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

VIRGINIA

The U.S. Army Corps of Engineers, Norfolk District (USACE) has conducted an environmental impacts analysis in accordance with the National Environmental Policy Act of 1969, as amended. This current Draft Supplemental Environmental Assessment (SEA), dated January 2023, considers the potential for environmental impacts for the Preferred Alternative Plan. The Preferred Alternative Plan includes adaptive management actions to improve performance of a large-scale oyster reef sanctuary network initially constructed in 2004.

This SEA evaluated a No Action and Action Alternative, selecting the Action Alternative as the Recommended Plan. The Recommended Plan (RP) includes elevating several low-relief areas to high-relief status by adding small stone (3-6 inches) or shell on top of existing low-relief reefs to bring them up to a height of 12-18 inches off the surrounding river bottom. These areas would first be scraped of live oysters and associated benthos, which would be relocated to nearby reefs to keep the oysters in local waters. After the first reef is upgraded, subsequent reefs' oysters and fauna would be relocated wherever possible to the newly upgraded high-relief reefs in sequence as they are constructed. It is also proposed to have a number of randomly placed class II granite riprap stones, from here on referenced as "habitat stones", approximately 60 stones/acre, installed across the entire reef network. These habitat stones will provide additional vertical relief off the reef, where it has been documented for higher levels of recruitment to occur. A secondary benefit to these habitat stones will be to discourage any future poaching, either anthropogenic or pelagic (i.e., Cownose rays). These reefs are permanent oyster sanctuaries, and by adding in an additional design feature such as the habitat stones we can ensure recruitment while also providing a physical means of protection to assure the reefs longevity. Additionally, one reef (reef 16) is proposed to be expanded by doubling its current size. This Action Alternative also includes the operation, maintenance and monitoring of these reefs.

For the Recommended Plan (RP), the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the RP are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	☐	☐	☒
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☒	☐	☒

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☐	☐	☒
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☒	☐	☐
Public infrastructure	☐	☐	☒
Socioeconomics	☒	☐	☐
Environmental justice	☒	☐	☐
Soils	☐	☐	☒
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the RP. There would be no required compensatory mitigation anticipated with implementation of the Recommended Plan. All mitigation, in terms of avoidance and minimization measures, has been incorporated into the development of the Recommended Plan. Best Management Practices (BMPs) have been incorporated to protect the environment and minimize impacts during construction and operation and maintenance cycles.

Best management practices (BMPs), as highlighted below and detailed in the EA, will be implemented to minimize impacts:

- Best management practices will be implemented during construction to minimize noise, emissions, health and safety, and to reduce the chance of a spill;
- To minimize air emissions associated with construction vessels and related equipment, vessels and equipment will not be allowed to run idle and will be shut off to the extent practical when not in use;
- Exposure to occupational health and safety hazards would be mitigated to the extent practical through adherence to an approved Work Safety Plan that incorporates standard work practices, avoidance of slip and fall hazards, and wearing PPE; and
- A standard specification regarding protection, evaluation, and treatment of archaeological discoveries will be included in construction plans.

No compensatory mitigation is required as part of the RP.

Public review of the Draft SEA and Finding of No Significant Impact (FONSI) will be completed from January to February 2023. All comments submitted during the public review period will be responded to in the Final Report/SEA and FONSI.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the Corps determined that the RP may affect but is not likely to adversely affect the following Federally listed species under the jurisdiction of the USFWS: Atlantic sturgeon, loggerhead sea turtle, piping plover, red knot, and west Indian manatee. There would be no effect to the monarch butterfly candidate species and no effect to the following Federally listed species under the jurisdiction of the USFWS: shortnose sturgeon, Northern long-eared bat, sea turtles (green, hawksbill, Kemp's ridley, leatherback), and the northeastern tiger beetle. There is no critical habitat under the jurisdiction of the USFWS in the Action Area, and there would be no affect to critical habitat under the jurisdiction of the USFWS in the Action Area. Formal consultation under Section 7 Endangered Species Act may be undertaken and would conclude with a decision from USFWS in the Final Report/SEA and FONSI.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the Corps determined that historic properties would not be adversely affected by the RP. The Virginia Department of Historic Resources concurred with a determination on 20 February 2003 that working within the public oyster grounds of the Great Wicomico River will not affect any historic properties or archeological resources, due to the long history of site disturbance of the fishery. Fishers have dredged and tonged these areas for well over 100 years. Because the RP will be activity done on the same sites as the 2003 study, there will be no impacts.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the RP has been found to be compliant with the action 404(b)(1) Guidelines (40 CFR Part 230). The US Army Corps does not expect any discharge of dredged or fill material into waters of the United States during the construction of the proposed project. The US Army Corps will prepare the Clean Water Act Section 404(b)(1) Guidelines evaluation for the Final Report/SEA and FONSI.

The Virginia Department of Environmental Quality (VDEQ) is expected to waive water quality certification pursuant to Section 401 of the Clean Water Act and not require a water quality certification for construction that is located entirely on subaqueous bottoms, provided a Federal Consistency Determination is obtained pursuant to the Coastal Zone Management Act (CZMA).

Prior to construction, pursuant to the CZMA, a Federal Consistency Determination with the Virginia Coastal Zone Management Program's enforceable policies will be obtained from the VDEQ. The consultation will conclude with a decision from VDEQ in the Final Report/SEA and FONSI. All conditions of the consistency determination shall be implemented in order to minimize adverse impacts to the coastal zone.

All applicable environmental laws have been considered, and coordination with appropriate agencies and officials has been completed. Coordination was initiated with NMFS, pursuant to the Magnuson-Stevens Fishery and Conservation Management Act concurrent with the release of the Draft SEA and Essential Fish Habitat (EFH) Assessment. EFH consultation will conclude with NMFS Conservation Recommendations, and the subsequent response to those

Recommendations from USACE. Consultation will conclude prior to release of the Final Report/SEA and FONSI. Potential impacts to fish and fish habitat from the Action Alternative are minor negative impacts that are temporary and not significant and positive impacts that are long-term and significant.

The area is in attainment for NAAQS, and it was determined that air emissions produced by implementing the RP will be de minimis so a general conformity analysis was not necessary. A Record of Non-Applicability will be prepared for the Final Report/SEA and FONSI.

Technical, environmental, and economic criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State, and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the RP would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

_____ _____

Date

BRIAN P. HALLBERG, PMP
Colonel, Corps of Engineers
District Commander

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Foster sustainability as a way of life throughout the organization.

Proactively consider environmental consequences of all U.S. Army Corps of Engineers (USACE) activities and act accordingly.

Create mutually supporting economic and environmentally sustainable solutions.

Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the USACE, which may impact human and natural environment.

Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.

Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.

Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

Chesapeake Bay Oyster Restoration Program
Great Wicomico River Supplemental Environmental Assessment

LEAD AGENCY: Department of the Army
U.S. Army Corps of Engineers, Norfolk District

EXECUTIVE SUMMARY

This Supplemental Environmental Assessment (SEA) documents additional, adaptive management actions proposed for the first large-scale oyster sanctuary reef network constructed in Chesapeake Bay in 2004. The project constructed in 2004 covers 85 acres, with 8 distinct reefs of varying sizes (USACE 2003) and two different heights off the surrounding river bottom. A mix of high (≥ 12") and low (2-4") relief reefs were built out of dredged "fossil" oyster shell as a field experiment to determine the most effective construction methods. By 2007, oyster densities were found to be fourfold greater on high-relief reefs than on low-relief reefs, explaining the failure of past attempts due to sedimentation over low density, low-relief oyster reefs (Schulte et al. 2009). The reef network continues to be monitored and to date, results have continued to demonstrate that the high-relief reefs hold several times the number of oysters per unit reef area when compared to low-relief reefs. Over time, low-relief reefs tend to degrade due to insufficient numbers of oysters over the reef surface to prevent sedimentation. Additional degradation due to damage from poaching has been documented on most, but not all, of the reefs in this network. This SEA will consider modifications to enhance the remaining low-relief reefs with crushed stone, update all reefs' designs with the addition of large habitat stones (class II granite rip-rap stone), and expand the footprint of Reef 16.

PURPOSE AND NEED

The purpose of this SEA is to consider modifications of an oyster reef restoration project first constructed in the Great Wicomico River in 2004 (modified once before in 2015) because of degradation that had occurred extensively over several of the reefs and to upgrade several areas (28.1 acres) of low relief to high relief reefs. In 2004, 53 acres of low relief reef and 32 acres of high relief reef were constructed. Since monitoring began in 2006, the high-relief reefs have consistently, significantly out-performed the low-relief reefs. Monitoring has also shown that the furthest downriver reef site (reef 16) has consistently been the best performing reef in the river system. The first adaptive management occurred in 2015 where 17 total acres were impacted by restoration actions. Eleven acres of low relief reef were rehabilitated to high relief acres. Six acres of low-relief reef were left in poor condition after moving all live oysters and original shell to other reefs in the Great Wicomico. National Environmental Policy Act (NEPA) compliance documentation was not done for these 2015 actions as it consisted of only adding shell to rehabilitate the reefs, the same material used to construct the reefs in 2004, so Norfolk District determined a supplemental NEPA assessment was not needed. The present adaptive management action considered is using stone instead of shell for the enhancement of the reef network and expansion reef 16 pasts its current footprint.

There is a need to continue adaptive management in the Great Wicomico River. There is a need to improve the function of 28.1 acres of low-relief reef by upgrading them to high-relief using crushed stone and to improve the function of the entire 85-acre reef network by adding large habitat stones. The best performing reef, reef 16, can also be expanded, as it currently occupies only a small portion of the public ground it is located in, and the surrounding bottom is sparse shell with mostly hard silty sand bottom with clay at present. Further, additional upstream sites are considered for future restoration efforts if needed to maintain restoration levels. All these actions would significantly improve the reef sanctuary network, ensuring its long-term sustainability and maintaining the Great Wicomico River's status as "fully restored". As defined by the Chesapeake Bay Program's Goal Implementation Team (GIT), a tributary is "fully restored" when restoration actions are completed on at least 50% of currently restorable oyster habitat in that tributary which equates to 122 acres in the Great Wicomico River. The 122-acre goal was completed in 2021 and is consistent with the restoration target range of 100-400 acres identified in the USACE Oyster Restoration Master Plan (USACE 2012) for the Great Wicomico River. Continued maintained and rehabilitation of these reefs will ensure the River remains at "fully restored" status.

PROPOSED ACTION AND ALTERNATIVES

There were two alternatives considered, an Action Alternative and a No Action Alternative. The No Action Alternative would not alter the current sanctuary reef system in the Great Wicomico River in any way. Current low-relief reef habitat would remain as is, and degradation of the reefs will likely continue. Reef 16 would remain at its current size. The Action Alternative (i.e., the Preferred Alternative) includes construction, monitoring, and maintenance of these features, which can be seen in Figure 1-1. The project construction is anticipated to begin in approximately 2023. The Action Alternative includes the following:

- Building up low-relief reef areas on reefs 1-2, 8, and 9 to a height of 12-18" by adding small stone (3-6"). All live oysters will be moved (if found at densities greater than 10/m^2 and placed on other sanctuary reefs prior to construction.
- Placing 60 large habitat stones/acre over all reef surfaces. Stones will be class II granite riprap, averaging 20-22" in size. This is an updated design feature that has been successful in adaptive management of other USACE oyster reefs projects in the Chesapeake Bay.
- Expand the footprint of Reef 16 by building along the eastern end of it. The new reef area will be approximately 14 acres in size and constructed to a height of 14-16" using small stone (3-6").

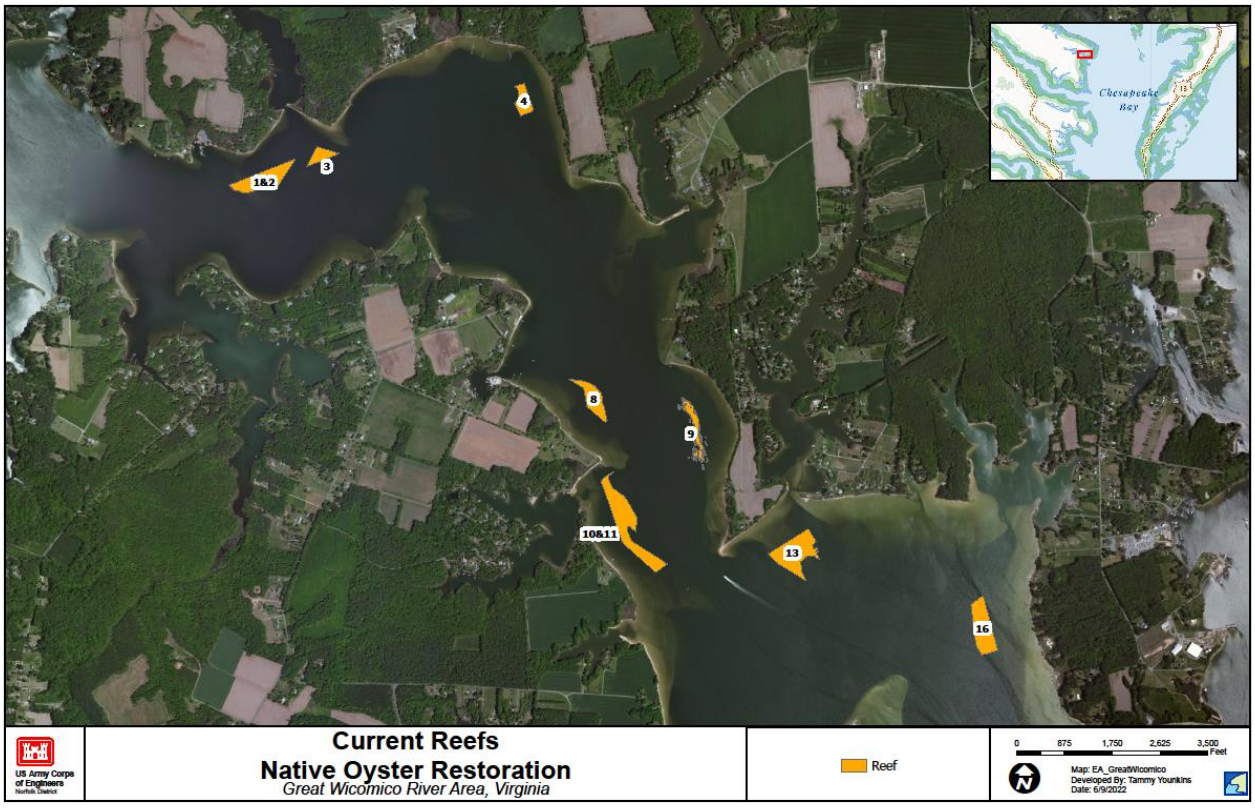

Figure 1-1. Current Native Oyster Restoration Reefs in Great Wicomico River. Numbering of reefs is non-sequential due to the numbering following the underlying public oyster ground it is built upon. USACE did not construct on all available public oyster grounds in the River.

ENVIRONMENTAL IMPACTS AND MITIGATION

The possible consequences of the Action Alternative (Preferred Plan) were considered in terms of probable environmental impact, social well-being, and economic factors. Coordination with the US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration/National Marine Fisheries Service) NOAA/NMFS is ongoing. The Essential Fish Habitat (EFH) consultation as required per the Magnuson-Stevens Fishery and Conservation Management Act with the NMFS has been reinitiated and is ongoing. Impacts to listed species and any designated Critical habitat as well as to EFH are not anticipated to be "significant," as defined by the significance thresholds in Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 Code of Federal Regulations 1500-1508), as amended. There is no anticipated required compensatory mitigation anticipated with implementation of the Action Alternative. All mitigation, in terms of avoidance and minimization measures, has been incorporated into the development of the proposed project. Best Management Practices (BMP) have been incorporated in order to protect the environment and minimize impacts during construction, and operation and maintenance cycles.

There would be no significant economic, recreation, aesthetic, or social well-being impacts, either adverse or unavoidable, as a result of the proposed action. This project would be expected to have a positive impact on the environment of the Great Wicomico River, the Chesapeake Bay, and the Commonwealth of Virginia. No adverse effect to historic properties is anticipated under the National Historic Preservation Act (NHPA). State Historic Preservation Officer (SHPO), Consulting Parties, and Tribal Government coordination is ongoing, with completion expected in 2023.

There would be no significant impacts anticipated to natural resources examined in this Supplemental Environmental Assessment (SEA), including benthic resources, wetlands, and water quality. All impacts would be anticipated to be temporary and negligible to minor in nature. Total Suspended Solids (TSS) and turbidity in the water column resulting from dredging and material placement/disposal would quickly return to ambient conditions after construction or maintenance operations. Long term, significant, and positive environmental benefits will result from implementing the proposed Action Alternative. Oyster reefs provide hard substrate for a wide variety of species and food for a wide variety of commercial and non-commercial species in the Bay, including blue crabs. Additionally, oysters filter water which improves water clarity and quality.

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Atlantic Ocean Channel
APP	Accident Prevention Plan
BMP	best management practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CZMA	Coastal Zone Management Act
DERMO	the oyster disease *Perkinsus marinus*
DO	dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
GIT	Goal Implementation Team
HAPC	Critical habitat as defined by NOAA regulation
HTRW	hazardous, toxic, and radioactive waste
LERR	lands, easements, right-of-ways and relocations
MBTA	Migratory Birdy Treaty of 1918
MLW	mean low water
mm	millimeters
MMPA	Marine Mammal Protection Act of 1972
MPA	Marine Protected Areas
MSX	the oyster disease *Haplosporidium nelsoni*
NAA/FWO	No Action Alternative/Future Without Project Alternative
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OSH	occupational health and safety
OSHA	Occupational Safety and Health Act
PPE	personal protective equipment
ppt	parts per thousand
ROI	Region of Influence
RP	Recommended Plan
RSLR	relative sea level rise
SAV	submerged aquatic vegetation
SEA	Supplemental Environmental Assessment
SHPO	State Historic Preservation Officer
SLR	sea level rise
TOYR	time of year restriction
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers

USFWS	U.S. Fish and Wildlife Service
VDEQ	Virginia Department of Environmental Quality
VDH	Virginia Department of Health
VMRC	Virginia Marine Resources Commission
WRDA	Water Resources Development Act of 1986

1.0 PURPOSE OF AND NEED FOR ACTION*

1.1 Introduction/Prior Studies and Reports

The purpose of this SEA is to consider adaptive management actions using stone for an oyster reef restoration project first constructed in the Great Wicomico River in 2004 because of degradation that has occurred extensively over several of the reefs. In 2004, 53 acres of low relief reef and 32 acres of high relief reef were constructed using oyster shell. All construction complied with time of year restrictions. Since monitoring began in 2006, the high-relief reefs have consistently and significantly out-performed the low-relief reefs. Low-relief reefs typically have oyster density less than 100 oysters/m2, much lower the average of 300 oysters/m2 on the high-relief reefs. The furthest downriver reef site (reef 16, 7.2 acres in size) has consistently been the best performing reef in the river system.

The first adaptive management occurred in 2015 when 17 total acres were impacted by restoration actions. Eleven acres of low relief reef were raised to high relief reef by adding additional shell, while six acres of low-relief reef were left in poor condition after moving all live oysters and original shell to other reefs in the Great Wicomico. No additional shell was added to the scraped six acres, so they remain in poor condition at present. NEPA compliance documentation was not done for the 2015 action as it consisted of only adding shell, the same material the reefs were composed of originally. Therefore, Norfolk District determined that a supplemental NEPA assessment was not needed. The present action being considered is using stone, as well as expanding reef 16 pasts its current footprint, which was not considered in the prior (2003) adaptive management actions.

There is a need to improve the function of 28.1 acres of low-relief reef and degraded high relief reefs across several sites and to protect the reef system from further degradation through the addition of large habitat stones. Reef 16 can be expanded, as it currently occupies only a small portion of the public ground it is located in. Future sites further upriver will be considered for potential restoration in this Draft SEA, though no construction will be recommended on them at this time. All these actions would significantly improve the reef sanctuary network, ensuring its long-term sustainability and maintaining the Great Wicomico River's status as "fully restored". As defined by the Chesapeake Bay Program's Goal Implementation Team (GIT), a tributary is "fully restored" when restoration actions are completed on at least 50% of currently restorable oyster habitat in that tributary which equates to 122 acres in the Great Wicomico River. The 122-acre goal was completed in 2021 and is consistent with the restoration target range of 100-400 acres identified in the USACE Oyster Restoration Master Plan (USACE 2012) for the Great Wicomico River. Continued maintained and rehabilitation of these reefs will ensure the River remains at "fully restored" status.

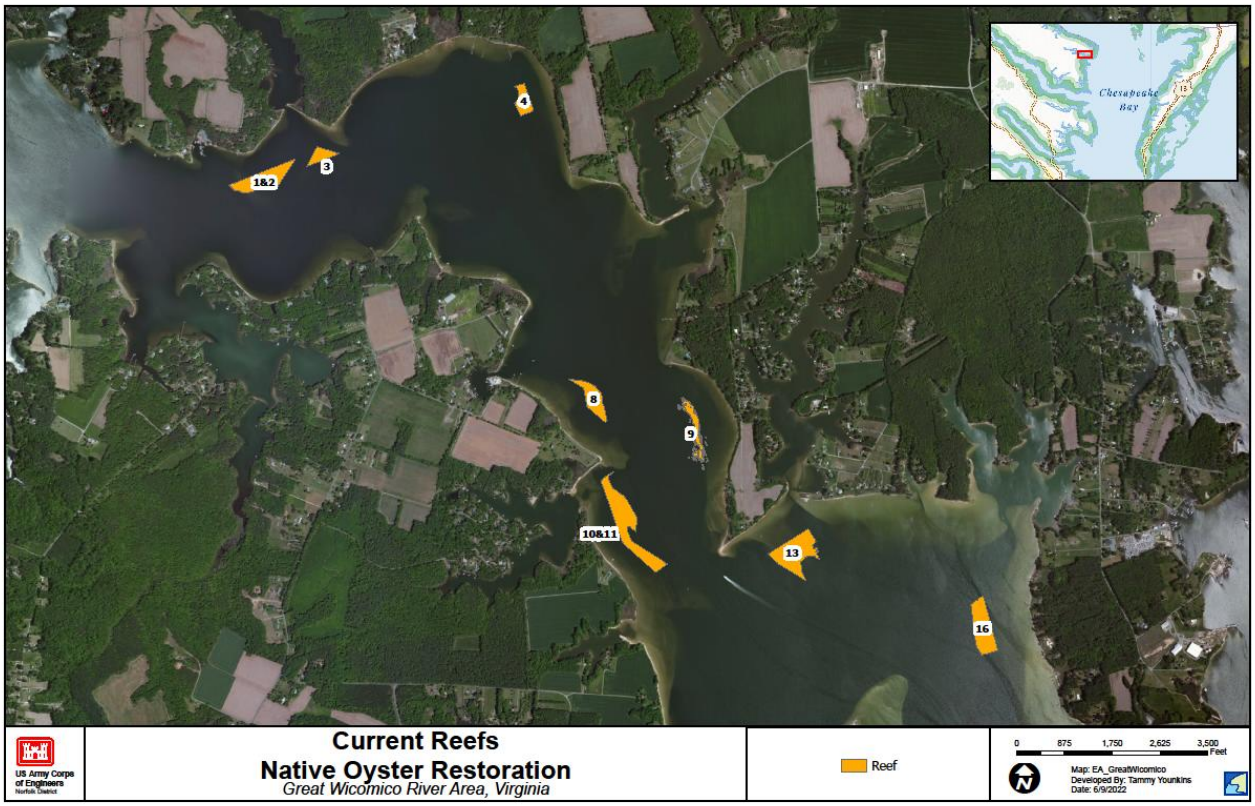

Figure 1-1. Current Native Oyster Restoration Reefs in Great Wicomico River. Reefs are not numbered sequentially because they follow the underlying Baylor Ground numbers for the Baylor (Public) oyster grounds they are located in. Not all Baylor Grounds in the river were subject to restoration efforts. All reefs are a mix of high and low relief.

1.2 Study Authority/Construction History

This SEA has been prepared under the authorization of Section 704(b) of the Water Resources Development Act of 1986 (WRDA) as amended and currently set forth in 33 U.S.C. § 2263(b). The lead Federal Agency is the USACE, and the non-Federal sponsor is the Virginia Marine Resources Commission (VMRC) which was also the non-Federal sponsor for the original Great Wicomico study in 2003.

The prior (2003) study constructed a total of 32 acres of high relief (1' + high) and 53 acres of low relief reefs (2-4" high) at eight different sites in 2004. At the time, it was not known how high relief versus low relief reef would perform, so both were constructed in 2004. Research since then (Schulte et al. 2009, 2014, 2018) has confirmed that high relief reefs significantly outperform low relief reefs. In the modern-day oyster restoration program, low relief reefs are no longer recommended except for areas to be fished, and low-relief reefs will require regular maintenance to keep them productive and sustainable. In 2015, several reefs (1-2, 3, 4 and 13) were repaired/rehabilitated due to the considerable degradation that had occurred on these reefs. Remaining live oysters and shells were scraped from these areas prior to the new shell

being placed in order to avoid killing these oysters. They were moved to other reefs in the Great Wicomico River. A total of 11.9 acres were repaired, and 15,200 cubic yards of dredged fossil shell was placed on these reef areas at this time (Figure 1-1). Six acres of reef that were scraped were left in poor condition at this time. No habitat stones were implemented.

1.3 Purpose and Need for USACE Action*

The purpose of this SEA is to investigate potential adaptive management measures to maintain the Great Wicomico's status as a "fully restored" as defined by the Chesapeake Bay Program's Goal Implementation Team. There is a need to consider these measures due to low performance and degradation of low-relief reefs in the project area.

Sanctuaries provide direct ecological benefits to nearby fishable areas by increasing local oyster recruitment (Kjelland et al. 2015, Schulte and Burke 2014). Sanctuaries provide an increase in oyster harvests, resiliency, and population stability in systems where they are built at sufficient size and location. Due to the direct benefits that oyster reefs provide, such as carbon sequestration, water filtration, increased secondary production, sediment stability, and improved water clarity, it is important that this network of sanctuary reefs be restored to fully functioning status and protected as best as practicable. Additional sites where further restoration could take place in the future are also identified (Figure 1-2). While it is unlikely that any of these sites will be restored, they are being identified here if future oyster restoration upriver of present restoration sites is considered. Constructing reef habitat for water quality improvements, addressing climate change impacts in the River, and/or coastal resiliency could be a potential future goal for the Great Wicomico.

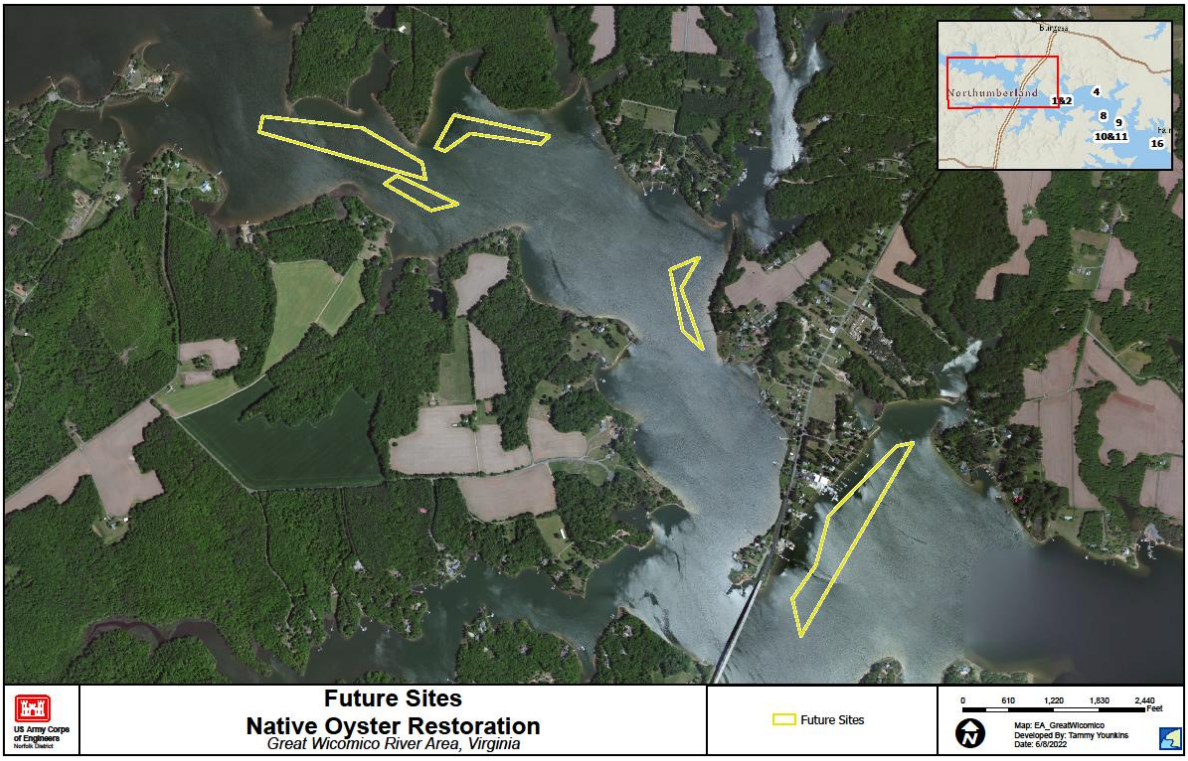

Figure 1-2. Future Native Oyster Restoration Sites in Great Wicomico River. If construction were to take place in the future, this would be part of the ROI.

1.4 Existing Project

The existing project is a restored sanctuary reef network consisting of eight distinct reefs, built in the mid-river segment of the Great Wicomico River. The reefs start just above Sandy Point, in a region of high hydrodynamic retention that is favorable for keeping locally produced oyster larvae in nearby waters (Figure 1-1). Of this reef network, 59.6 acres is high-relief reef, and 24.2 acres is low-relief reef. The latest monitoring (Lipcius et al. 2022) indicates that the size of oysters on the reefs ranged from 3.1-132.2 mm, with most oysters ranging from 40-90 mm. Oyster densities ranged from 301/m^2 (of which 258.9/m^2 were adults) on high-relief reefs and 118/m^2 (of which 91.7/m^2 were adults) on low-relief reefs. Overall abundance of oysters on the sanctuary reefs is estimated to be 76.2 million oysters. The Chesapeake Bay Program's Oyster Goal Implementation Team (GIT) developed metrics for success where fully restored oyster reefs hold at least 50 adult oysters/m^2. Based on monitoring of reefs in the James, Lynnhaven, and Great Wicomico Rivers, The USACE Oyster Restoration Master Plan (2012) considered the long-term sustainability of oyster reefs and determined that 150 oysters/m^2 of various size classes, of which at least 100/m^2 are adult, is needed. This goal metric determines if and when adaptive management measures are considered on USACE-built projects. The GIT metric is significantly lower due to the general belief of oyster scientists that oyster recruitment in the upper portion of Maryland waters of the Bay would not be sufficient to permit such high numbers

as the USACE considers its goal. Being less than the sustainable goal documented in the Master Plan, USACE is considering adaptive management actions to increase densities to achieve desired metrics.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES*

2.1 Alternatives considered

2.1.1 No Action/Future Without Project

Under this alternative, no modifications of any existing oyster reefs or construction of any new reefs at locations outside the present reef footprint will occur. Existing reefs will remain performing as is, will remain vulnerable to degradation, and will likely continue to be increasingly compromised until the project is greatly reduced in habitat quality and oyster abundance.

2.1.2 Action Alternative

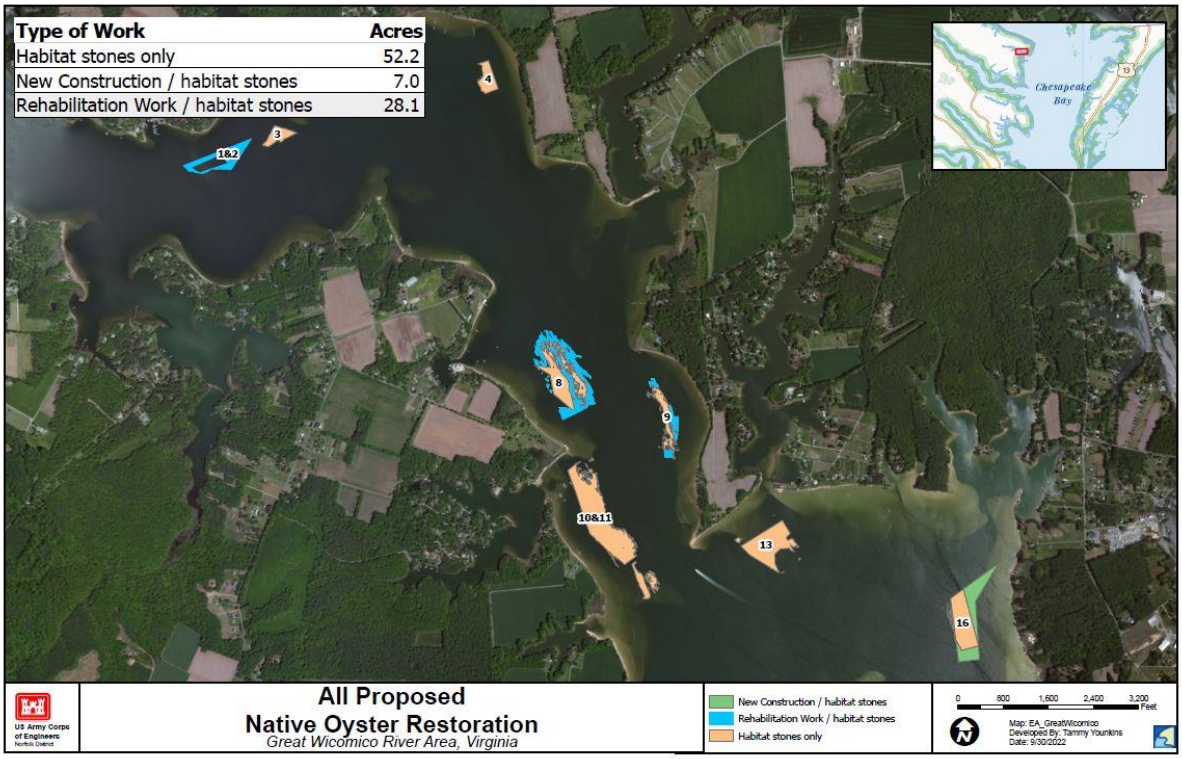

Figure 2-1. All Proposed Adaptive Management and Rehabilitation in Great Wicomico River

Under this alternative, all existing oyster reefs (Figure 2-1) will be enhanced by placing class II granite riprap stones (or similar) at a rate of 60 stones/acre randomly over the reef surface as Such stones are typically from 18-26” and weigh from 150-500 lbs and would be expected to extend approximately 16” higher than the main reef. The addition of large 3-D reef structures on

top of existing reef substrate has been previously implemented by USACE in the Chesapeake Bay for the Craney Island Eastward Expansion oyster mitigation reefs. In most cases across that reef network, the large habitat stones structures—which rose higher in the water column than the underlying shell reef base—outperformed the base with oyster densities several times greater on the higher structures than the base on average (Burke and Lipcius 2019). The habitat stones also tend to support a higher oyster population than the base alone because their size and shape can help deter both oyster predators and poaching actions on permanent sanctuary reefs. Oyster fishing gear has been shown to damage oyster reefs, ultimately destroying reef habitat unless periodic and extensive maintenance is undertaken (Rothschild et al. 1994, Kirby 2004, Lenihan and Peterson 2004, Smith et al. 2005, Beck et al. 2011, Wilberg et al. 2011, Schulte 2017). Precise location of the stones will be taken as they are placed and the data will be kept by the USACE and provided to VMRC to ensure monitoring efforts, which use oyster patent tongs, are not impeded by the stones. This placement will take place over the entire 85-acre reef footprint with approximately 5,100 class II stones will be needed for this.

Rehabilitation will occur over 28.1 acres. Approximately 50,000 cubic yards of small stone will be needed for the rehabilitation, which will mainly involve raising current low relief to high relief, but also includes a 7-acre expansion of reef 16 that will involve construction of a new 16” high reef out of small stone. All rehabilitated reefs will also be approximately 16 inches high post construction, as several inches of shell remain on the bottom in these areas. Current low-relief reef habitat will be selected for adaptive management by increasing reef height using a combination of stone and/or concrete to achieve high-relief habitat. This rehabilitation effort will focus on reefs 1-2, 8, and 9 (Figure 1-2). Reef height would be increased by adding approximately 12 inches of small stone (3-6 inch pieces of either crushed concrete or granite) placed on top of the existing reef habitat footprint in specific areas while avoiding adjacent high-relief habitat. Prior to the application of stone, these areas would be prepared for the stone application. Selected reefs would be scraped clean of live oysters and associated fauna using oyster tongs and dredges of local, contracted watermen or other qualified personnel. These oysters and other benthic organisms would be relocated to other sanctuary reefs to ensure the organisms’ survival

The last construction action associated with the Action Alternative is the expansion of reef 16 (Figure 1-2). Currently, reef 16 lies in a small region at the northern tip of a much larger public oyster (Baylor) ground. This 7.25 acre reef has remained intact since its initial construction in 2004. Reef 16 has consistently been one of the top-performing reefs in the Great Wicomico River, always approximately 10 times the GIT metric of fully restored and several times the USACE (2012) goal metric. The USACE and VMRC propose to approximately double this reef in size (to approximately 14 acres), to the extent that suitable bottom is found adjacent to the present reef footprint. Suitable bottom is typically mostly sand with some clay and shell, forming a sub-surface solid enough to support the new reef. This new construction would be of a small stone and/or shell base, along with the habitat stones using the random spacing strategy as proposed for other Great Wicomico construction (60 stones/acre). The resultant reef would be 12-14” off the bottom, with the habitat stones extending upward approximately another 16”. While dredged fossil shell and/or shucking house shell could be used as base reef material for either upgrades from low to high-relief or the proposed reef 16 expansion, shell materials are limited and generally used to help maintain public oyster grounds that are fished. It is unlikely that any new work will use shells, but due to the possibility it is listed here. Both shells and

alternative materials (stone, concrete, etc.) perform similarly as oyster habitat (Schulte et al. 2009).

A final activity will be a bottom assessment of several new areas upriver of the current reef network to evaluate them as potential future sites for oyster restoration. This assessment will be done using available data, which includes field work already done. No additional field work is needed and, as a result, no impacts from this assessment are expected. If reefs are placed at these sites in the future, impacts will be similar to those found in the original (2003) EA, which found No Significant Impacts from building new reefs on top of old reef sites that no longer have surface shell present. Due to time of year restrictions (TOYR) for SAV, construction generally occurs during the fall and winter.

2.1.3 Preferred Alternative: Action Alternative

The recommended plan is to implement the Action Alternative in its entirety. As this is an ecosystem restoration enhancement of an existing ecosystem restoration project, no mitigation will be necessary. Time of year restrictions prevent adverse impacts to most fish species, and to local submerged aquatic vegetation (SAV), as construction will occur when SAV is not actively growing.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES*

3.1 Introduction

This chapter describes the existing environmental and socioeconomic conditions found within the Region of Influence (ROI), the area of potential impact of the project alternatives. The ROI for the proposed construction are waters of the Great Wicomico River for 200 meters upriver and downriver of the impact area (Figure 1-1), with reef 1 being the most upriver and reef 16 being the most downriver. If construction would occur in the future in more upriver areas, these areas would become part of the ROI. Impacts described for the proposed construction actions would be similar to those that would occur in the upriver ROI addition, no impacts beyond those described in this Draft SEA would be expected.

This chapter has been prepared in accordance with the NEPA and the Council of Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations (CFR) 1500-1508), regulations. This section summarizes the existing (baseline) conditions, to provide a sound basis for plan formulation as described in Section 4 and the impact analysis. For both existing and future either with or without implementation of an action alternative, existing oyster restoration reefs as well as remnant natural habitat will continue to provide ecological benefits to the Great Wicomico River.

The Affected Environment for this Supplemental EA is fully described in the USACE (2003) Final Decision Document Amendment, Section 704(b) as Amended, Chesapeake Bay Oyster Recovery Phase III, Great Wicomico River, Virginia, Final Environmental Assessment. This EA serves as an update to the previously coordinated Coastal Zone Management Act (CZMA) document, and a supplemental EFH assessment has been prepared as the species list has

changed since the original EFH assessment completed in 2003. A new 404(b) analysis was unnecessary because the prior 404(b) analysis assumed that reefs could be constructed up to three feet in height, the placement of new material will result in reefs below this height. Future sites are under consideration and these areas have a hard bottom but no surface shell. Impacts to these sites for this SEA are no impacts, and if constructed in the future, impacts would be similar to the findings of the original EA, minor and not significant. This Supplemental EA will focus on new information and the reader should reference the original (2003) EA for further information.

The following sections are dismissed and/or do not require further analysis in this Supplemental EA because the USACE determined that modification of the prior project would result in No Effects:

- Location
- Land use/Induced Development
- Climate
- Geology, Physiography and Topography
- Hazardous, Toxic, or Radioactive Waste
- Flood Plains
- Utilities
- Cultural Resources
- Navigation
- Wild and Scenic Rivers
- Wildlife
- Aesthetics
- Recreation

Because the USACE (2003) Final Decision Document Amendment, Section 704(b) as Amended, Chesapeake Bay Oyster Recovery Phase III, Great Wicomico River, Virginia, Final Environmental Assessment fully describes the Affected Environment for these sections they are not repeated in this chapter.

For the Environmental Consequences Section, the No Action/Future Without Project Alternative assumes that the proposed construction of additional reefs and adaptive management of present restoration reefs would not occur. Therefore, the No Action/Future Without Project Alternative includes those effects and serves as the baseline from which to compare the Project Action Alternative, for this Supplemental EA.

Table 3-1 provides a summary of the impacts for the resources that could be potentially affected by implementation of the project alternatives.

Table 3-1: Environmental consequences of the project alternatives summary table.

Resource	No Action Alternative/Future Without Project Alternative	Action Project Alternative
Geology, Physiography, and Topography	No Effect	There would be no impacts to geology, physiography or topography.
Bathymetry, Hydrology, and Tidal Processes	No Effect.	The proposed adaptive management actions which include the raising of low-relief reefs to high-relief and the addition of randomly placed large stone over the reefs will alter local bathymetry in a minor, permanent way. The reefs would better mimic natural reefs, and therefore impacts will be minor but beneficial due to the construction ensuring the reefs' long-term sustainability.
Hazardous, Toxic, and Radioactive Waste (HTRW)	No Effect.	Proposed construction within existing reef polygons would not be expected to result in the identification and/or disturbance of hazardous, toxic, and/or radioactive waste. An approved spill plan will be consulted in the event any of the construction vessels experiences an accidental release, which is highly unlikely. Stone used for construction will be free of contaminants. No Effect.
Water Quality	No Effect	Minor, temporary increases in turbidity may be created by resuspension of bottom sediments during reef habitat adaptive management, rehabilitation and construction. Increased turbidity has the potential to lower DO; however, due to the short duration of construction activities and the shallow depths of the proposed project area, these effects would be minor and short-lived. Long-term, positive and significant benefits to local water quality is expected due to the filtering abilities of oysters that would colonize the new reef substrate.

Resource	No Action Alternative/Future Without Project Alternative	Action Project Alternative
Vegetation, Wetlands, and Submerged Aquatic Vegetation	No Effect	No Effect to terrestrial vegetation or wetlands as all construction will be done in subtidal areas via water-based equipment. SAV in the river may experience a minor, temporary adverse impact due to increased total suspended solids (TSS) due to construction activities. Post-construction, SAV would benefit due to improved water clarity from increased numbers of oysters filtering local waters. There is a Time of Year restriction from March 1 through July 15 that will be complied with that willprotect SAV though the TOYR primary purpose is to protect sea turtles and anadromous fish.
Benthic Fauna	No Effect	Live oysters and associated benthic fauna attached to their shells are removed from reefs proposed for adaptive management, and placed back on the newly augmented habitat post-construction. Some non-oyster benthic fauna will be lost. Impacts would be minor, temporary and adverse. Post construction, benthic fauna will be significantly and positively benefitted by the newly augmented and protected oyster reefs.
Fish and Fish Habitat	No Effect	Implementation of the proposed construction would result in significant improvements to local fish habitat and foraging areas. This benefit would be significant, permanent and beneficial. Mobile fish are expected to vacate the project area during construction.
Wildlife	No Effect	No Effect
Special Status Species	No Effect	The species list provided by USFWS IPac indicated three terrestrial species in the project area. No Effect to these species is expected due to project implementation. It is possible that sea turtles could potentially forage in the Great Wicomico River during warmer months. They are highly mobile and would be able to avoid impacts due to construction. No Effects are expected for sea turtles. Post construction, improved habitat would provide for improved foraging opportunities for sea turtles in the project area, a significant, permanent, positive benefit.

Resource	No Action Alternative/Future Without Project Alternative	Action Project Alternative
Air Quality	No Effect	Air emissions produced during construction would be far below *de minimus* thresholds. Temporary, minor and negligible impacts to air quality.
Climate Change	No Effect	GHG produced during construction would be a very minor contributor to climate change. Oysters have the potential to fix carbon in their shells and, if these shells are incorporated into long-term storage below the sediments as the oysters grow and die over generations, this would be a small, positive benefit reducing climate change impacts.
Flood plains	No Effect	No Effect.
Noise and Vibration	No Effect	A minor, temporary increase in noise would occur during project construction. This is a minor, adverse impact and should have no significant impact on local flora or fauna, nor to any human population along the shore.
Occupational Safety and Health	No Effect	Occupational safety and health risks would be related to construction activities occurring over the water and remain at an adverse, temporary and negligible to minor level of impact.
Utilities	No Effect	No Effect
Cultural Resources	No Effect	The original EA was coordinated with the SHPO that concurred with our findings of no significant impacts to cultural/archeological resources. The new proposed adaptive management construction will also occur within Baylor Grounds, within the same ones we constructed in before. If the future sites were restored, they are also withing Baylor Grounds. Therefore, our finding for Cultural resources is No Effect.
Aesthetics	No Effect	No Effect. The river is already an active site for commercial boating activities, the additional, temporary boats and barges present during construction will not significantly change the current aesthetics of the Great Wicomico River.
Recreation	No Effect	No Effect. Reef habitat attracts a wide variety of recreational fished species, which are already present on the reefs in large numbers.

Resource	No Action Alternative/Future Without Project Alternative	Action Project Alternative
Socioeconomics and Environmental Justice	No Effect	A larger oyster population and more extensive reef system would increase oyster recruitment in the Great Wicomico River on the sanctuaries and areas that can be fished, and also increase fish production in local waters. This would be a small, but positive socioeconomic benefit to people that fish for commercially valuable species, including oysters, blue crab, and finfish in the Great Wicomico River, as well as recreational and subsistence fishermen.
Navigation	No Effect	Ships used in construction would not significantly impede local navigation. Low-relief reefs would be raised to high-relief, but would all be at least -6 ft MLW post-construction, even considering the habitat stones. No lands would be needed for construction staging areas that would require local boat facilities and associated navigation channels. No Effect.

3.2 **Water Quality**

3.2.1 Affected Environment

Water quality within the Great Wicomico River is generally good as determined by the Virginia Department of Environmental Quality (VDEQ) and supports recreational and commercial fishing use throughout the river mainstem and the majority of its tidal tributary creeks. Tides are semi-diurnal (two high and two low tides per day) with an average tidal range of 1.3 feet. Salinity varies throughout the year, being on average lowest in winter and highest in summer, generally ranging through the mid-to-high teens in salinity and is considered mesohaline. Four VDEQ water quality stations are located where proposed construction is being considered. The majority (~70%) of the Great Wicomico River's watershed is undeveloped, forested lands with ~10% being cropland and ~10% being hay/pasture lands, with very little (~ 2%) being urban, developed land. Extensive oyster leases surround the natural oyster reefs in the local area. These leases are important producers of aquaculture (sustainably farmed) oysters, and no depuration (moving oysters from contaminated to clean water for a period of time to ensure they can be safely consumed) is needed prior to their consumption due to the cleanliness of the water. Small-scale commercial boating activity related to these private oyster leases has been ongoing in the Great Wicomico River and is expected to continue. It is highly unlikely that this activity will have any effects on local water quality. The main channel is vulnerable to episodic hypoxia, generally in the summer, due to the Chesapeake Bay "Dead Zone" of low dissolved oxygen (DO) water. At times, the hypoxia spreads far enough south directly impacting deeper waters in the Great Wicomico River. This dead zone is due to excess nutrient input from human activities, primarily agriculture. The main channel of the Great Wicomico River can become hypoxic during years where the dead zone is large enough. Depths impacted are typically waters from 16 feet and deeper. These hypoxic events can cause mass oyster mortalities and restoration efforts are not recommended at these or greater depths. No construction under the Action Alternative proposed would occur at depths prone to hypoxia.

3.2.2 Environmental Consequences

3.2.2.1 No Action/Future Without Project Alternative (NAA/FWO)

Water quality within the Great Wicomico River would likely continue to be generally good as determined by the Virginia Department of Environmental Quality (VDEQ) and continue to support recreational and commercial fishing use throughout the river mainstem and the majority of its tidal tributary creeks. The main channel would remain vulnerable to episodic hypoxia, generally in the summer, due to the Chesapeake Bay "Dead Zone" of low DO water that at times, spreads far enough south to directly impact deeper waters in the Great Wicomico River. Monitoring of oyster reefs has indicated that oysters will experience mass mortality during these events, and as a result, the USACE does not recommend reef construction in waters subject to hypoxia. These conditions would likely continue unless further progress in controlling human and agricultural nutrient inputs into Chesapeake Bay. Climate change will also affect local water quality as salinity is expected to increase as sea level continues to rise, ocean acidification will lower pH in Bay waters potentially making it more difficult for oysters to produce shell, and higher water temperatures are expected, all of which are likely to significantly alter Bay ecology. These impacts are predicted to be major, permanent, and significant.

3.2.2.2 Action Project Alternative

Construction activities involve placement of new, clean substrate (inspected to ensure it is free of debris, HTRW, plastics, asphalt, rebar, etc.) to repair, enhance, and protect existing reef habitat. This substrate could be granite but may also include concrete or shell. Placement activities will cause re-suspension of small amounts of fines/sediment as the material is placed. This resuspension of bottom sediments will cause very localized, short-term increases to TSS around the construction sites in the Great Wicomico River. This activity would cause minor, temporary adverse impacts to local water quality. These impacts are not anticipated to be significant enough to require mitigation, and such materials have been placed in Bay waters and tributary rivers for many decades with no measurable ill effects due to the temporary short-term changes in water quality (Smith 2005; Schulte 2017). USACE personnel observations have never noted a sediment plume longer than 200 feet from a shell placement event. Any stone used would be clean and no significant sediment input to the river would be expected during placement. Assessing bottom conditions at the future potential restoration sites would not impact water quality. Post construction, the additional oyster substrate will support a significantly larger oyster population than at present capable of, improving water quality via filtering and reducing TSS and phytoplankton from the water column. Long-term, significant improvements to local water quality are expected in the Great Wicomico River due to project implementation. Overall the proposed project would provide direct, significant, beneficial, and permanent benefits to water quality.

3.3 Bathymetry, Hydrology, and Tidal Processes

3.3.1 Affected Environment

The lower Chesapeake Bay attained its current configuration after the end of the last Ice Age and has been relatively stable for the last three thousand years (Bratton et al. 2002). However, waters have continued to slowly rise over this time, due to glacial rebound and now the addition of human-induced climate change (Wu and Schulte et al. 2021) (Figure 3-1).

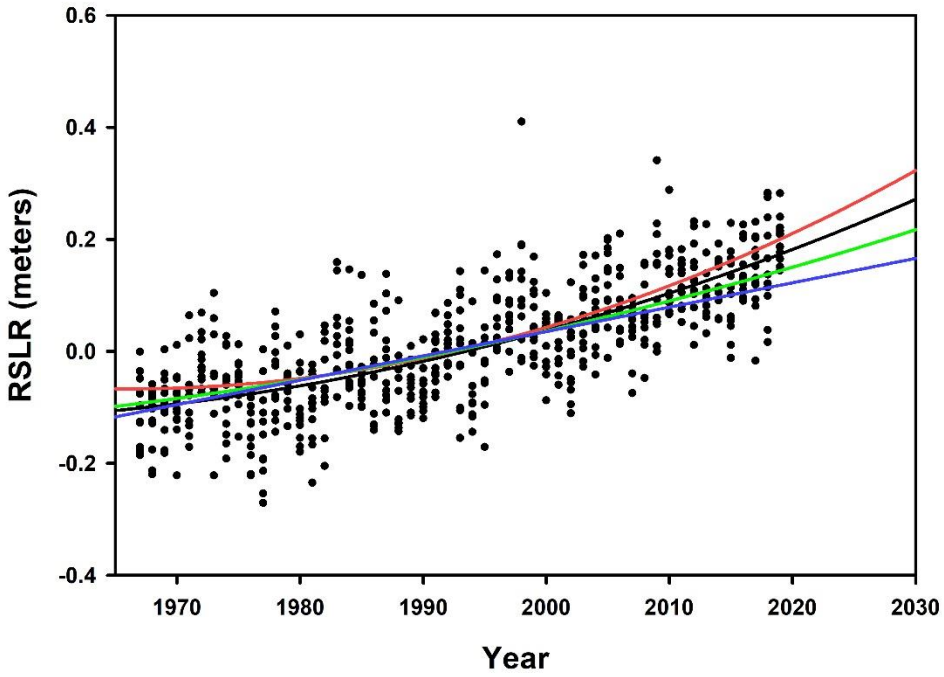

Figure 3-1. Local tide data (black dots and line) of Sewell's Point, VA vs the three USACE curves (low=blue, mid=green, red=high) derived from the USACE sea level change curve calculator (https://cwbi-app.sec.usace.army.mil/rccslc/slcc_calc.html). Figure retrieved from Wu and Schulte 2021.

The Great Wicomico River is a small river with a distinct mid-river deep channel that ranges from 16-41 feet at mean low water (MLW). Out of the main channel, a series of natural oyster reefs that developed over the past several thousand years are found mostly in depths ranging from 4-20 feet at MLW. These reefs and some surrounding areas were included within surveys in the late 1800s (Baylor 1895) that defined public oyster grounds. Prior to human harvesting on the reefs, which is well-documented to reduce their height, these natural reefs were likely higher than 3 feet above the surrounding river bottom, though modern-day remnant natural reefs are now almost entirely level with the surrounding bottom, rendering them vulnerable to sedimentation and further losses in area.

The River's watershed is mostly undeveloped. Tidally, the river is strongly influenced by the Chesapeake Bay and closely follows the local tidal cycle of mid-Chesapeake Bay. The River is also known to display a low tidal exchange rate with the Bay, being known as a "trap estuary" that tends to retain significant amounts of locally produced plankton for longer than the typical exchange rates of Chesapeake Bay. This is one of the main reasons that this river was initially selected for oyster restoration in the 2003 study, as it was theorized that locally produced oyster larvae would tend to be retained in the local river system, where they would settle and allow for population recovery in the river at within several years post-construction. Monitoring results indicate that this has occurred (Schulte and Burke 2014).

3.3.2 Environmental Consequences

3.3.2.1 No Action/Future Without Project Alternative

With implementation of the NAA/FWO Alternative, there would be no additional impacts to bathymetry, hydrology, and tidal processes. Due to sea level rise, it is expected that water depths in the Great Wicomico River will increase over time, as will the Chesapeake Bay. It is likely that tidal processes will remain the same over time, with the River maintaining a low tidal exchange rate.

3.3.2.2 Action Project Alternative

The additional reef elevations, repair, and the addition of large stone that would occur with implementation of the Action Alternative would slightly alter local bathymetry in the River, raising reef habitat to better mimic what was there prior to large-scale commercial harvesting activities when oyster reefs were significantly higher, up to over six feet, above the surrounding sediments. This proposed raising of the reefs would return the bathymetry to mimic a more natural, historic condition, as these reefs were present at high-relief heights prior to European colonization and subsequent development of the commercial oyster fishery, whose dredging and tonging activities flattened these natural high-relief oyster reefs throughout Chesapeake Bay. This minor, direct alteration of local bathymetry would be beneficial to fauna attracted to underwater structure and variances in bottom topography.

3.4 **Vegetation, Wetlands, and Submerged Aquatic Vegetation**

3.4.1 Affected Environment

There are significant wetlands and Submerged Aquatic Vegetation (SAV) along the shoreline and shallow waters of the Great Wicomico River, respectively. The wetlands consist mainly of Spartina sp. marsh near the shoreline. SAV in the local area consists of two species, Eelgrass (*Zostera marina*) and widgeongrass (*Ruppia maritima*). Due to the undeveloped nature of the River and its watershed, a majority of the shoreline holds intact wetlands and riparian zones. SAV beds typically lie in less than 2 m MLW depths, the great majority of the current oyster reefs are deeper than that, with the exception of reef 13, where no SAV has been or is currently growing within the reef footprint.

3.4.2 Environmental Consequences

3.4.2.1 No Action/Future Without Project Alternative

There are significant wetlands and SAV along the shoreline and shallow waters of the Great Wicomico River, respectively. Climate change will bring warmer and more saline waters into Chesapeake Bay, which may extirpate the local, dominant species of SAV, *Zostera marina,* that is near its upper thermal limit in the Bay at present and experiencing die-backs due to lethally high temperatures during particularly hot summers (Lefcheck et al. 2017). It is likely that another, similar in habitat preference and appearance SAV species, *Halodule wrightii*, will move into Chesapeake Bay as waters continue to warm, replacing the ecological role of *Zostera* in the Bay. Wetlands may become inundated due to sea level rise and die off, but wetland conversion of adjacent uplands is likely to occur, replacing the lost wetlands. This conversion is

largely possible along the shorelines of the Great Wicomico River due to its lack of development and has been occurring in other areas of little urban development (Schieder et al. 2018).

3.4.2.2 Action Project Alternative

No wetlands or SAV encroach on any of the proposed reef footprints where construction is being recommended, as they are all deep enough that no SAV can grow within them, with the exception of reef 13. It has been observed in the Great Wicomico River that SAV would colonize bottom areas shoreward of reefs post-construction, benefiting from the oysters' filtering and associated improvements to water clarity (Gagnon et al. 2020). No impacts to wetlands are expected. Significant, positive impacts are expected to local SAV populations due to increased oyster filtering and bottom sediment stabilization (Cerco and Noel 2007, Smith et al. 2009). Climate change impacts are expected to occur as explained in the No Action/Future Without Project narrative.

3.5 Benthic Fauna

3.5.1 Affected Environment

The benthic communities of the lower Chesapeake Bay are complex and include an array of fauna that play critical roles in the food web. The typical Chesapeake Bay ecosystem includes epifauna (organisms that live attached to surfaces on the Chesapeake Bay bottom) such as oysters, sponges, sea squirts, sea stars, and barnacles and infauna that burrow into bottom sediments such as worms, clams, and other tunneling organisms. Oysters are considered a keystone species (Reece et al. 2020), due to their ability to create a unique hard-bottom reef habitat in the Bay that supports a wide variety of structure-preferring species, their water filtering capability, and their role as a food source for a wide suite of benthic predators. Their water filtering capability is a powerful pelagic-benthic coupling that was a fundamental part of the Bay ecosystem prior to their exploitation.

3.5.2 Resources in the ROI

3.5.2.1 Shellfish Condemnation Zones

The Virginia Department of Health (VDH) Division of Shellfish Sanitation is responsible for protecting the health of the consumers of molluscan shellfish and crustacea by ensuring that shellfish growing waters are properly classified for harvesting and that molluscan shellfish and crustacea processing facilities meet sanitation standards. The regulations protect shellfish consumers through water quality monitoring, growing area assessments, education, and regulatory programs. While waters of the Great Wicomico River are in general quite healthy, there are upstream areas of several tributary creeks that are condemned due to high levels of bacteria, as seen in the following map (Figure 3-2).

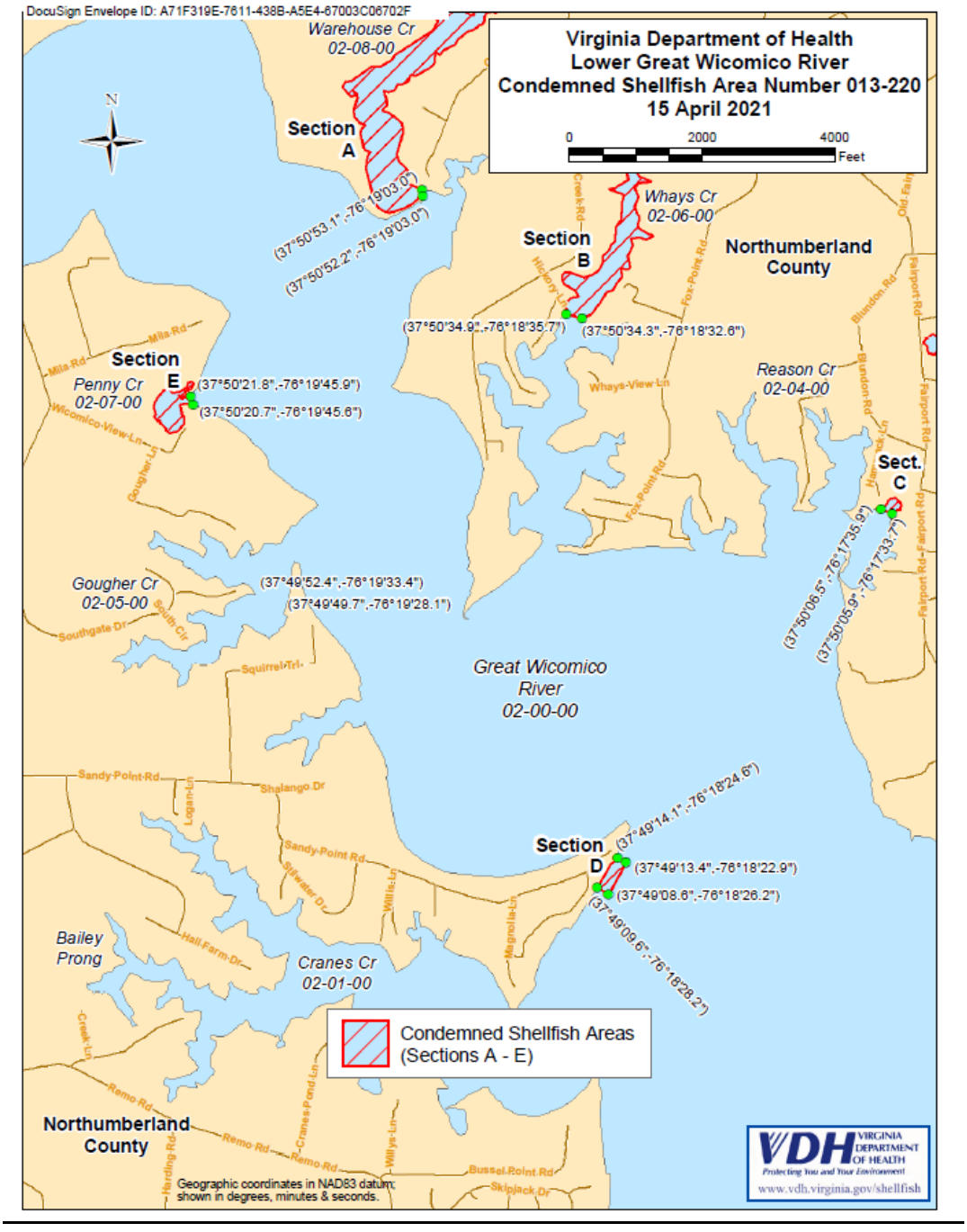

Figure 3-2: Condemned Shellfish Areas in the Great Wicomico River (VDH 2021)

3.5.2.2 Eastern Oyster Resources

The eastern oyster (*Crassostrea virginica*) is considered an important commercial fishery as well as a keystone species fundamental to the Bay's ecology and prefer a depth range of two to twenty-six feet in brackish or salt water. Although this fishery has declined over the years due to

overharvesting, pollution, disease, and loss of habitat (Schulte 2017), a variety of partners (state, Federal, and local agencies as well as nongovernmental organizations) have been successfully implementing programs to increase oyster populations. The first large-scale oyster restoration effort based on sanctuaries that functioned as Marine Protected Areas (MPA) is in the Great Wicomico River and was the subject of the 2003 Environmental Assessment and associated Feasibility Study. It was also the first successful oyster restoration attempt, after years of failure (Schulte et al., 2009). Locations of natural (relict) or artificial oyster reefs are numerous throughout the Great Wicomico River in waters of salinity sufficient for oyster growth and reproduction, both in the ROI as well as up and down-river. Marginal, natural oyster reef areas are the sites where the original reefs were constructed in 2004 and have performed very well since (Schulte et al. 2009, Schulte et al. 2017, Lipcius et al. 2022), outperforming all other restored oyster sanctuaries in Chesapeake Bay from an oyster density and biomass perspective.

3.5.2.3 Blue Crab Resources

The blue crab, *Callinectus sapidus,* is an important benthic prey source for a variety of predators, including striped bass, American eel, Atlantic croaker, and red drum. They can tolerate a wide salinity range in Chesapeake Bay from lower Chesapeake Bay waters (up to 32 ppt) to the upper reaches of its tributaries. Mating occurs from May through October in tributaries and middle and upper waters, peaking in July and August (Epifanio 1995).

According to the 2021 Chesapeake Bay Blue Crab Advisory Report, the start of the 2021 crabbing season saw 158 million adult female crabs in the Chesapeake Bay. This number is based on the results of the winter dredge survey and is tracked by the Chesapeake Bay Program as an indicator of Chesapeake Bay health. This number of crabs is a historic low and will likely require a reduction in the fishery to prevent population collapse.

3.5.3 Environmental Consequences

3.5.3.1 No Action/Future Without Project

The natural river channel has not needed to be dredge for navigation, being deep enough to suit local commercial and recreational navigational needs. Oyster leases, due to their financial profitability, are expected to continue to be actively worked, as they have been for decades prior to the USACE effort that restored recruitment to the Great Wicomico River, making these leases profitable to operate once again (Schulte and Burke 2014) after years of relative idleness. This activity disturbs the bottom within the lease, producing minor, temporary increases in turbidity, but this activity has taken place in the Great Wicomico River with no significant impacts for many decades. Climate change impacts may bring new species into the local waters, due to increased temperature and salinity. No new predators that could exert a major impact on local benthos are expected, and current invasives such as the blue catfish may be prevented from colonizing the area due to the expected increase in salinity (Nepal and Fabrizio 2019).

Therefore, effects to the benthic community from implementation of the No Action/Future Without Project Alternative are predicted to be temporary and minor in nature.

3.5.3.2 Action Project Alternative

With implementation of the Action Alternative, there would be significant, beneficial impacts to the local benthic community. Oyster reefs would be enhanced and rehabilitated, which will increase local oyster populations and all the benefits they provide. Further, protecting restored reefs from degradation has proven a necessary element in maintaining the long-term function of the restored oyster reefs. It is essential that these reefs be protected, and the proposed construction will accomplish this.

Overall, impacts would be significant and beneficial, due to the improvements to the benthic oyster reefs. These benefits will extend to other benthic habitats, as SAV habitat is expected to expand due to the improvements in oyster reef function. Minor, temporary impacts are expected during construction due to increased TSS levels, but these will subside quickly and be more than compensated for by the improvements to the local oyster population due to project implementation.

3.6 Fishery Resources and Essential Fish Habitat

3.6.1 Affected Environment

The ROI for fishery resources and Essential Fish Habitat includes the areas transited by construction vessels as well as the footprints of reefs where construction is proposed.

This country's largest estuary, the Chesapeake Bay, has been ranked third in the nation for fisheries catch; only the Atlantic and Pacific Ocean exceed Chesapeake Bay (U.S. Fish and Wildlife Service 2013). The Chesapeake Bay and its tributaries provide fishing grounds for both commercial and recreational users. Approximately 350 species of fish are known to inhabit the Chesapeake Bay Region. Of these fish species, only 32 species are year-round residents of the Chesapeake Bay (Chesapeake Bay Program 2022; National Wildlife Foundation 2022). The remaining species enter the Chesapeake Bay either from freshwater tributaries or the Atlantic Ocean to reproduce, feed, or find shelter.

The fish species in the Chesapeake Bay Region fall into two categories: resident and migratory. Resident fishes tend to be smaller than migratory species. Common resident species include the Chesapeake Bay anchovy (*Anchoa mitchilli*), Atlantic silverside (*Menidia menidia*), killifish (Cyprinodontidae), blennies (Bleniidae), skilletfish (*Gobiesox stumosus*), gobies (Gobiidae), pipefish (*Syngnathus spp.*), lined seahorse (*Hippocampus erectus*), oyster toadfish (*Opsanus tau*), blackcheek tonguefish (*Symphurus plagiusa*), hogchoker (*Trinectes maculatus*), windowpane (*Scophthalmus aquosus*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), and silver perch (*Bidyanus bidyanus*). Common anadromous species found in the ROI include: alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad *(Alosa sapidissima)*, striped bass (*Morone saxatilis*), and white perch (*Morone americana*). For further details please see the original (2003) EA.

3.6.2 Essential Fish Habitat.

The Magnuson-Stevens Fishery Conservation and Management Act, as amended October 11, 1996, defines the term "Essential Fish Habitat" as the “waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity”. The act applies to Federally managed species and requires Federal agencies to identify and describe EFH for fisheries that may be impacted by a potential project. Using the NOAA (2022) Essential Fish Habitat Mapper, EFH for 11 species was identified to potentially occur within the ROI (Table 3-2). Because new species are included in this report compared to the results obtained for the EFH assessment done for the EA in 2003, an amendment to the prior EFH assessment was necessary and can be found in the Environmental Appendix to this Draft SEA Appendix. For further details on EFH, refer to the Essential Fish Habitat Assessment. There is critical habitat (HAPC) for summer flounder in the project area.

Table 3-2. Species with Essential Fish Habitat in the local area.

Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP (Fishery Management Plan)
Little Skate	Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
Winter Skate	Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
Red Hake	Adult/Eggs/ Larvae/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
Windowpane Flounder	Adult/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
Clearnose Skate	Adult/Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
Atlantic Herring	Adult/Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
Bluefish	Adult/Juvenile	Mid-Atlantic	Bluefish
Atlantic Butterfish	Adult/Eggs/Larvae	Mid-Atlantic	Atlantic Mackerel, Squid & Butterfish Amendment 11
Scup	Adult/Juvenile	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
Black Sea Bass	Adult/Juvenile	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Summer Flounder	Adult/Juvenile	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

3.6.3 Environmental Consequences

3.6.3.1 No Action/Future Without Project Alternative

Under the No Action/Future Without Project Alternative, EFH in the project ROI would remain as is at present. Over time, certain changes are expected. Without protection, the oyster reefs, which are an important habitat for structure-preferring EFH species such as Black Sea Bass and for benthic prey species of EFH species such as Summer Flounder, would continue to be degraded, reducing the quality and availability of this habitat. Climate change will bring warmer, more saline waters to the Great Wicomico River, likely resulting in increased salinity and temperatures over time. It is also expected that, due to ocean acidification, local pH will decrease over time. This may result in species alteration, which could bring new species with different ecological requirements into the River and also the loss of current EFH species that need the salinities and temperatures currently found in the River. More temperate EFH species such as Black Sea Bass, Summer Flounder and Scup would likely be sensitive to increasing the increasing temperatures in the Great Wicomico. Additionally, these changes in the conditions due to climate change are anticipated to negatively impact SAV habitat in the River utilized by EFH species such as Summer Flounder.

3.6.3.2 Action Project Alternative

The 2003 EA included a discussion describing how oyster reef construction can impact EFH and determined that impacts were minor and temporary increases in turbidity and a modification of bottom habitat from very marginal oyster bottom with little shell to a vibrant oyster reef. There was also a small chance for motile fish to be struck with reef materials as they were being placed, but the chances of this having a significant impact on local fish/EFH was determined to be not significant. The proposed project, which is to upgrade low-relief reef to high and repair degraded reefs should result in even less impacts as the bottom under the proposed construction is already an oyster reef. Burial of the organisms on the low-relief reefs to be upgraded should not result in mass mortalities as such areas are typically scraped of live oysters and associated fauna via oyster dredges immediately prior to construction, then replaced on top of the new habitat or planted on other reefs. There is even less chance for motile fish to be impacted due to the lower amount of material to be placed when compared to the original construction. The large stones placed over the reefs randomly should benefit local fish species that prefer structure, so positive benefits will be provided by the project. The improved reefs will also result in higher oyster populations on these reefs, with enhanced foraging opportunities for local fish on the associated fauna the oysters attract. The new addendum to the prior EFH Assessment will be coordinated with the National Marine Fisheries Service (NMFS).

In summary, potential impacts to fish and fish habitat from the Action Alternative, as described in this draft EA, are minor, temporary negative impacts that are not significant, and long-term positive, significant beneficial impacts to local fish and EFH.

3.7 Special Status Species

3.7.1 Affected Environment

The ROI consists of the areas where reef construction is to be performed, as well as surrounding nearby waters of the Great Wicomico River. Searches in March 2022 on the US Fish and Wildlife Service (USFWS) IPac website, Virginia Department of Game and Inland Fisheries search engine and NOAA's ESA Section 7 Mapper were used to identify rare, threatened and endangered species in the project ROI. All federally listed species are found in Table 3-3. The only state listed species is the northern diamond-backed terrapin (*Malaclemys terrapin terrapin)*. The ROI includes the area anticipated to be transited by reef construction vessels/equipment and areas in which construction will occur. The ROI also includes the area of anticipated circulation patterns shifts and potential water quality impacts. The geographic extent of water quality impacts is dependent upon factors such as the type of construction equipment, depth, and environmental conditions such as wind and currents (USACE 1983). Additionally, the ROI includes the range of noise impacts as they pertain to special status species.

This section provides a summary of the special status species that are known or have the potential to occur in the Action Area.

3.7.1.1 Federally listed Species and Critical Habitat

Animals and plants listed as endangered or threatened are protected under the Endangered Species Act of 1973, as amended (ESA). According to the ESA, an "endangered species" is defined as any plant or animal species in danger of extinction throughout all or a substantial portion of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future throughout all or a substantial part of its range. "Proposed Species" are animal or plant species proposed in the Federal Register to be listed under Section 4 of the ESA. "Candidate species" are species for which the USFWS and NMFS have sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. Critical habitat is designated per 50 CFR parts 17 or 226 and defines those habitats that are essential for the conservation of a Federally threatened or endangered species and that may require special management and protection.

Species that are federally listed under Section 7 of the Endangered Species Act of 1973, as amended (ESA) with the potential to occur in the ROI are provided in Table 3-3. Results were obtained using a geographic search of the local area around the Great Wicomico River using the Virginia Department of Game and Inland Fisheries search engine and NOAA's ESA Section 7 Mapper both accessed 30 March 2022. No critical habitat occurs in the ROI.

Table 3-3. Federally listed species known or with the potential to occur in the Region of Influence

Taxonomic Category/Common Name	Scientific Name	Status	Critical Habitat
Birds			
Piping plover	*Charadrius melodus*	T, E	N
Red knot	*Calidris canatus rufa*	T	N
Fish			
Atlantic sturgeon (all DPSs)	*Acipenser oxyrinchus*	E	N
Shortnose sturgeon	*Acipenser brevirostrum*	E	N
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	T	N
West Indian manatee	*Trichechus manatus*	T	N
Reptiles			
Green sea turtle (North Atlantic DPS)	*Chelonia mydas*	T	N
Hawksbill sea turtle	*Eretmochelys Imbricata*	E	N
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	N
Leatherback sea turtle	*Dermochelys coriacea*	E	N
Loggerhead sea turtle (Northwest Atlantic DPS)	*Caretta caretta*	T	N
Insects			
Monarch Butterfly	*Danaus plexippus*	C	N
Northeastern Beach Tiger Beetle	*Habroscelimorpha dorsalis dorsalis*	T	N

DPS = Distinct Population Segment; E = Endangered; T = Threatened; C = Candidate; Y = Yes; N = No; P = Proposed; ^Species status is reported as it pertains to the DPS/Action Area; *Critical Habitat not located in Region of Influence/Action Area

The monarch butterfly (*Danaus plexippus*) is a candidate species that, due to its terrestrial nature, would not be found in the offshore waters of the Great Wicomico River, nor would the northeastern beach tiger beetle (*Habroscelimorpha dorsalis dorsalis)*. The northern long-eared bat (*Myotis septentriolnalis)* has the potential to forage over upriver, freshwater portions of the Great Wicomico River and is highly unlikely to be found over the more saline waters of the project ROI, due to lack of terrestrial insects to forage upon. No impacts are expected to any of these species and they will not be discussed further.

Additional state listed species are described in the next section.

3.7.1.2 State Listed Endangered and Threatened Species

The only state species of concern likely to be found in the project area is the northern diamond-backed terrapin (*Malaclemys terrapin terrapin)*, a state species of concern. It prefers estuarine waters for foraging, and it could potentially be found in waters of the project ROI.

3.7.1.3 Marine Mammals

The Marine Mammal Protection Act of 1972, as amended (MMPA) prohibits, with certain exceptions, the “take” of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. In reference to the MMPA, a marine mammal is a species found in the U.S. that is classified into one of the following four distinct groups: cetaceans (whales, dolphins, and porpoises), pinnipeds (seals, sea lions, and walruses), sirenians (manatees and dugongs), and marine fissipeds (polar bears and sea otters). No marine mammals would be found in the project ROI, no effect to marine mammals is expected, and they will not be discussed further.

3.7.1.4 Species Protected under the Migratory Bird Treaty Act of 1918 and Executive Order 13186 (EO)

The Migratory Bird Treaty Act (MBTA) and Executive Order 13186 (EO) requires agencies to protect and conserve migratory birds and their habitats. Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the USFWS. Migratory birds are defined as those described by the USFWS in the 50 CFR 10.13.

Migratory birds nest throughout North America, some as far north as the Arctic. In late summer and fall, they migrate south for the winter. Some winter in the southern United States, Mexico, the Caribbean, or Central America while others go as far as South America. Each spring they return north to their breeding grounds. Many migratory songbirds, shorebirds, and raptors rest and refuel in the Chesapeake Bay Watershed during their spring and fall migrations. Others winter south and return to the Chesapeake Bay watershed each spring to breed.

3.7.1.5 Bald Eagles Protected under the American Bald and Golden Eagle Act of 1972

Previously listed as Federally endangered, the bald eagle (*Haliaeetus leucocephalus*) has made a comeback and is no longer Federally listed. It is currently protected under the American Bald and Golden Eagle Act and the MBTA.

A large raptor, the bald eagle has a wingspread of about seven feet. Adults have a dark brown body and wings, white head and tail, and a yellow beak. Juveniles are mostly brown with white mottling on the body, tail, and undersides of wings. Bald eagles typically breed and winter in forested areas adjacent to large bodies of water. However, such areas must have an adequate food base, perching areas, and nesting sites. Throughout its range, it selects large, super-canopy roost trees that are open and accessible. Nests are constructed from an array of sticks placed in an interwoven pattern. Other materials added as fillers may include grasses, mosses, and even corn stalks. Three bald eagle nests are located along upriver tidal freshwater tributary creeks of the Great Wicomico River. The closest one to the project ROI is over 2 miles away. (The Center for Biological Diversity 2022).

The ROI is not located in a Bald Eagle Concentration Area.

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative/Future Without Project Alternative

The reefs would continue to function as is, with degradation continuing to take a toll on them. Low-relief reefs would continue to perform at a lower level than the high-relief reefs, with some of them eventually becoming covered with sediment and ceasing to function as reef habitat. Subsequently, benefits to water quality and overall ecosystem productivity will not be realized. While they do not feed directly on oyster reefs, avian piscivores like the Bald Eagle prey upon fish species that utilize oyster habitat. Climate change is also expected to influence the local habitat suitability for special status species. Climate change will bring warmer, more saline waters to the Great Wicomico River, likely resulting in increased salinity and temperatures over time. This will likely decrease suitable spawning habitat for species like the Atlantic Sturgeon that require specific temperature and salinity conditions for successful egg and larval survival and development. It is also expected that, due to ocean acidification, local pH will decrease over time. Without shoreline protection, increasing sea level is expected to limit the habitat available for shorebirds like the Piping Plover.

While they do not feed directly on oyster reefs, avian piscivores like the Bald Eagle prey upon fish species that utilize oyster habitat. Climate change is also expected to influence the local habitat suitability for special status species. Climate change will bring warmer, more saline waters to the Great Wicomico River, likely resulting in increased salinity and temperatures over time. This is likely decrease suitable spawning habitat for species like the Atlantic Sturgeon that require specific temperature and salinity conditions for successful egg and larval survival and development. It is also expected that, due to ocean acidification, local pH will decrease over time. Without shoreline protection, increasing sea level is expected to limit the habitat available for shorebirds like the Piping Clover.

3.7.2.2 Action Project Alternative

No effects to any terrestrial species, including the northeastern beach tiger beetle, monarch butterfly, and northern long-eared bat are expected due to the ROI being offshore waters of the Great Wicomico River. Findings for other species are listed in the following table. The piping plover and red knot are both shore foraging waterbirds that do not utilize subtidal oyster reefs for foraging. Construction will proceed from the water, and no disturbance to the shoreline is expected. Impacts to these birds are expected to be minimal and not significant. There are no records of either the Atlantic or shortnose sturgeon being observed in the Great Wicomico River and an encounter with either species is highly unlikely. The Atlantic sturgeon is much more numerous in the Bay than the shortnose and has a record of recent reproduction in several major rivers of Virginia, including the York and James Rivers, though not in the Great Wicomico River. If a foraging sturgeon was in the River while construction was taking place, it would likely depart the immediate area where activity was occurring due to the noise and disturbance caused by construction vessels placing stone. No effects to the shortnose sturgeon are expected, and potential minor and not significant impacts are expected to the Atlantic sturgeon, which has a much higher chance than the shortnose of swimming into the Great Wicomico River. Several species of sea turtles, including the loggerhead, green, kemps ridley, and leatherback, can be found in the Bay, migrating into our region in the spring as waters warm, and leaving for warmer southern waters in the fall. Detailed monitoring (Barco et al. 2018) has shown that the only species that can be found in local waters is the loggerhead sea turtle, with other species being found further south in the Bay mainstem and more commonly in waters along the seaside Eastern Shore. The results of the effect assessments are summarized in Table 3-4 and Table 3-5. Potential impacts to state listed birds would be as those described in the migratory birds section.

Table 3-4. Federally Listed Species Conclusions (Within the Jurisdiction of the National Marine Fisheries Service)

Species / Resource Name	Endangered Species Act Section 7 Determination	Notes / Documentation
Atlantic sturgeon (All DPS)	May Affect, Not Likely to Adversely Affect	Placement of new reef materials may result in a disturbance effect where any sturgeon leave the Action Area from the increased levels of Total Suspended Solids, turbidity, and noise. It is unlikely that sturgeon would be in the Great Wicomico River, there is no modern-day tracking data that indicates this river is a site they utilize.
Shortnose sturgeon	No Effect	There is no documented occurrence of the shortnose sturgeon in the ROI and this species would not be

Species / Resource Name	Endangered Species Act Section 7 Determination	Notes / Documentation
		anticipated to occur in the ROI/Action Area; any potential effects would be discountable.
Sea turtles: loggerhead sea turtle (Northwest Atlantic DPS)	May Affect, Not Likely to Adversely Affect	Placement of reef materials could create enough disturbance to cause any sea turtles in the project ROI to leave the area while construction takes place.
Green sea turtle	No Effect	There is no documented occurrence of the hawksbill sea turtle in the Action Area and there is no preferred habitat for this species in the Action Area. This species would not be anticipated to occur in the Action Area. Any potential effects would be discountable.
Leatherback sea turtle	No Effect	This turtle is a more oceanic species and the few that have been recorded in the Bay were observed in mainstem Bay waters significantly South of the project ROI. They are not typically observed in Bay tributary rivers.
Kemp's Ridley sea turtle	No Effect	This species has only been observed further South in the Bay mainstem waters relative to the Great Wicomico River and is highly unlikely to be found there.

Table 3-5. Federally Listed Species Conclusions and Bald Eagle Determination (Within the Jurisdiction of the U.S. Fish and Wildlife Service)

Species / Resource Name	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Piping plover, red knot	May Affect, Not Likely to Adversely Affect	The project may slightly impact flight and foraging behaviors but would have an insignificant impact.
West Indian manatee	May Affect, Not Likely to Adversely Affect	Manatees would be transient species and would not likely occur in the Action Area due to lack of its food source, seagrass, which is found in shallower waters. Effects would be discountable.
Northern long-eared bat and Indiana bat	No Effect	No suitable foraging or roosting habitat is located in the Action Area. There are no known hibernacula in the Action Area. The project would not be anticipated to affect flights if they occur in this area.
Nesting habitat for sea turtles: green, hawksbill, Kemp's ridley, leatherback, and loggerhead	No Effect (within the jurisdiction of the U.S. Fish and Wildlife Service)	There is no nesting habitat in the ROI/Action Area.
Northeastern beach tiger beetle	No Effect	There is no documented occurrence of the northeastern tiger beetle in the Action Area. This species would not be anticipated to occur in the ROI as it is found on sandy beaches.
Bald eagle	Unlikely to disturb nesting bald eagles. Does not intersect with eagle concentration area. No Effect.	Several nests are found along tributary creeks of the Great Wicomico River, but the closest lies over two miles away.
Monarch butterfly (candidate species)	No Effect	This species would not be found in offshore waters of the Great Wicomico River, typically being

Species / Resource Name	ESA Section 7 / Eagle Act Determination	Notes / Documentation
		found in riparian and upland zones along freshwater waterbodies.

3.8 Air Quality

3.8.1 Affected Environment

Air quality in the local region is considered good, and the area is in attainment by Clean Air Act National Ambient Air Quality Standards (NAAQS) for six measured pollutants, including carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter, and sulfur dioxide. The region is rural with little development or heavy industrial activity. Local commercial and recreational navigation would continue, as would emissions due to local housing and light industry. Climate change impacts are not likely to reduce air quality.

3.8.2 Environmental Consequences

3.8.2.1 No Action/Future Without Project Alternative

Air quality in the local region is considered good, and the area is in attainment by Clean Air Act standards.

Ongoing activities such as navigation and other transportation, industry, commerce, military, and recreation included in the No Action/Future Without Project Alternative would result in adverse, temporary impacts to air quality that are negligible to minor, and the region should remain in attainment.

3.8.2.2 Action Project Alternative

Locally produced air emissions resulting from combustion of fuel during construction would increase very slightly with implementation of the Action Project Alternative, as compared to the No Action/Future Without Project Alternative. The construction equipment will likely consist of several barges, a tugboat, and various diesel-powered construction vehicles necessary to move and place the stone onto the barges and then off loaded onto the reefs during construction. It is not expected that further maintenance will be required. Due to the expected short duration of the activity, which should last approximately two months, it is expected that emissions produced will be significantly below the *de minimus* level. A conformity determination is not required.

The increases in construction-related emission from implementing this alternative would be temporary and negligible and would not be predicted to result in substantial changes to regional or global-climatic air quality.

3.9 Climate Change

3.9.1 Affected Environment

Human-induced climate change and global warming have been observed during the 20th and 21st centuries and have resulted in rising global and local sea levels. Analysis in the Sixth Assessment Report states that "Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of sea level rise was 1.3 [0.6 to 2.1] mm yr^{-1} between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr^{-1} between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm yr^{-1} between 2006 and 2018 (high confidence)." Human influence was cited as the unequivocal main driver of these SLR increases since at least 1971 (IPCC 2021).

Locally, the RSLR (relative sea-level rise) has been higher than the global mean, due to a SLR "hotspot" that exists on the East coast of North America (Koeberl et al., 1996; Kleinosky et al., 2007; Barbosa & Silva, 2009; Yin et al., 2009; Boon et al., 2010; Sallenger et al., 2012). This higher rate is driven by oceanic currents that influence local sea level rise on the Atlantic Coast due to temperature and salinity changes in the Atlantic Ocean, which cause pressure gradients between the Gulf Stream and coastal waters to decrease. This then causes coastal waters to rise (Sallenger et al. 2012) and glacial rebound, which causes the earth's crust in the southern Bay region to subside. As a result of these factors, local, relative sea level rise (RSLR) on the mid-Atlantic Coast of the United States from North Carolina northward is occurring at approximately twice the global mean rate, and the rate of sea level rise is accelerating both globally and locally.

Data from the Sewell's Point tidal gauge indicate that Hampton Roads has experienced an increase of 1.15 feet of relative sea level rise between 1927 and 2006 (HRTPO 2013). Sea level rise due to climate change is now the dominant factor in relative sea level rise whereas as only 2.10 mm/yr of the present rate of sea level rise of 4.85 mm/ is due to subsidence (Schulte et al. 2015) and has further increased to 6.35 mm/yr (2010-2020) (Schulte and Wu 2021). NOAA recently published a report (Sweet et al. 2022) that estimates sea level rise will, on average, increase by 10-12 inches in the next 30 years along the U.S. coastline, locally in Chesapeake Bay this is predicted to be 11.9 inches (Wu and Schulte 2021).

The Fourth U.S. National Climate Assessment (2018) has established a range of global sea level rise predictions for the year 2100 that all predict sea level rise and range in the predicted value from 0.7 feet on the low end to 6.6 feet as a high prediction with intermediate values between the extremes (U.S. National Climate Assessment 2012). Locally, sea level rise began trending from the mid to high scenario around the year 2000 (Wu and Schulte 2021).

Changes to relative sea level can result from a number of factors including faulting and consolidation of sediments in fill structures and sediment compression caused by groundwater withdrawals and glacial rebound (Boon 2010). Although rare, factors other than the rising of the sea itself can be less than the subsidence of local land, resulting in a negative rate of RSLR, for example off the coast of Alaska. As a result, the USACE typically refers to RSLR as "sea level change" since despite the overall, global positive rate of sea level rise, it can at times be negative due to land-based factors.

In 2013, the USACE published Engineering Technical Letter 1100-2-1, "Procedures to Evaluate Sea Level Change: Impacts, Responses, and Adaptation" (USACE 2014a) and Engineering Regulation ER-1100-2-8162, "Incorporating Sea Level Change into Civil Works Programs"

(USACE 2013), which provide guidance to the USACE for how to incorporate sea level change for civil works projects. The USACE engineering documents require that planning studies and engineering designs evaluate the entire range of possible future rates of sea-level change, represented by three scenarios of "low", "intermediate", and "high" sea-level change (USACE 2013; USACE 2014) (See Section 5.10). The local rate, determined by the USACE, using the Sewell's Point tide gauge, which is within the project ROI and has been operating for 80 years, was determined using the USACE sea level rise calculator (USACE 2022), and the results can be seen in Figure 3-4.

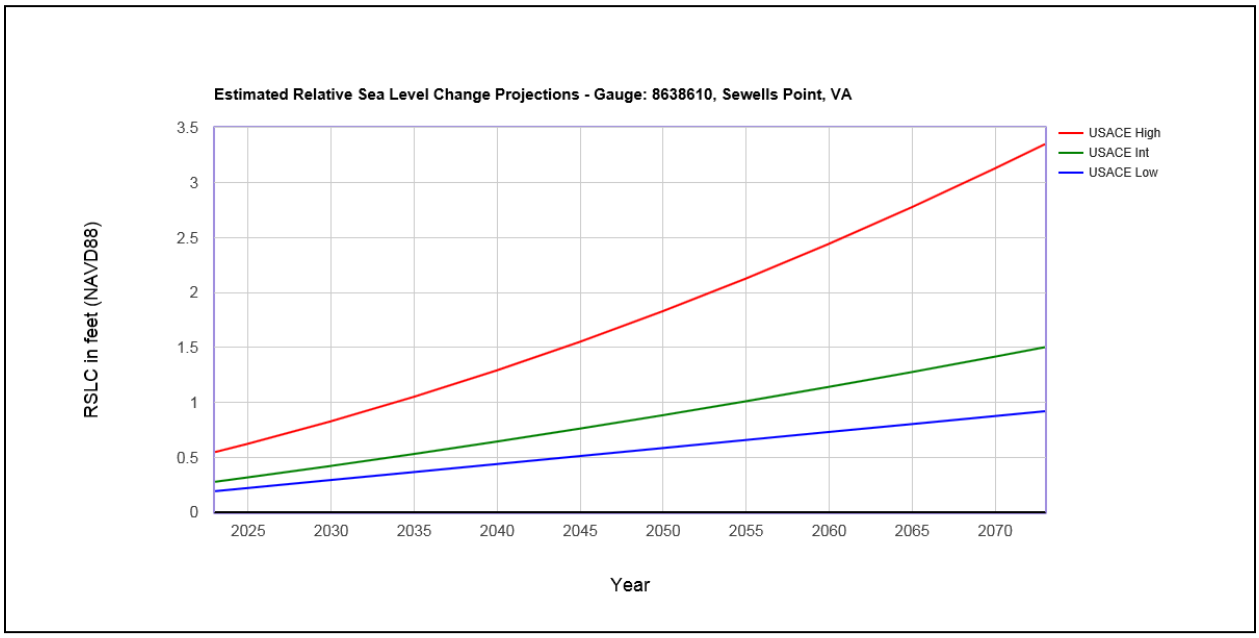

Figure 3-3. Relative Sea Level Rise in the project ROI, lower Chesapeake Bay.

Other impacts to local waters would be increased temperatures and salinity, changes to precipitation patterns (generally fewer but more intense rain events) and pH being reduced (ocean acidification) due to climate change impacts driven primarily by CO_2 emissions. Ocean acidification makes it more difficult for any organism with a calcium carbonate shell to make and maintain their protective shells, including local species such as oysters (Waldbusser et al. 2011). Local species distributions will also be significantly altered in the Chesapeake Bay (Najjar et al. 2010). The severity of these effects will be determined by how much carbon humanity releases to the atmosphere in coming years as well as the level of change that is now unavoidable due to increased CO_2 that has already occurred.

3.9.2 Environmental Consequences

3.9.2.1 No Action/Future Without Project Alternative

With implementation of the No Action/Future Without Project alternative, existing greenhouse gas-producing activities within the ROI, as well as climate change, would be predicted to continue and relative sea level rise would be expected to continue to rise over the 50-year period of analysis, likely continuing to accelerate unless worldwide carbon emissions are

brought under control. As previously described in the Air Quality Section, implementation of the No Action/Future Without Project Alternative does have minor impacts to air quality but this would not substantively impact global-climatic air quality.

3.9.2.2 Action Project Alternative

The Action Project Alternative will result in a minor, temporary increase in local CO_2 emissions.

Post construction, local oyster populations should increase significantly due to the improved quality of the reef system's substrate, as well as protecting the reefs from further degredation. Oyster reef habitat acts as a carbon sink, removing carbon from the water column that was initially absorbed from the atmosphere. Oyster reefs, therefore, directly reduce CO_2 levels, helping to reduce climate change impacts from CO_2 emissions (Lee et al. 2020). Overall, constructing these reefs will result in an overall reduction in atmospheric CO_2 due to the presence of the higher density oyster populations on the upgraded and protected restored reefs. This will take some years after the project is constructed to compensate for the emissions produced during construction, but assuming the reefs perform as expected it will occur. No specific calculations as to when this will occur have been done, as the science on how long it will take is still evolving. When it does eventually occur, this will result in significant, positive benefits to reduce climate change impacts due to carbon reduction over the reefs.

Climatic changes such as sea level rise and increasing global temperatures are predicted to continue. Predicted climate change impacts such as increased ocean temperatures, ocean acidification, sea level rise, and changes in currents, upwelling and weather patterns, have the potential to cause changes in the nature and character of the estuarine ecosystem in the ROI. The pH within surface waters will likely drop as ocean acidification occurs. Climate change is anticipated to potentially increase winter and spring nutrient loading into the Chesapeake Bay (Najjar et al. 2010). The higher temperatures, lower dissolved oxygen levels, and increased phytoplankton productivity may result in more frequent hypoxic conditions (low dissolved oxygen conditions) in the water column. The anticipated higher temperatures and carbon dioxide levels in the Chesapeake Bay may result in increases in harmful algal blooms (Najjar et al. 2010).

As a result of climate change, global temperatures and sea level are expected to rise in the foreseeable future. Sea level rise may result in an increase in salinity in upstream areas that could affect breeding sites and survival of early life stages for fish (eggs, larvae, and young of the year). There could be shifts in breeding habitat availability and timing, and the effects of this change on fish populations could be detrimental although relatively uncertain at this time. The shifts in salinity, temperature, and sea level rise all have the potential to result in shifts in prey species availability, which could also cause detrimental effects to fish resources and habitats. The two oyster diseases, MSX (*Haplosporidium nelsoni*) and dermo (*Perkinsus marinus*), become more infectious and deadly as salinity and temperature increase, which could cause increased oyster mortalities as climate change effects progress over time (Cohen et al. 2018), though oysters have shown some capability to respond by natural selection to these impacts (Bushek et al. 2016).

Existing greenhouse gas-producing activities within the ROI (e.g., navigation and other transportation, industry, commerce, military, and recreation) would be expected to continue throughout the 50-year period of analysis. Although, implementation of the Action Project Alternative would have very minor impacts to air quality, this would not substantively impact

global-climatic air quality. The presence of the oyster reefs will provide positive benefits that will help lessen the impacts of climate change.

3.10 **Noise and Vibration**

3.10.1 Affected Environment

The local region around the proposed reefs would be impacted by increased noise during construction. The area around the reefs is very lightly developed, and construction would occur during regular business hours. The local area has periodic shell plantings done using various methods by the VMRC during maintenance of fished areas near the sanctuary reefs.

3.10.2 Environmental Consequences

3.10.2.1 No Action/Future Without Project Alternative

Local noise in these waters is limited to small commercial and recreational boats, as no large vessels call on local ports in the Great Wicomico River. Periodic re-shelling of public oyster grounds would continue to occur, causing a local, temporary increase in noise due to this construction.

Implementation of the No Action/Future Without Project Alternative is predicted to result in no additional noise in the local region.

3.10.2.2 Action Project Alternative

Compared to the No Action/Future Without Project Alternative, implementation of the Action Project Alternative would result in a minor increase in local noise from vessel operations during the reef construction. The noise and vibration produced by barges, tugboat, and other equipment used in the construction is predicted to dissipate within a relatively short distance from operations, though this may be dependent on wind speed and direction. Nearby public oyster grounds are periodically re-shelled using similar equipment and causing similar noise as the proposed activity would produce. However, it is anticipated that noise inputs from project implementation would not significantly increase ambient noise levels in the human environment or affect sensitive noise receptors.

Implementation of the Action Project Alternative is predicted to result in temporary, minor adverse noise and vibration impacts within the ROI.

3.11 **Occupational Health and Safety**

3.11.1 Affected Environment

The occupational health and safety (OSH) environment in the ROI of this project would be in the work of navigating to construction sites and during the placement of reef materials on site. This will involve large vessels such as barges and tugs, as well as heavy construction vehicles to place the materials from the barges onto the desired reef footprints. Best management practices (BMP) and an US Army Corps of Engineers approved safety plan would be in place to help minimize the chances of any accident. Standard practices such as use of hard hats and

steel-toed shoes while working with the materials being placed will be required and followed. Any accidents will be reported to USACE. Based on past oyster construction, the chances of an accident are low, as there have to date not been any accidents during several prior oyster restoration construction events.

Contractors are required to prepare an Accident Prevention Plan (APP) for review by USACE safety staff prior to being given notice to proceed with work (USACE 2014b). The APP specifies the safety and occupational health plan, responsible personnel and their OSHA certifications, safety training for all personnel, protective equipment, Clothing and Personal Protective Equipment (PPE) are typically required for workers. PPE includes:

- Appropriate clothing for weather conditions;
- Steel toed boots;
- Hard hat;
- Protective eyewear matched to work type (e.g., cutting or welding);
- Work vest/personal floatation device; and
- Hearing protection if exposed to various decibel levels for a scale of time periods.

3.11.2 Environmental Consequences

3.11.2.1 No Action/Future Without Project Alternative

There would be no chance for any accident as the proposed construction would not take place.

3.11.2.2 Action Project Alternative

Reef construction is assumed to present a minor occupational health and safety risk. Implementation of the Action Alternative would have a minor potential for exposure to chemical and accident hazards should they be encountered. The occupational safety and health risks would be temporary and negligible to a minor level of impact and is not considered significant.

With the mitigative measures and prevention plans as described above, adverse effects on safety would be temporary, and negligible to minor.

3.12 **Socioeconomics and Environmental Justice**

3.12.1 Affected Environment

The Affected Environment for Socioeconomics are waters of the Great Wicomico River in the region of the project ROI and the economic activity they support. These waters primarily support commercial fishing activity, including private oyster leases, which are rented areas of river bottom used by fishermen to grow oysters for market via aquaculture, fishing activity on public oyster grounds downriver of the project at VMRC-managed sites that receive oyster recruits from the upriver sanctuary reefs, and commercial crab-potting activities. The river also supports significant recreational fishing and crabbing. For Environmental Justice, the ROI also includes the local population that lives in close proximity to the proposed project, within the Great Wicomico River watershed. Information on environmental justice was obtained using the EPA EJScreen tool (EPA 2022). This area is mostly rural with a low population density (0-1,866 people/square mile) and tending towards lower income. The Great Wicomico watershed is in the 50-60th percentile for a population that has less than a high school education. The population is

mostly white as people of color represent 13% of the local population. The local population also tends to be older with 43% over age 64, much higher than the state average of 15%. This indicates that there is little influx of young people settling in the area, and it is likely that most young people born in the local region leave as they reach adulthood. In general, environmental quality is good with the exception of lead paint, likely due to the greater than average age of local housing compared with more urban areas.

3.12.2 Environmental Consequences

3.12.2.1 No Action/Future Without Project Alternative

The river and its watershed would continue to provide primarily commercial fishing benefits to the local population, along with recreational opportunities. Climate change-related impacts could possibly influence these benefits, causing a reduction in commercial crab and oyster harvests, introducing new species that could be fished, or possibly expanding the salinity zone in which oysters can live in the River, which could potentially increase the local population. It is expected that the local human population will continue to age, with little immigration into the River watershed. The character of the region will likely remain primarily rural.

3.12.2.2 Action Project Alternative

Implementation of the Action Project Alternative would result in increases in commercial output of oysters, and likely increased fish production of species that prefer structured habitat rather than open bottom. There should be no disruption of commercial fishing activity as the reef construction occurs. There would be no substantive predicted influx of new people hired, no substantive changes in local employment, and no substantive changes to income within the ROI.

Implementation of the Action Project Alternative would not result in measurable changes to environmental resources that individuals involved in commercial, recreational, or subsistence fishing or hunting utilize and would not create disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Native American tribes. Climate change will impact the region as described in the No Action/Future Without Conditions section.

4.0 **CUMULATIVE IMPACTS**

Cumulative impacts result when the effects of an action are added to or interact with other effects occurring in the proposed project's ROI. For the selected plan, the Action Alternative, a number of low-relief oyster reef areas will be elevated to high-relief, and the entire sanctuary reef network will have large stones installed randomly over the reef surface to provided additional habitat benefits.

The Great Wicomico River and its watershed are predominantly undeveloped, and no large towns or cities lie within its watershed. This will continue to be the case into the foreseeable future. The main human impact to the River is periodic hypoxia in the deeper waters (>16 feet) of the river near and within the main channel caused by the "dead zone" in the Chesapeake Bay mainstem which is due to human nutrient input. Local private oyster leases have been operational in the river for decades before the dermo disease outbreak in the 1980s that devastated the already collapsed oyster fishery and further reduced the oyster population to the

smallest fraction it had ever been documented. The local fishery began to recover in the late 2000s (first documented around 2006) as a result of both natural resistance to dermo and increased oyster recruitment in the Great Wicomico River from USACE oyster reef construction in 2004 (Schulte and Burke 2014). Today, private leases as well as public oyster grounds in the river that can be fished are commercially profitable to fish and will likely continue to be so into the foreseeable future. There is no significant heavy industry in the region, which will likely to continue to be the case into the future.

Most of the impacts of the proposed reef construction will be minor, temporary, and not significant in nature. There are a few impacts of implementation of the Action Alternative that would act cumulatively with other aspects of the environment. The local benthic community will benefit over time and this will act cumulatively with the natural development of disease resistance to dermo in the Chesapeake Bay oyster population. It is expected that implementation of the proposed project will accelerate local oyster recovery and enhance recruitment further, which will be cumulative and complimentary with VMRC and other agency efforts to augment oyster populations. The proposed project will provide additional benefits to water quality, working cumulatively with Bay-wide efforts to continue to improve on water quality in the Chesapeake Bay and its tributaries. Fish and other invertebrate secondary production and population will be augmented, which will work cumulatively with various species' management efforts to sustain their populations over time. A positive feedback loop between the local oyster population and recruitment will be enhanced over time as the population continues to grow and improved disease resistance to dermo continues to evolve. It is expected that the local oyster population will expand over time due to the cumulative impacts of the 2004, 2015, and proposed 2023 reef construction. This expanded population will improve the local oyster fishery over time, which should increase in profitability due to increased recruitment and improved habitat quality on fished areas due to higher numbers of oysters per unit area of fished reef, either public or private. The ability of oysters to fix carbon for long-term storage in the underlying reef layer will act cumulatively with other efforts to reduce climate change impacts.

Overall, the cumulative impacts of the proposed project are positive to the environment and ecology of Chesapeake Bay.

5.0 ENVIRONMENTAL COMPLIANCE

5.1 Environmental Compliance Tables

Compliance with the following environmental laws (Table 7-1), Executive Orders (Table 7-2) and implementing regulations (Table 7-3) is required for the project alternatives under consideration (note: this is not necessarily an exhaustive list of all applicable environmental requirements).

Table 5-1. Environmental Laws

Title of Law	U.S. Code	Compliance Status
Abandoned Shipwreck Act of 1987	43 United States Code (U.S.C.) 2101	Full Compliance upon agency review/approval of Draft SEA

American Bald and Golden Eagle Protection Act of 1962, as amended	16 U.S.C. 668	Full Compliance upon agency review/approval of Draft SEA
American Indian Religious Freedom Act of 1978	Public Law No. 95-341, 42 U.S.C. 1996	Full Compliance upon agency review/approval of Draft SEA
Anadromous Fish Conservation Act of 1965	16 U.S.C. 757 a et seq	Full Compliance upon agency review/approval of Draft SEA
Archaeological and Historic Preservation Act of 1974	Public Law 93-291 and 16 U.S.C.469-469c	Full Compliance upon agency review/approval of Draft SEA
Archaeological Resources Protection Act of 1979	16 U.S.C. 470aa–470mm,	Full Compliance upon agency review/approval of Draft SEA
Clean Air Act of 1972, as amended	42 U.S.C. 7401 et seq	Full Compliance, based on similar projects emissions are expected to be below *de minimus* levels. Local area is in attainment. No permit needed.
Coastal Barrier Resources Act of 1982	Public Law 114-314	The project is not located in a designated coastal barrier zone and therefore, no coordination is necessary.
Clean Water Act of 1972, as amended	33 U.S.C. 1251 et seq	Full Compliance upon agency review/approval of Draft SEA
Coastal Zone Management Act of 1972, as amended	16 U.S.C. 1451 et seq	Full Compliance upon agency review/approval of Draft SEA
Comprehensive Environmental Responses, Compensation and Liability Act of 1980	42 U.S.C. 9601	Full Compliance upon agency review/approval of Draft SEA
Deepwater Port Act of 1974, as amended	33 U.S.C. 1501	Full Compliance upon agency review/approval of Draft SEA
Emergency Wetlands Resources Act	16 U.S.C. 3901-3932	N/A
Endangered Species Act of 1973	16 U.S.C. 1531	Full Compliance with USFWS and NMFS upon agency review/approval of Draft SEA.
Estuary Protection Act of 1968	16 U.S.C. 1221 et seq	N/A
Fish and Wildlife Coordination Act of 1958, as amended	16 U.S.C. 661	Full Compliance upon agency review/approval of Draft SEA and receiving FWCA documentation.

Flood Control Act of 1970	33 U.S.C. 549	Full Compliance upon agency review/approval of Draft SEA
Land and Water Conservation Act	16 U.S.C. 460	Full Compliance upon agency review/approval of Draft SEA
Magnuson-Stevens Fishery Conservation and Management Act	16 U.S.C. 1801	Full Compliance upon agency review/approval of Draft SEA
Marine Mammal Protection Act of 1972, as amended	16 U.S.C. 1361	Full Compliance upon agency review/approval of Draft SEA
Marine Protection, Research, and Sanctuaries Act of 1972	33 U.S.C. 1401	Full Compliance upon agency review/approval of Draft SEA
Migratory Bird Conservation Act of 1928, as amended	16 U.S.C. 715	Full Compliance upon agency review/approval of Draft SEA
Migratory Bird Treaty Act of 1918, as amended	16 U.S.C. 703	Full Compliance upon agency review/approval of Draft SEA
National Environmental Policy Act of 1969, as amended	42 U.S.C. 4321 et seq	Full compliance, upon signature of the FONSI
National Historic Preservation Act of 1966, as amended	16 U.S.C. 470	Full Compliance upon agency review/approval of Draft SEA
National Historic Preservation Act Amendments of 1980	16 U.S.C. 469a	Full Compliance upon agency review/approval of Draft SEA
Native American Graves Protection and Repatriation Act of 1990	25 U.S.C. 3001	Full Compliance upon agency review/approval of Draft SEA
Noise Control Act of 1972, as amended	42 U.S.C. 4901	Full Compliance upon agency review/approval of Draft SEA
Resource Conservation and Recovery Act of 1976	42 U.S.C. 6901 et seq	Full Compliance upon agency review/approval of Draft SEA
River and Harbor Act of 1888, Section 11	33 U.S.C. 608	Full Compliance upon agency review/approval of Draft SEA
River and Harbor Act of 1899	33 U.S.C. 401 et seq	Full Compliance upon agency review/approval of Draft SEA
Safe Drinking Water Act of 1974, as amended	42 U.S.C. 300	Full Compliance upon agency review/approval of Draft SEA
Submerged Lands Act of 1953	43 U.S.C. 1301 et seq	Full Compliance upon agency review/approval of Draft SEA
Toxic Substances Control Act of 1976	15 U.S.C. 2601	Full Compliance upon agency review/approval of Draft SEA

Table 5-2. Executive Orders

Title of Executive Order	Executive Order Number	Compliance Status
Protection and Enhancement of Environmental Quality	11514/11991	Full Compliance upon agency review/approval of Draft SEA

Protection and Enhancement of the Cultural Environment	11593	Full Compliance upon agency review/approval of Draft SEA
Floodplain Management	11988	Full Compliance upon agency review/approval of Draft SEA
Protection of Wetlands	11990	Full Compliance upon agency review/approval of Draft SEA
Federal Compliance with Pollution Control Standards	12088	Full Compliance upon agency review/approval of Draft SEA
Offshore Oil Spill Pollution	12123	Full Compliance upon agency review/approval of Draft SEA
Federal Compliance with Right-to-Know Laws and Pollution Prevention	12856	N/A
Federal Actions to Address Environmental Justice and Minority and Low-income Populations	12898	Full Compliance upon agency review/approval of Draft SEA
Protection of Children from Environmental Health Risks and Safety Risks	13045	Full Compliance upon agency review/approval of Draft SEA
Invasive Species	13112	Full Compliance upon agency review/approval of Draft SEA
Marine Protected Areas	13158	N/A
Consultation and Coordination with Indian Tribal Governments	13175	Full Compliance upon agency review/approval of Draft SEA
Responsibilities of Federal Agencies to Protect Migratory Birds	13186	Full Compliance upon agency review/approval of Draft SEA
Facilitation of Cooperative Conservation	13352	N/A
Preparing the United States for Impacts of Climate Change	13659	Full Compliance upon agency review/approval of Draft SEA
Planning for Federal Sustainability in the Next Decade (2015)	13693	Full Compliance upon agency review/approval of Draft SEA

Table 5-3. Permitting Requirements

Law	Agency Responsible	Permit, Agreement, Authorization, or Notification Required
American Bald and Golden Eagle Protection Act of 1962, as amended	USFWS	"Take" permit if any eagles are accidentally harmed or killed; no take permit is required
Comprehensive Environmental Responses, Compensation and Liability Act of 1980, as amended	U.S. Environmental Protection Agency (USEPA)	Full Compliance upon agency review/approval of Draft SEA
Clean Water Act, Section 401	VDEQ	401 Water Quality Certification
Clean Air Act, Section 110	VDEQ	No permit anticipated as air emissions will be below de minimis levels
Endangered Species Act of 1973	NMFS	Draft SEA will initiate coordination
Endangered Species Act of 1973	USFWS	Concurrence Determination (Informal Consultation)
Fish and Wildlife Coordination Act (FWCA)	USFWS	Coordination is ongoing to obtain FWCA Letter Report
Magnuson-Stevens Fishery Conservation and Management Act	NMFS	Notification of any noncompliance; none anticipated
Marine Mammal Protection Act of 1972, as amended	NMFS	No Incidental Take Authorization anticipated
Marine Protection, Research, and Sanctuaries Act of 1972	USEPA	No expected impacts involving this Act.
Migratory Bird Treaty Act of 1918, as amended	USFWS	"Take" permit; no take permit is required
National Historic Preservation Act of 1966, as amended	Advisory Council on Historic Preservation, Virginia Department of Historic Resources	Programmatic Agreement in place
Noise Control Act of 1972	USEPA	Notification of any noncompliance; none anticipated
Resource Conservation and Recovery Act of 1976	USEPA, VDEQ	Testing, quantification, and notification for any hazardous materials.

N/A = Not Applicable; VDEQ = Virginia Department of Environmental Quality; NMFS = National Marine Fisheries Service; USEPA = U.S. Environmental Protection Agency; USFWS = U.S. Fish and Wildlife Service

5.2 Public Involvement

5.2.1 NEPA Scoping and Public Review

Limited scoping was conducted to develop this document because it is a supplemental to a prior evaluation. Pertinent Federal (U.S. Fish and Wildlife Service, NOAA) and state agencies were contacted via email to request their comments on the proposed action. This Draft Supplemental Environmental Assessment will be released for a 30-Day Public Comment period for public and agency review.

For public review, the release of the Draft SEA will be accompanied by a joint news release and posting of the Draft SEA on the Norfolk District website. Instructions will be provided in the news release and on the website for how to submit comments. The Draft SEA will be available for public and agency review for 30 days. Comments will be reviewed and addressed, and comments and USACE responses will be included in the Environmental Appendix under the Coordination sub-heading.

5.2.2 Agencies, Tribal Governments, and Persons Consulted*

For the prior Feasibility Study and EA, full coordination with all relevant Federal and State agencies was completed. Full compliance with all relevant Federal and State laws and regulations was completed prior to first construction in 2004. For this SEA, the USACE will coordinate this document with all prior agencies consulted. Pertinent agencies for this re-coordination include USFWS, NOAA, VMRC, and VDHR. Please see the prior report/EA in Appendix B.

5.2.3 Distribution List

NMFS - National Marine Fisheries Service
NPS – National Park Service
USEPA - U.S. Environmental Protection Agency
USFWS - U.S. Fish and Wildlife Service
VDGIF - Virginia Department of Game and Inland Fisheries
VDCR - Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation
VDEQ - Virginia Department of Environmental Quality
VDH - Virginia Department of Health
VDHR - Virginia Department of Historic Resources
VIMS - Virginia Institute of Marine Science
VMRC - Virginia Marine Resources Commission

6.0 DISTRICT ENGINEER RECOMMENDATION

I concur with the findings presented in this Supplemental Environmental Assessment. The Action Alternative/Recommended Plan developed is technically sound, economically justified, and socially and environmentally acceptable.

I recommend that the existing oyster sanctuary reef network, constructed in 2004 in the Great Wicomico River, be modified to upgrade several existing areas of low-relief reef up to high-relief reef using crushed stone to improve their function, to ensure the long-term sustainability of the entire reef network with the placement of large habitat stones, and to expand the footprint of Reef 16, doubling it in size. Based on a review of existing data as well as findings from the prior Environmental Assessment, and coordination with Federal, state, and local agencies, there is no environmental mitigation required for construction of the Action Alternative/Recommended Plan.

The Recommended Plan conforms to the essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, and it complies with other Administration and legislative policies and guidelines on project development. If the project were to receive funds for Federal implementation, it would be implemented subject to the cost sharing, financing, and other applicable requirements of Federal law and policy for navigation projects including WRDA 1986, as amended; and would be implemented with such modifications, as the Chief of Engineers deems advisable within his discretionary authority. Federal implementation of the recommended project would be subject to the non-Federal sponsor agreeing to comply with Federal laws and policies, including but not limited to:

- Provide all lands, easements, rights-of-way, relocations, and disposal areas (LERRDs).

- Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the reefs, an additional amount equal to 10 percent of the total cost of construction of the reefs less the amount of credit afforded by the Government for the value of the LERRD is provided by the sponsor for the reefs. If the amount of credit afforded by the Government for the value of LERRD, and relocations, including utility relocations, provided by the sponsor equals or exceeds 10 percent of the total cost of construction of the reefs, the sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LERRD and relocations, including utility relocations, in excess of 10 percent of the total cost of construction of the reefs.

- Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function.

- Provide, operate, and maintain, at no cost to the Government, the local service facilities in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations and any specific directions prescribed by the Federal government.

- Accomplish all removals determined necessary by the Federal government other than those removals specifically assigned to the Federal government.

- Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the Sponsor owns or controls for access to the project for the purpose of completing, inspecting, monitoring and/or operating and maintaining the reefs.

- Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors.

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

- Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601–9675, that may exist in, on, or under LERR that the Federal government determines to be necessary for the construction or operation and maintenance of the general navigation features. However, for lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the Federal government provides the sponsor with prior specific written direction, in which case the sponsor shall perform such investigations in accordance with such written direction.

- Assume complete financial responsibility, as between the Federal government and the sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under LERRD that the Federal government determined to be necessary for the construction or operation and maintenance of the project.

- Agree, as between the Federal Government and the non-Federal Sponsor, that the non-Federal Sponsor shall be considered the operator of the local service facilities for the purpose of CERCLA liability.

- To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.

- Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, (42U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law 99-662, as amended, (33 U.S.C. 2211(e)) which provide that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

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

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

- Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project.

- Not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the sponsor's obligations for the project unless the Federal agency providing the Federal portion of such funds verifies in writing that such funds are authorized to be used to carry out the project.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Virginia, the Virginia Marine Resources Commission (the non-Federal Sponsor), interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

_____

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