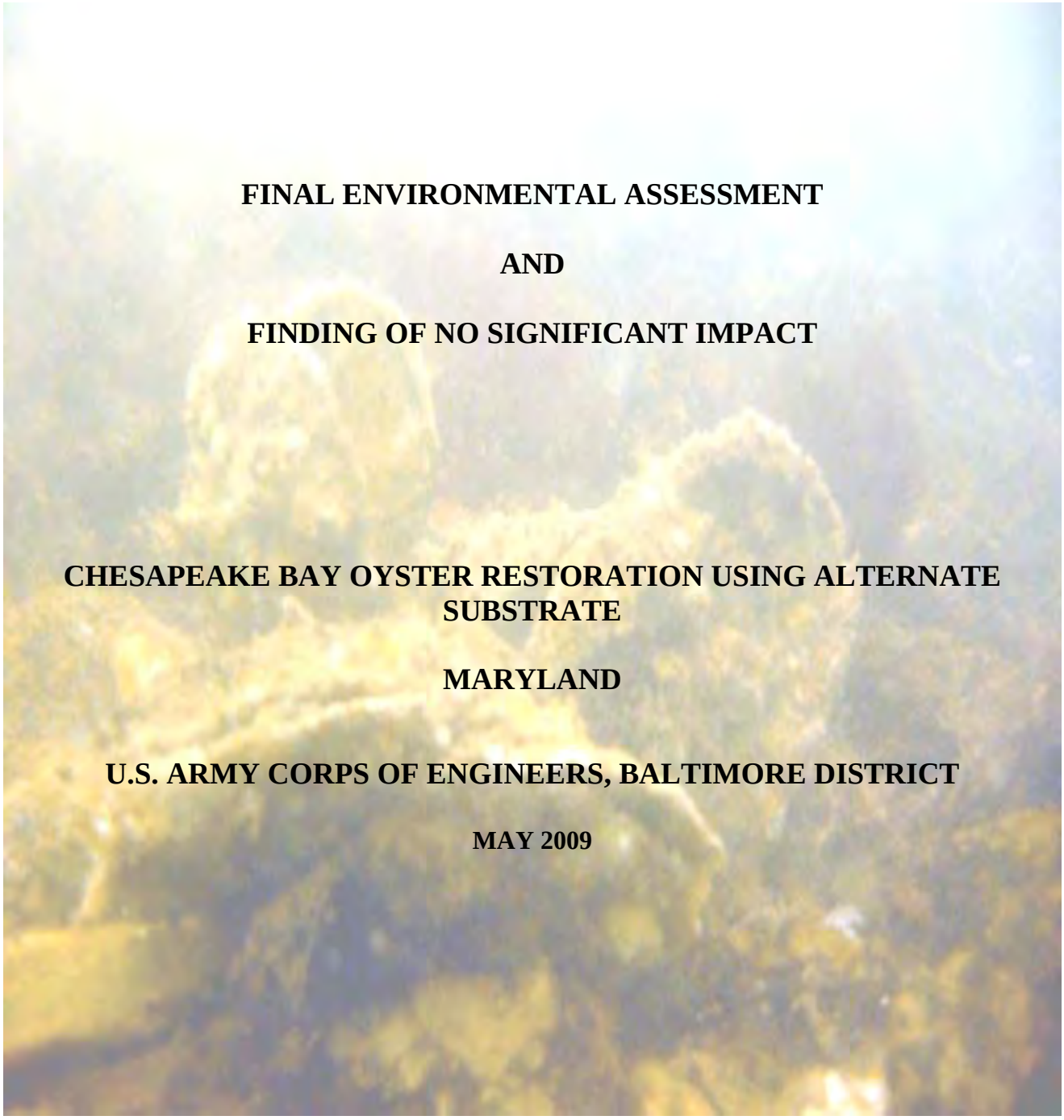

FINAL ENVIRONMENTAL ASSESSMENT

AND

FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE SUBSTRATE

MARYLAND

U.S. ARMY CORPS OF ENGINEERS, BALTIMORE DISTRICT

MAY 2009

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DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

MARYLAND

In 1996, U.S. Army Corps of Engineers, Baltimore District (USACE) completed a report, the *Chesapeake Bay Oyster Recovery Project*, Maryland which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MD DNR) for restoration in the Chesapeake Bay within the Oyster Recovery Areas of the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers. Implementation of the eastern or American oyster (*Crassostrea virginica*) restoration recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. A supplemental Environmental Assessment (EA) was prepared in 1999 to evaluate the construction of seed bars in the Eastern Bay of Queen Anne's County, Maryland. Additionally, another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities. Oyster shell is in short supply. This has hampered past activities and is expected to impact future oyster restoration activities if alternate substrate is not used to create oyster bars and reefs.

USACE proposes the use of alternate substrate in addition to oyster shell to construct oyster bars and reefs within the Maryland portion of the Chesapeake Bay and its tidal tributaries. Restoration projects assessed for this action would be performed under the Corps' authority to restore native oysters codified in 33 U.S.C. § 2263. This construction is targeted to begin in spring/summer 2009, and will continue in annual cycles thereafter, subject to availability of funding. Potential substrate includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any substrate utilized would be clean material and free of building debris such as wiring, pipes and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls).

USACE has prepared an EA documenting the expected project impacts of using alternate substrate for Corps projects implemented in the Maryland portion of the Chesapeake Bay. This EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts from the proposed action were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. This EA documents the overall effects of the proposed action and finds that there will be minor, temporary impacts, during construction to benthic organisms, local turbidity, recreational and commercial fishermen,

fish (eggs, larval, and juvenile stages) as well as noise levels and aesthetics for residents. There will be a long-term beneficial impact and no long-term adverse impacts associated with the project.

In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed action. The analysis determined that the use of alternate substrate to create oyster bars and reefs would result in beneficial impacts to the aquatic environment. On August 13, 2008 USACE (Baltimore Operations Division) signed a FONSI and issued a permit under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act to allow MD DNR to use alternate substrate materials to construct oyster sanctuaries and harvest reserves (Permit # CENAB-OP-RMN (MD DNR/Alternate Material) 2007-03659-M24).

Upon reviewing the EA, I find that the potential negative impacts to benthic and open water habitat associated with the implementation of the project will occur over a small area and will be short-term. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities and does not constitute a major Federal action significantly affecting the quality of the human environment. Based upon this finding, preparation of an Environmental Impact Statement (EIS) is not required.

Peter W. Mueller
Colonel, Corps of Engineers
District Engineer

Date: 29 May 2009

EXECUTIVE SUMMARY

As part of the Chesapeake Bay Oyster Recovery Project, Maryland the U.S. Army Corps of Engineers, Baltimore District (USACE) is undertaking the preparation of this environmental assessment (EA) to construct and cost share eastern or American oyster (*Crassostrea virginica* bar and reef restoration in the Maryland portion of the Chesapeake Bay and its tributaries using alternate (non-oyster shell) substrate, as authorized by Section 5021 of Water Resources Development Act (WRDA) of 2007. Previous oyster restoration efforts in this area by USACE have been limited to the use of clean oyster shell as substrate, which has become increasingly unavailable. The purpose of this proposed action is to enhance oyster propagation efforts in the Chesapeake Bay and six tidal tributaries (Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers) by seeding native oysters on alternate (non-oyster shell) materials. Taking this action within Maryland natural oyster bars (NOB's) will assist the regional effort of establishing an abundant and self-sustaining oyster population. These efforts support the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan (OMP). The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland. The non-Federal sponsor is the Maryland Department of Natural Resources (MD DNR).

Construction using alternate substrate rather than oyster shell is targeted to begin in spring/summer 2009 and continue thereafter in annual placement cycles subject to the availability of funds. Potential alternate substrate for construction includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be placed would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). On August 13, 2008, USACE (Baltimore District Engineer) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MD DNR to use alternate materials to construct oyster sanctuaries and harvest reserves.

The Baltimore District prepared oyster restoration decision documents in 1996, 1999, and 2002. These reports address the use of oyster shell; not alternate substrate. Areas considered and addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) within the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers. A supplemental EA was prepared in 1999 to evaluate the use of the Eastern Bay as a seed bar area for the project. Additionally, another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities.

This project is authorized under Section 704(b) of WRDA 1986, as amended by Section 505 of WRDA 1996, Section 342 of WRDA 2000, Section 113 of the Energy and Water Development Appropriations Act (EWDA) of 2002, and Section 5021 of WRDA 2007. Section 505 of WRDA 1996 increased the authorization limit from $5 million to $7 million. Section 342 of WRDA 2000 further increased the project authorization limit to $20 million, as well as provided guidance on allowable project activities. Section 113 of the EWDA further modified the authorization to permit the non-Federal interest to provide its share, including the provision of suitable shell stock, as in-kind services, and permits USACE to consider such services provided on or after October 1, 2000. The authorization for the program is codified at 33 U.S.C. 2263,

entitled ‘Study of Corps Capability to Conserve Fish and Wildlife’. One of the provisions of WRDA 2007 provides the USACE with authority to construct restore and rehabilitate habitat for fish, including native oysters, in the Chesapeake Bay and its tributaries in Maryland and Virginia, and to evaluate and use appropriate alternative substrate material for these projects.

The analysis conducted in this supplemental EA identifies minor, temporary, and short term adverse impacts from using alternate substrate. There is a net beneficial impact from this proposed action that will contribute to the restoration of oyster populations and overall ecology of the Chesapeake Bay.

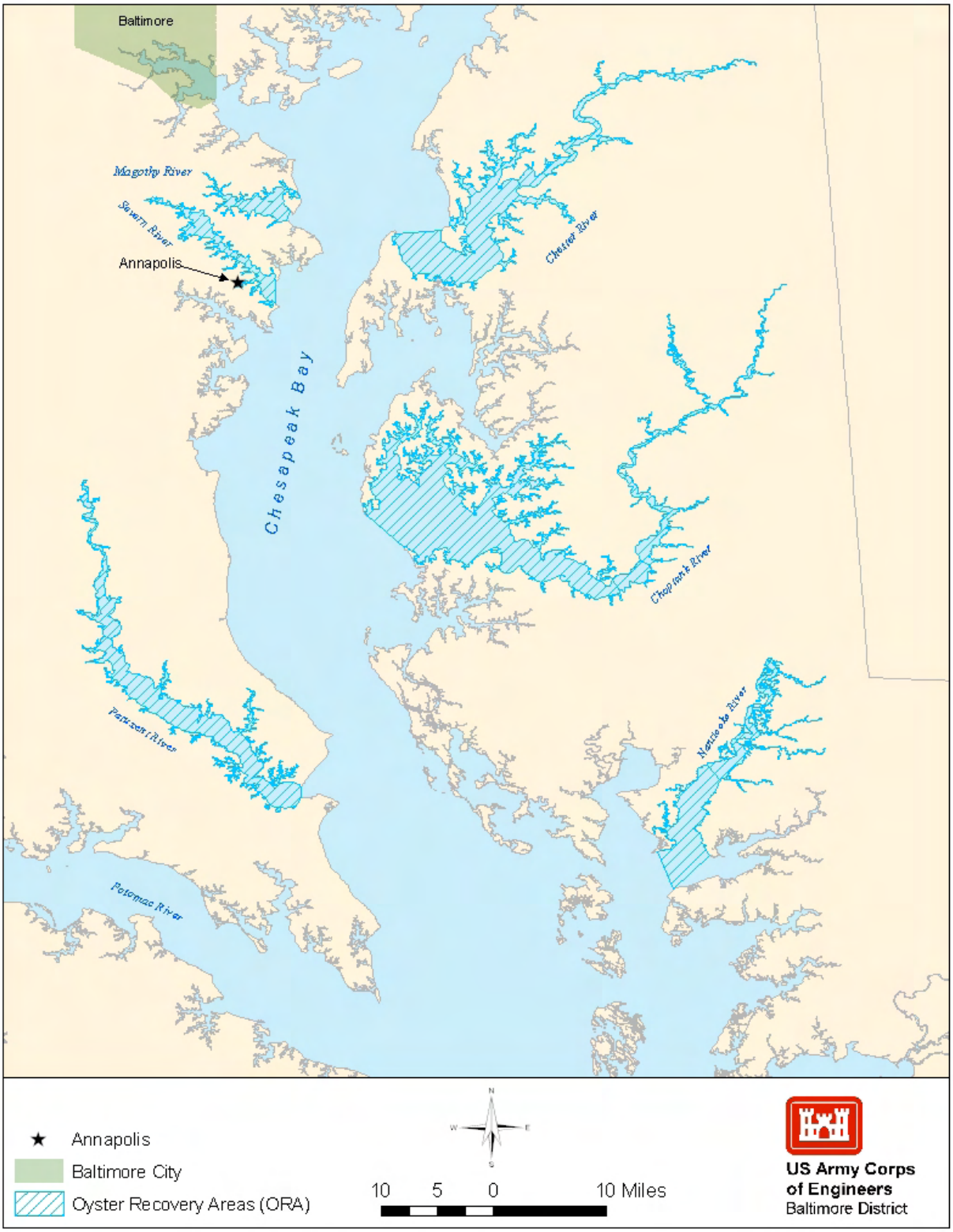
TABLE OF CONTENTS

1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Baltimore District (USACE) is preparing this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA). The EA addresses the use of alternate (non-oyster shell) substrate in Maryland waters as part of the USACE Chesapeake Bay Oyster Recovery Project. The overall purpose of the proposed alternate substrate project is to enhance eastern or American oyster (*Crassostrea virginica)* propagation efforts in the Chesapeake Bay and its tidal tributaries, specifically the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers, in Maryland, by seeding native oysters on alternate substrate within natural oyster bars (NOBs). All previous oyster restoration efforts by USACE have been limited to the use of clean oyster shell as substrate which has become increasingly unavailable due to overharvesting and disease. This work, similar to all previous oyster restoration efforts by USACE in the Maryland portion of the Bay and its tributaries, aids in the rehabilitation of oyster bar habitat and the re-establishment of an abundant and self-sustaining oyster population. These efforts support the Chesapeake Bay Program (CBP) 2000 Agreement and 2005 Oyster Management Plan (OMP) prepared by the Environmental Protection Agency (EPA).

In 1996, USACE completed a report, the *Chesapeake Bay Oyster Recovery Project*, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MD DNR). This supplemental EA for alternate substrate is consistent with the goal and authority of this recovery project which provides the bar and reef development material upon which to construct future bars and reefs. Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. The 1996 EA proposed the following: creation of new oyster bars and rehabilitation of existing non-productive bars; construction of seed bars for production and collection of seed oysters or spat; planting of hatchery produced and seed bar spat on new and rehabilitated bars; and monitoring of implemented projects. Areas addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (Figure 1). A supplemental EA was prepared in 1999 to include the construction of seed bars in the Eastern Bay area. Additionally another supplemental EA was prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration in order to continue construction activities. Appendix F contains cover pages and authorization letters for these oyster decision documents.

Figure 1. Chesapeake Bay Oyster Recovery Areas



All previous oyster restoration efforts by USACE in these areas have been limited to the use of clean oyster shell as substrate. In order for USACE to construct and cost share oyster bar and reef restoration using alternate substrate, as was authorized by the Water Resources Development Act (WRDA) of 2007, USACE is undertaking the preparation of this EA. Construction using alternate substrate rather than oyster shell is targeted to begin in spring/summer 2009 and continue annually thereafter subject to the availability of program funds. Potential alternate substrate for construction includes (but is not limited to) clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls).

On August 13 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) and issued a permit to MD DNR to use alternate materials to construct oyster sanctuaries and harvest reserves (Permit #CENAB-OP-RMN (MD DNR/Alternate Material) 2007-03659-M24) (Appendix E). The proposed action of this EA is the USACE-led equivalent of the permitted MD DNR action.

1.1 Authority

This project is authorized under Section 704(b) of WRDA 1986, as amended by Section 505 of WRDA 1996, Section 342 of WRDA 2000, Section 113 of the Energy and Water Development Appropriations Act (EWDA) of 2002, and Section 5021 of WRDA 2007. Section 505 of WRDA 1996 increased the authorization limit from $5 million to $7 million. Section 342 of WRDA 2000 further increased the project authorization limit to $20 million, as well as provided guidance on allowable project activities. Section 113 of the EWDA further modified the authorization to permit the non-Federal interest to provide its share, including the provision of suitable shell stock, as in-kind services, and permits USACE to consider such services provided on or after October 1, 2000. The authorization for the program is codified at 33 U.S.C. 2263, entitled ‘Study of Corps Capability to Conserve Fish and Wildlife’. One of the provisions of WRDA 2007 provides the USACE with authority to construct restore and rehabilitate habitat for fish, including native oysters, in the Chesapeake Bay and its tributaries in Maryland and Virginia, and to evaluate and use appropriate alternative substrate material for these projects.

1.2 Study Area

The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland and specifically on the designated ORA’s of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (Figure 1) which is the same project area established in the 1996 document. The plantings of alternate material would take place on NOB’s in the Chesapeake Bay.

1.3 Recent and Proposed Federal Actions Affecting the Study Area

The Chesapeake Bay Oyster Recovery Project has been performed in two phases: Phase I was conducted in 1996-2000 and Phase II activities were beyond 2000. A 2002 decision document

entitled *Chesapeake Bay Oyster Recovery Project, Maryland* completed by USACE initiated Phase II construction beyond 2000. This document provided the basis to amend the project cooperation agreement (PCA) to extend the duration of construction activities and increased the project cost to $6.7 million. As in Phase I, MD DNR was the local sponsor. The activities implemented in Phase II projects were identical to those implemented under Phase I. Of the six areas authorized in Phase I, Phase II activities were limited to the Chester, Choptank, and Patuxent Rivers. The areas excluded for Phase II construction were judged to not have suitable substrate and environmental conditions. Phase II activities have resulted in the construction of 250 acres in the Chester, Choptank, and Patuxent Rivers between 2001 and 2008.

The original Phase I project was described in the C*hesapeake Bay Oyster Recovery Project, MD* report prepared by the Baltimore District in May 1996. The 1996 report covered construction activities and potential environmental impacts for the four-year period of 1997 through 2000. The report addressed alternatives, risk management, and included an EA and FONSI that were fully coordinated with the public and resource agencies. The 1996 report and EA recommended hatchery upgrades, seed bar construction, seed bar harvests and replanting, new bar construction, planting of hatchery-produced seed, and planting disease-resistant strains of native oyster in various locations in the Bay. This report evaluated actions in six ORAs: Chester, Choptank, Severn, Magothy, Nanticoke, and Patuxent Rivers plus the construction of seed bars near James Island and Smith Island in the lower portion of the Chesapeake Bay in Maryland. The Smith Island, James Island and the Eastern Bay (1999 EA) areas are not ORA's but are suitable for the growing of oysters to be used as seed oysters at ORAs.

Although evaluated as an alternative, the 1996 recommended plan did not include the use of alternate materials for bar construction other than the use of dredged material in geotextile tubes. At the time, the construction of oyster bars and reefs through the use of concrete and other materials was being addressed by the Maryland Artificial Reef Program and the CBP, and was therefore not included in further USACE projects. Phase I project construction activities through 2000 resulted in the creation of 99 acres of new bars at a cost of $3.3 million. The construction was carried out in the Choptank, Magothy, Patuxent, Chester, and Severn Rivers.

A supplemental EA *Construction of Seed Bars in Eastern Bay as part of Chesapeake Bay Oyster Recovery Project, MD* was completed by USACE-Baltimore in 1999. The 1999 report evaluated seed bar construction in Eastern Bay, the use of dredged material in geotextile tubes as an alternate substrate, and planting of hatchery seed. The use of dredged material for oyster restoration was determined to be infeasible due to time and funding constraints. Additionally, due to hatchery seed limitations at the time, the construction of seed bars in Eastern Bay was deemed to provide a better source of seed for restoration activities.

Additionally, the non-profit group, Oyster Recovery Partnership (created in 1994) works with experts in their respective fields and management agencies including National Oceanic and Atmospheric Agency (NOAA), USACE, and MD DNR to coordinate oyster restoration efforts among state and federal governmental agencies, scientists, watermen and conservation organizations. Experts include scientists from the University of Maryland Center for Environmental Science (UMCES) environmental organizations like the Chesapeake Bay Foundation and Maryland watermen. Since 1994, the Maryland Oyster partners have planted

more than 1.6 billion oysters on 1,100 acres, a majority of which are permanently protected and managed. Production output has increased from 15 million oysters per year, to a record 525 million, disease-free, spat on shell in 2008 https://www.oysterrecovery.org/.

Baywide funds contributed by Maryland, Virginia and Federal government agencies such as the NOAA, USACE, and others, to support in-water restoration of the native oyster population and recovery of the fishery throughout the Chesapeake Bay totaled approximately $17 million for sanctuaries and $41 million for harvest areas from 1994 through 2006 (USACE, 2008). The current high rate of loss of oyster habitat from overharvesting and disease is estimated at 2,600 acres per year (USACE, 2008). This high rate of loss combined with the disappearance of sources of oyster shell for enhancing habitat are generally recognized as major obstacles to all oyster restoration efforts. As implemented to date, management programs have produced no substantial increase in oyster harvests over the past decade. The likelihood of attaining the Chesapeake 2000 goal of a standing oyster population that is 10 times greater than the 1994 baseline by the year 2010 appears small (USACE, 2008).

Currently, the USACE, Baltimore and Norfolk Districts are jointly preparing a Native Oyster Restoration Master Plan (NORMP) that will be instrumental in large scale oyster restoration for the entire Bay. Maryland and Virginia historically have managed oysters in their respective portions of the Bay separately, using a combination of harvest restrictions, size limits, habitat enhancement, and planting of seed oysters to support the oyster fishery.

In addition to the development of the NORMP, each state continues to have separate programs for restoration in their respective portions of the Chesapeake Bay. Over the next three years, MD DNR plans on implementing recommendations made by the Oyster Advisory Commission (OAC) report. This report was released in 2009 and includes investing in training and infrastructure to encourage aquaculture, undergoing oyster bar rehabilitation, reopening the Piney Point Hatchery for seed production, and investing in cameras to monitor oyster sanctuaries to deter poaching. The Virginia Marine Resources Commission (VMRC) plans on implementing recommendations made by the Blue Ribbon Oyster panel report which was released in 2007 including the creation of larger oyster sanctuaries, rotating oyster bars for harvesting, and developing a commercial fishery for cownose rays which are a predator of oysters. NOAA was recently appropriated $4.6 million dollars for Fiscal Year (FY) 2009 for MD and VA oyster restoration activities; specific activities to be carried out by NOAA with this funding are still being determined.

2.0 PURPOSE AND NEED

NEPA requires the preparers of an EA to develop specific definitions of the purpose and need of a proposed action so that reasonable alternatives can be formulated for objective and consistent analysis and evaluation.

2.1 Purpose

The purpose of the project is to evaluate the use of alternate substrate to restore oyster habitat and to increase populations of the eastern oyster in the Chesapeake Bay. In addition to having economic value as a commercial fishery, oysters provide significant environmental benefits. Oysters are a keystone species in the Chesapeake Bay, serving both water quality and habitat functions. There is no substitute for a thriving oyster community in the Bay. The oysters filter the water, play an important role in sediment and nutrient removal, and provide a hard structure that serves as habitat for not only future oyster generations, but also a variety of fish and benthic species, including economically important species such as juvenile striped bass and blue crabs. It is anticipated that restoring functioning oyster bars and reefs would provide habitat and water quality improvements, at least locally, that will promote a healthy estuarine system.

Oyster restoration is a significant component of current efforts to restore the Chesapeake Bay ecosystem. The proposed project supports objectives of CBP and the Maryland Oyster Roundtable. The project is also consistent with the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* of 1994 and other USACE oyster restoration projects and reports.

The Maryland OAC released a 2008 Legislative Report that recommended a multi-faceted strategy for restoring the Chesapeake's native oyster population and specifically highlighted the need to identify new sources of substrate:

> "*Increasing and diversifying sources of disease free oyster seed and identifying new sources of substrate to meet future ecologic and economic needs.*"

2.2 Need

A need exists to restore the ecological role of oysters in the Bay that would restore lost functions such as sediment and nutrient removal.

The oyster was historically found in extensive bars and reefs many acres in size throughout its range in the Chesapeake Bay watershed. These bars and reefs covered an estimated 200,000 to 400,000 acres prior to harvesting by European settlers. Today, oyster stock is estimated to be just one percent of its historical abundance. The current estimate of oyster bar and reef area in the Bay is 20,000 acres, and remaining bars and reefs are in very poor condition. It is estimated that 2,600 acres of habitat are degraded and lost per year (USACE, 2008).

2.3 Problem Identification

Oyster populations in Maryland have declined dramatically since the turn of the century, largely due to parasitic diseases, historic overharvesting, declining water quality, and the loss of habitat. Various decision documents USACE (1996, 1999, 2002) as discussed in previous sections, discuss these problems in detail. Extensive research confirming the decline of oyster populations in the Chesapeake Bay have been conducted by various agencies such as the Chesapeake Bay Program, NOAA, University of Maryland, and the National Research Council (NRC) and there are many reports supporting these conclusions such as the CBP (2007) *Chesapeake Bay 2006 Health and Restoration Report, Part One: Ecosystem Health;* Newell (1988) *Ecological Changes in Chesapeake Bay: Are they the Result of Overharvesting the Eastern Oyster;* NRC (2004) *Nonnative Oysters in the Chesapeake Bay;* Rothschild et al. (1994) *Decline of the Chesapeake Bay Oyster Population: a Century of Habitat Destruction and Overfishing;* and Smith et al. (2005) *Assessment of Recent Habitat Conditions on Crassostrea virginica bars in Mesohaline Chesapeake Bay.*

The main focus of the proposed action is to use alternate substrate to address habitat loss and subsequent scarcity of oyster shell for restoration activities.

2.3.1 Habitat Loss

Much of the historical range of oyster habitat has been lost, and total oyster habitat in the Maryland portion of the Bay has been estimated to be one percent or less of what it was in the late 1800s. Harvesting directly removes habitat by removing shell, culminating in a flattening and fragmenting of oyster bars. Flattening of bars places oysters lower in the water column exposing them to reduced currents, food availability, and oxygen. Increased sediment loads in the Chesapeake Bay from agricultural and urban runoff, and construction activities impact water quality and have adversely affected oyster habitat (CBP, 2005). Free-swimming oyster larvae attach to oyster shells or other hard substrate in a process known as "setting." Larval setting has been impaired as habitat has been reduced, fragmented, and dispersed. Siltation of oyster bars further reduces the amount of suitable habitat for larval setting and impairs the health of adult oysters.

2.3.2 Scarcity of Oyster Shell for Restoration

Programs to replenish or recondition hard bottom oyster substrate have been under way for more than 100 years. Numerous Federal, State, and Local entities have come together under a broad commitment agreement called Chesapeake 2000 (C2K) and set a goal to restore oysters 10-fold by 2010 (estimated to be approximately 10,000 acres). Recently, this goal has been refined to implementing oyster restoration practices on 2,466 acres of oyster bar and reef habitat between 2007 and 2010 (CBP, 2008). Following the C2K efforts, there was a sharp increase in the need for dredge shell; in fact, so much that the existing available sources are being rapidly depleted, and new sources or alternatives are being sought. In order to restore long-term goals of significant acreage and a sustainable population, many of the historic sites will need to be reshelled.

The oyster-shell dredging and planting program in Maryland began in 1960. Buried shells were dredged, washed, and transported to productive oyster bars, where they were planted with oyster spat. Due to stakeholder concerns regarding shell dredging practices altering the bottom substrate, thereby impacting other fisheries and creating sediment plumes, the shell-dredging program ceased in 2006 (USACE, 2008). The MD DNR has investigated alternative means of enhancing substrate suitable for oysters. One alternative is shell reclamation. This involves retrieving previously planted shell that has been reburied due to siltation. Another management technique, seed-area plantings, involves planting shell located in areas of high salinity where large spat sets are most likely to occur, and the resulting spat are moved to areas of lower salinity to attempt to protect them from disease (MSX and Dermo) that occur in the higher salinity waters.

Prior to significant degradation of the oyster population, oyster shell was readily available in the region and was used not only for restoration and repletion, but also for roadbed and driveways, and as crushed calcium sources, fertilizer additives, and chicken feed. As oyster populations collapsed in the past 50 years, not only have oyster shell resources become scarce, but the collapse in itself has resulted in a greater need for shell for restoration. Numerous Federal, State, and Local entities committed to the Chesapeake 2000 goal of restoring oysters 10-fold by 2010 which equates to more than 10,000 acres at 10,000 to 100,000 bushels of dredged oyster shell per acre. Although this goal has bee recently refined to 2,466 acres between 2007 and 2010, the original goal speaks to the scale of restoration that needs to be met to restore a long-term sustainable oyster population.

In recent decades, clean oyster shell for restoration was available from shucking houses and restaurants, but the primary source has been dredged fossil oyster shell deposits. Fossil shell deposits had been dredged from the northern Bay tributaries at levels that have reached approximately 2 to 3 million bushels in any given year (E. Campbell, MD DNR, personal communication February 17, 2009). However, many of the shell deposits fall within traditional fishery management protection zones because they are seasonally important spawning or nursery grounds for anadromous and other commercially important fish species. Dredging fossils shell produces turbidity and sediment-related impact issues on water quality and habitat. Recently, there have been concerns with the environmental impacts of dredging, specifically to spawning and nursery grounds of commercially important fish species. As a result, the dredging of fossil shell deposits was discontinued in Maryland in 2006. Fossil oyster shell had constituted approximately 95 percent of the substrate placed for oyster restoration since 1986 (MD DNR, Chris Judy, email dated Feb 6, 2009). Without the ability to dredge fossil shell, oyster restoration using clean oyster shell has come to a halt. Restaurants and shucking houses do not currently produce the volumes necessary to restore the desired acres of oyster beds. MD DNR plans to submit a permit to dredge fossil shell in limited areas.

3.0 EXISTING CONDITIONS

As allowed by 40 CFR 1508 information from previous Baltimore District and Norfolk District reports are incorporated by reference. Appendix F contains the cover pages and approval letters (FONSI or Record of Decision) for the following documents incorporated by reference in the report:

Chesapeake Bay Oyster Recovery Project Report January 1996.

Environmental Assessment for the Construction of Seed Bars in Eastern Bay as Part of the Chesapeake Bay Oyster Recovery Project, July 1999.

Decision Document Chesapeake Bay Oyster Recovery Project, Maryland; dated May 2002.

Programmatic Environmental Impact Statements for Oyster restoration in Chesapeake Bay Including the Use of a native and/or Nonnative dated October 2008.

The project sites are open water with hard shell bottom, portions of which have been previously dredged for over 40 years for oyster restoration efforts. The plantings of alternate material could take place on NOBs in the Chesapeake Bay within the ORAs of the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers.

3.1 Physical Environment

3.1.1 Physiography and Topography

The Chesapeake Bay proper encompasses over 2,200 square miles. If tributaries are included, this area becomes approximately 4,400 square miles. Nineteen principal rivers and 400 lesser creeks and streams are tributaries to the Bay (Lippson and Lippson 1984).

The Bay lies within the Atlantic Coastal Plain Physiographic Province. Coastal plain topography exhibits rolling hills and broad open valleys with streams that have flat slopes and shallow channels. The Chester, Choptank, and Nanticoke rivers are located on the Eastern Shore of Maryland. The Magothy, Severn, and Patuxent rivers are on the Western Shore of Maryland. The Patuxent River drains piedmont and coastal plain areas encompassing approximately one-tenth of the land area in Maryland. The estuarine reaches of the Patuxent River are narrow, and some reaches are enclosed by high banks. The Patuxent River is the deepest Maryland tributary to the Bay with depths over 130 feet, but it has sufficient shallow areas to support a large amount of oyster habitat.

The Chesapeake Bay is an estuary, which is defined as a semi-enclosed coastal body of water where the flow of freshwater mixes with high-salinity ocean water (White, 1989). Salinity increases from the head of the Bay and the head of each Bay tributary in a downstream direction to an average of about 15 parts per thousand (ppt) in the mid-Bay. Salinity of ocean water averages 30 to 35 ppt. Salinity levels within the Bay vary widely, both seasonally and from year to year depending on the volume of flowing freshwater. The average depth of the mainstem of

the Bay is less than 30 feet, and the average depth of the entire system, including all tidewater tributaries, is 20 feet. The vast expanses of relatively shallow water in the Bay support a wide variety of bottom life. The tidal range of the Bay is about 3 feet at the mouth, gradually decreasing to 1 foot in the vicinity of Annapolis, from where it increases to approximately 2 feet at the head of the Bay.

3.1.2 Geology

The Chesapeake Bay lies within the Atlantic Coastal Plain Physiographic Province. The Coastal Plain consists of layers of sediment laid down in ancient marine, estuarine, and riverine environments tens of millions of years ago. These sedimentary deposits originated from changes in sea level over geologic time that allowed deposition of sediment when the area was flooded by ancient seas.

3.1.3 Soils

The aquatic substrate is firm sand, firm silt, mud and shells. The project sites are open water with hard shell bottom, portions of which have been previously dredged for over 40 years for oyster restoration efforts.

3.1.4 Prime and Unique Farmlands

Prime farmland is available land that provides the best combination of physical and chemical characteristics for producing crops. As the project would be constructed in open water, there are no prime or unique farmlands located within the project area.

3.1.5 Bathymetry

The mean depth of existing oyster habitat in Maryland's portion of the Bay is 13 feet, with a range of 6 feet to 30 feet (USACE, 2008).

3.1.6 Water Quality

The waters that flow into the Bay carry effluent from wastewater treatment plants and septic systems serving a population of 18 million people, and nutrients, sediment, and toxic substances from a variety of anthropogenic sources, such as agricultural lands, industrial discharges, automobile emissions, and power generating facilities. Five major rivers contribute 90 percent of the freshwater delivered to the Bay: Susquehanna, Potomac, Rappahannock, James, and York (USACE, 2008).

Hypoxic waters generally occur in the Bay during the summer of each year in deep areas of the mainstem and at the mouths of the major tributaries. From 1985 to 2006, during the period June through September, on average 1.44 percent of the volume of the mainstem was anoxic, and 5.25 percent was hypoxic (CBP, 2007). Water quality data gathered between 2004 and 2006 indicate that only about 33 percent of the Bay's tidal waters met standards for dissolved oxygen (DO). DO levels are the concentrations established by regulatory agencies as appropriate for biota that

occupy different habitats in the Bay, including open water, deep water, and deep channel during the months of June through September (http://www.chesapeakebay.net/do.htm).

Impaired water quality in the Bay is linked to nutrient over-enrichment and high concentrations of suspended sediment. Forest clearing, agricultural practices, and urban development contribute large amounts of nutrients and sediment that are transported to the Bay by its tributaries. Increased algal growth (from nutrient over-enrichment) and sediment runoff also contribute to reducing water clarity in Chesapeake Bay.

Water clarity is usually low in the upper Bay (above 39ºN latitude). The lower Bay generally has the clearest waters. Water clarity is also low in most of the tributaries. Recent CBP data show a trend toward decreasing water clarity in many tributaries, including the Patuxent, Potomac, York, James, and Choptank rivers, the smaller tributaries of the lower eastern shore of Maryland, Tangier Sound, and the mainstem of the Bay. Only 7 percent of the Bay's waters had acceptable water clarity in 2006 relative to water clarity goals established by the CBP (http://www.chesapeakebay.net).

3.1.7 Climate

The project area has a continental type of climate with four well-defined seasons. The coldest months are January and February with temperatures averaging about 30 degrees Fahrenheit. The warmest month is July with temperatures averaging in the upper 80's (°F). Annual precipitation ranges from 40 to 44 inches, distributed fairly evenly throughout the year. The greatest rainfall intensities occur in summer and early fall, the season for severe thunderstorms and part of the hurricane season while winter low pressure systems moving up the Atlantic Coast cause most of the precipitation during the cold months. Snowfall occurs on about eleven days per year on the average, but snow accumulations of one inch or greater happen only about six days annually.

The prevailing winds are southerly from May through September and west-northwesterly to northwesterly during the rest of the year. Hurricanes, blizzards, and tornadoes are infrequent.

Climate and subsequent changes in salinity affect the distribution and intensity of MSX and Dermo. Due to the inflow of freshwater to the Bay and decreased salinity, disease is generally less virulent in years of high rainfall.

3.1.8 Air Quality

The six air pollutants commonly found throughout the United States are ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide and lead. These pollutants can injure health, harm the environment, and damage property. The EPA calls these air pollutants "criteria pollutants". According to the Maryland Department of the Environment (MDE), all of Maryland is in attainment for four of the six criteria pollutants. The D.C. metropolitan area which includes Prince George's County and Baltimore County, Maryland, are designated as a serious ground level ozone non-attainment area by the EPA, as well as being in nonattainment for particulates (PM 2.5). Non-attainment areas are designated regions where air pollution levels do not meet National Ambient Air Quality Standards (MDE website).

Additionally the principal pollutants from atmospheric deposition that affect the Chesapeake Bay are nitrogen oxides (NOX) and chemical contaminants. Some of the NOX deposited in the Bay is converted into a form that is useable by algae, thereby increasing nutrient enrichment that contributes to causing anoxic conditions in the Bay. The CBP estimates that a quarter of the total nitrogen load to the Bay comes from atmospheric deposition; 75 percent of that load is deposited on land and later transported to the Bay by surface water runoff and groundwater flow. The remaining 25 percent is deposited directly into the Bay. NOX emissions in the watershed have increased by 3.5 million tons since 1970, and this trend is likely to continue in the immediate future as the population increases within the Bay's watershed.

3.1.9 Wild and Scenic Rivers & American Heritage Rivers

Maryland's Scenic and Wild Rivers Act of 1968 recognizes specific rivers as significant environmental resources for the State. The Act directs the MD DNR Secretary to "provide for wise management...and preservation" of the land resources as well as the scenic and wild qualities of these rivers. The Patuxent and Severn are two rivers located within the project area that are designated as State scenic rivers as stipulated in the 1968 Maryland Scenic and Wild Rivers Act.

A river designated as an American Heritage River by EPA enables local communities to receive Federal assistance to restore and protect their rivers. There are no EPA designated American Heritage Rivers located within the project area.

3.2 Biological Resources

3.2.1 Submerged Aquatic Vegetation

The Virginia Institute of Marine Science (VIMS) conducts annual aerial surveys of submerged aquatic vegetation (SAV) in the Bay. SAV has been documented in the tributaries where the designated ORA's are located. However, due to the associated water depths, SAV does not usually occur within oyster bars (SAV is typically not found in areas greater than 6 feet deep depending on water clarity).

3.2.2 Wetlands and Wetland Vegetation

There are no wetlands in the vicinity of the project footprint.

3.2.3 Upland Vegetation

There are no uplands in the vicinity of the project footprint.

3.3 Animal Resources

3.3.1 Benthic Macroinvertebrates

Benthic communities play a central role in the transfer of materials from the water column to higher levels in the food web. Much of the productivity of fisheries in Chesapeake Bay is linked directly to the benthos through feeding (Virnstein 1977; Holland et al. 1988; Diaz and Schaffner 1990).

The variety and density of benthic organisms generally increase with increasing salinity in the Bay. Tidal freshwater habitats are numerically dominated by tubeworms and insect larvae, and the Asian clam (*Corbicula fluminea*). Mesohaline (5 to 18 ppt) regions exhibit high densities of bivalves (e.g., clams, oysters), except where low oxygen conditions prevail; segmented worms (i.e., polychaete annelids), small crustacea, and suspension-feeding bivalves (*Rangia cuneata, Macoma* spp.) dominate these areas. Suspension feeding polychaetes and tunicates are important contributors to biomass in high-salinity environments.

Human activities have increased the volume of sediment and nutrients that enter the Bay and have contributed to altering the Bay from one dominated by benthic production and SAV to one heavily influenced by pelagic (water column) processes (mainly phytoplankton production). In 2006, 59 percent of the Bay's benthic habitat was considered degraded according to the Benthic Index of Biotic Integrity (B-IBI) (CBP, 2007). The percentage of habitat classified as degraded in 2006 was substantially greater than the values for 2004 and 2005, probably as a result of prolonged persistence of low DO during 2006 (USACE, 2008).

Oyster habitat is a unique feature of Bay benthic habitats. The bars and reefs themselves provide hard structure used by a diversity of macroinvertebrates and fish. As it settles, sediment covers oyster bars and reefs and other hard-bottom substrate that oysters need to settle on; most of the historical oyster shell substrate in Chesapeake Bay is now covered with sediment consequently, which may limit future increases in oyster abundance. Most suitable substrate occurs within areas where the MD DNR has planted shell recently; however, planted shell becomes covered with sediment after an average of 5.5 years in the Bay (Smith et al. 2005). Excessive sediment loads delivered by increased runoff bury shell faster than current oyster populations can create new shell, resulting in a severe and continuing decline in habitat suitable for oysters.

3.3.1.1 Eastern Oysters

The Eastern oyster was once so abundant in Chesapeake Bay that it inspired the Algonquin to name the bay Chesepiook, meaning "great shellfish bay." The eastern oyster occurs subtidally throughout the Bay, mostly in water depths ranging from 6 to 30 feet. Oysters tolerate a wide range of salinities from 5 to 30 ppt, although salinities must remain at or above 9 ppt for successful reproduction. Oyster bars and reefs are formed by the continual attachment of individual oysters. The Eastern oyster is a keystone species that provides a variety of ecological services within the Chesapeake Bay ecosystem including improved water clarity via filter feeding, and oyster bar and reef habitat for fish and other species in the Bay.

Oysters can affect other organisms by changing the physical and chemical environment of the Bay ecosystem. Oysters filter water while feeding, thereby removing sediment and other particles from the water and depositing it on the bottom in pellets called pseudo-feces. Filtration by large numbers of oysters can reduce the time that sediment remains suspended in the water column and increase the clarity of the filtered water. Oysters' pseudo-feces are rich in nutrients and, therefore, help to support primary production among bottom-dwelling organisms in areas immediately surrounding oyster bars and reefs. Local nutrient enrichment also stimulates the exchange of various forms of nitrogen and nitrogen compounds from one part of the system to another (Newell et al. 2002). In addition to filtering suspended particles, large populations of oysters create bars and reefs of accumulated shell that are unique among kinds of habitat in Chesapeake Bay. Successive generations of oysters growing on the shells of previous generations gradually accrete large, three-dimensional structures that can compensate for sedimentation, if the rate of growth of the oyster bar or reef exceeds the rate of sedimentation.

The elevated structure of an oyster bar provides habitat for oyster spat, barnacles, mussels, hydroids, nudibranchs, and algae. These communities support blue crabs (*Callinectes sapidus*) and finfish, such as oyster toadfish (*Opsanus tau*), naked goby (*Gobiosoma bosci*), striped blenny (*Chasmodes bosquianus*), Atlantic croaker (*Micropogonias undulatus*), summer flounder (*Paralichthys dentatus*), striped bass (*Morone saxitilis*), white perch (*Morone americana*), and spotted sea trout (*Cynoscion nebulosus*).

In addition to its ecological functions, the Eastern oyster provides an important commercial fishery. Commercial landings of oysters in Chesapeake Bay declined steadily during the late 19th and early 20th centuries. Major factors believed to have contributed to that decline include intense fishing pressure, mechanical destruction of habitat, siltation of optimal substrate, and stock over fishing (Rothschild et al. 1994). Dredging for oysters began to degrade the physical integrity of centuries-old bars and reefs (DeAlteris 1988) by breaking off shell and oysters that were too small to harvest, thereby reducing the population and the habitat available for future production and harvest. Declining water quality also contributed to reducing the oyster population.

The Bay's oyster population is now estimated to be less than 1 percent of its size during the 1800s (Newell 1988). The more recent decline in the population has been attributed primarily to the introduction of two foreign diseases to which the Eastern oyster had no resistance: Dermo and MSX. Oysters infected with Dermo, generally live only two or three years, and oysters infected with MSX generally die within one year. High mortality rates caused by these diseases not only remove oysters potentially available for harvest, but also reduce the number of large, highly reproductive oysters that are left to propagate. Overall, oyster populations in the Bay are now strongly controlled by disease pressure (Ford and Tripp 1996) in addition to being negatively affected by harvest, degraded oyster habitat, poor water quality, and complex interactions among these factors (Hargis 1999; NRC 2004).

3.3.1.2 Clams

Oyster bars or reefs provide valuable habitat for many organisms such as clams which are important food items for higher order prey. Suspension-feeding bivalves, such as clams,

dominate the soft-bottom benthic community in mesohaline regions of Chesapeake Bay (Holland et al. 1987). Two key species of bivalves considered to be representative of the soft-bottom benthic community are the hard clam and the Baltic clam. These two species occupy different salinity regimes covering the range of salinities in which oysters occur (hard clams are found predominantly in higher salinities and Baltic clams in lower salinities), and both are filter-feeding infauna (i.e., species that live completely or mostly buried within the bottom sediment). Commercially important species within the project area include the softshell clam (*Mya arenaria*). The soft-shell clam is a bivalve mollusk found over a wide range of bottom types, but prefers substrate with mixes of fine sand and silt. Clams are harvested in subtidal areas ranging in depth from 6 to 20 feet. Clam dredging is restricted within 150 feet of legal oyster bars.

The major potential mechanisms for these species to interact with oysters are through competition for food and space. Competition for space could occur on a local scale if an increase in oyster population causes an expansion of hard-bottom habitat over existing soft-bottom habitat. Increased competition between clams and oysters for food could result in a reduction in the abundance of infaunal bivalves.

3.3.2 Blue crab

Oyster bars and reefs provide valuable habitat for many organisms, including the blue crab which is a commercially important species in the Bay. The blue crab is an important predator of bivalves, such as young oysters, in the Bay as well. The blue crab occupies a variety of aquatic habitats ranging from the mouth of the Bay to fresher rivers and creeks and occupies different trophic levels during various stages of its life cycle. Throughout the year, crabs may burrow into the bottom, shed and mate in shallow waters and beds of SAV, or swim freely in open water.

Both juvenile and adult blue crabs forage on the bottom and hibernate there through the winter. During spring, blue crabs migrate from the southern part of the Chesapeake to tidal rivers and northern portions of the Bay. During the rest of the year, adult blue crabs are dispersed throughout the Bay.

Although adult oysters are too large for blue crabs to open and prey upon (White and Wilson 1996), crabs feed readily and opportunistically on juvenile oysters (Eggleston, 1990). Oysters attain a partial refuge from predation at low densities (Eggleston, 1990), but predation by blue crabs might increase with increasing oyster abundance. Mobile predators such as the blue crab produce strong direct effects of predation and disturbance on the benthic communities in Chesapeake Bay (Hines et al. 1990). Changes in the community structure and population density of predators and of prey species resulting from complex interactions with introduced species usually have cascading trophic effects that alter the entire structure of an ecosystem, as documented for the Hudson River estuary (Strayer et al. 1999) and San Francisco Bay (Carlton et al. 1990). An increase in the oyster population could increase the food supply for blue crabs. An increase in the abundance of SAV resulting from increased filtration by oysters could enhance the blue crab population by providing more refuge for juvenile crabs.

Annual commercial harvests of blue crabs from Chesapeake Bay since 2004 have been approximately 60 million pounds, which is well below the 73-million-pound annual average for

the period 1968 to 2004 (CBP 2007). This is attributed to low exploitable stock abundance and restrictive harvest management measures enacted in 2001 and 2002. In 2006, the abundance of adult crabs was about 57 percent of the CBP's interim restoration goal of 232 million crabs (CBP 2007).

3.3.3 Fish

Approximately 267 species of fish can be found in the Chesapeake Bay (White 1989). The fishes of the Bay are either resident or migratory. Migratory fish fall into two categories: (1) anadromous fish, which spawn in the Bay or its tributaries, and (2) catadromous fish, which spawn in the ocean. Anadromous fish migrate varying distances to spawn in freshwater. Striped bass spawn in the tidal freshwater areas of the Bay and major tributaries; younger fish remain in the Bay to feed while many adults migrate to ocean waters after spawning. Shad and herring are truly anadromous, traveling from the ocean to freshwater to spawn and returning to the ocean to feed. Eels are the only catadromous species in Chesapeake Bay. Other migratory fish use the Bay strictly for feeding. Some species, like croaker, drum, menhaden, weakfish, and spot, journey into the Bay while still in their larval stage to take advantage of the rich supply of food. Bluefish generally enter the Bay as juveniles or adults (USACE, 2008).

Fish in the Bay can also be categorized as planktivorous, reef-oriented, or piscivorous. Planktivorous fish are a key part of the food web in Chesapeake Bay. They consume plankton, and are preyed upon by larger fishes such as striped bass and bluefish (piscivores). The larval and early juvenile stages of all fish species in the Bay feed on plankton; however, bay anchovy and menhaden are the only two major species in Chesapeake Bay that feed primarily on plankton throughout their life cycles. Because oysters also feed on some types of phytoplankton, and phytoplankton serve as a food source for zooplankton, the mechanism of interaction between oysters and planktivorous fishes would be through the food chain. The primary mechanism of interaction between oysters and planktivorous fish would be the potential to compete for food.

Oyster bars provide habitat for several species of fish (reef-oriented), many of which are important in commercial and recreational fisheries. The naked goby resides on oyster bars throughout its juvenile and adult lifestages (Breitburg 1991) and is considered an exclusively reef-dwelling species. Black sea bass (*Centropristis striata*), which is considered to be a temperate reef fish, is found seasonally on oyster bars and other hard substrate and structures in the middle and lower Bay during warm months. Although black sea bass generally migrate to ocean waters during the winter, they are reef dependent for a significant portion of each year. A third category of reef-oriented fish includes species that use a variety of habitats but frequent hard-bottom habitat, such as oyster bars; the Atlantic croaker is an example of such reef-aggregating species. These three species, naked goby, black sea bass, and Atlantic croaker, represent the suite of species that orient to and may be affected by changes in the availability of oyster-reef habitat.

3.3.4 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Section 305(b)(2)) requires that essential fish habitat (EFH) areas be identified for each fishery management plan and that all

Federal agencies consult with National Marine Fisheries Service (NMFS) on all Federal actions that might adversely affect EFH. Under the Magnuson-Stevens Act each Federal agency is required to prepare an EFH Assessment for all proposed actions that occur within coastal waters of the United States.

The 1996 amendments to the Magnuson-Stevens Fishery Act strengthened the ability of NMFS to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans." Essential fish habitat is defined in 50 Code of Federal Regulations (CFR) part 600 as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.

After consultation with John Nichols, NMFS, Maryland Habitat Office, (personal communication Feb 12, 2009) it was determined that some areas of the Bay under consideration for alternate substrate for oyster restoration as part of this project placement lie within the general area that may provide EFH for some of the species managed by NMFS. Species of concern are: Summer flounder, Windowpane flounder (*Scopthalmus aquosus*), Bluefish (*Pomatomus saltatrix*)**,** Cobia (*Rachycentron canadum*), Red drum (*Sciaenops ocellatus*), King mackerel (*Scomberomorus cavalla*), and Spanish mackerel (*Scomberomorus maculates*). Due to specific habitat needs, it is unlikely that cobia, king mackerel, Spanish mackerel, or windowpane flounder would be in the project area (Murdy et al., 1994). Windowpane flounder prefers sandy substrates which would be avoided for this project. As a result, the EFH analysis focused on bluefish, summer flounder, and red drum. The EFH assessment was prepared and is located in Appendix B. Coordination regarding EFH is ongoing with NMFS.

3.3.5 Avifauna

The Chesapeake Bay is located along the Atlantic flyway, which channels the annual seasonal flights of millions of migratory waterfowl to the Bay. The shallow waters and wetlands of the Bay and its temperate climate offer a fertile and diverse environment for waterfowl. Four categories of waterfowl inhabit Chesapeake Bay: dabbling ducks, diving ducks, geese, and swans. All four kinds depend on agricultural areas, bay bottom, and wetlands for food and nesting habitat. Black ducks (*Anas rubripes*) depend upon the condition of the bottom of the bays and wetlands in which they feed. Diving ducks such as canvasbacks (*Aythya valisineria*) depend totally on aquatic habitats throughout their life cycle. They feed on plants and animals in wetlands and shallow benthic habitats.

Numerous avian species in the Chesapeake Bay watershed use benthic species as a primary food source such as the American oystercatcher (*Haematopus palliates*), black duck, and canvasback. These waterfowl may feed on or around oyster bars. The primary mechanism of interaction between oysters and these benthic-feeding birds is indirect, through changes in the kinds and distribution of benthic invertebrates that could result from competition with oysters for food and habitat.

Oystercatchers were once hunted almost to extinction but are now conspicuous shorebirds found throughout the Chesapeake Bay region. Oystercatchers at times consume oysters by using their brightly colored bills to open the shells of bivalves. Several studies have shown that a decrease in

shellfish stocks negatively affects the oystercatcher population (Goss-Custard et al. 2003; Atkinson et al. 2003; Tuckwell and Nol 1997). The primary mechanism of interaction for oystercatchers is direct, through a change in the availability of oysters as a food source. A secondary mechanism of interaction could be through competition between oysters and other shellfish, which could shift the prey-suite for oystercatchers. Many avian piscivore species use the abundant fish populations of Chesapeake Bay as their primary food sources. Two of the species documented best in the literature are the bald eagle (*Haliaeetus leucocephalus*) and the North American osprey (*Pandion haliaetus*).

3.3.6 Mammals

Numerous mammals inhabit the Bay watershed. Many piscivorous mammals inhabit the shores and waters of Chesapeake Bay such as the raccoon (*Procyon lotor*) and river otter (*Lontra Canadensis*). The raccoon is an omnivorous nocturnal mammal that prefers to inhabit trees near streams, springs, or rivers. The river otter spends most of its life in the rivers, marshy ponds, and wooded riparian areas of the Chesapeake and its tributaries. Although these mammals do not feed directly on oysters to any significant extent, a change in oyster populations could affect them indirectly through competition between oysters and planktivorous fish, which are food for piscivorous mammals.

3.3.7 Rare, Threatened, and Endangered Species

Species of plants and animals that have been designated as rare, threatened, or endangered (RTE) are protected under Federal and State regulations. The Endangered Species Act (ESA) of 1973 (16 USC 1531-1543) regulates activities affecting plants and animals classified as endangered or threatened, as well as the designated critical habitat of such species.

A few of the federally listed species of marine turtles may occur within project areas. Several species of turtles, including the threatened loggerhead turtle (*Caretta caretta*), the endangered Kemp's ridley turtle (*Lepidochelys kempiz*), and the endangered leatherback turtle (*Dermochelys coriacea*), occasionally move into the central and upper Chesapeake Bay during warm weather months. Additionally the Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*) may occur in the project area. An email was received from Ms. Julie Crocker, NFMS, dated March 12, 2009, which concurred with USACE (marine turtles, and Atlantic sturgeon may occur in the project area). Coordination with Dr. Roland Limpert, MD DNR (personal communication February 24, 2009) indicated that at this time, there are no State listed RTE species within the project site under the agency's purview. A letter was received from USFWS dated February 10, 2009 indicating that no RTE under their purview are expected in the project area.

3.4 Community Settings

3.4.1 Land Use

The watershed of the Chesapeake includes parts of New York, Pennsylvania, West Virginia, Delaware, Maryland, and Virginia, and the entire District of Columbia. Before European settlement, forests covered about 95 percent of the Chesapeake Bay watershed. Now, forests are concentrated in the Appalachian region of Pennsylvania and West Virginia and account for only 60 percent of the total land area in the watershed. Agricultural land is most common in the coastal lowlands north and east of the Bay and accounts for 28 percent of the total land area of the watershed. Developed lands and wetlands each account for about 3 percent to 4 percent of the total land area; the remaining 5 percent is open water and other land uses.

3.4.2 Recreation

The hospitable climate and abundant natural resources of the Chesapeake Bay make it a heavily utilized area for recreation. Hunting, camping, swimming, boating, waterskiing, and crabbing are major attractions. Sportfishing is another major recreational activity in the Chesapeake. The Chesapeake Bay provides one of the primary focal points for tourism in Maryland and tourism attracted almost 28 million people to Maryland in 2005. Those visitors spent more than $10 billion on accommodations, services, and attractions throughout the state (MD Tourism Development Board 2006). Boating on Chesapeake Bay is a popular recreational activity and an important component of the economy of Maryland. Approximately 209,500 boats are registered in Maryland (MD Sea Grant 2004). In 2000, recreational boating contributed approximately 1.6 billion dollars in revenue for Maryland and supported 28,200 jobs in the state (MD Sea Grant 2004). Fish species supported by oyster communities are key elements in providing recreational opportunities.

3.4.3 Cultural and Historic Resources

The project, as a Federal undertaking, falls within the review requirements of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR, Part 800. These regulations require the agency to identify, evaluate and mitigate impacts to National Register eligible or listed cultural resources prior to project initiation, in consultation with the appropriate State Historic Preservation Officer (SHPO), and at times, the Advisory Council on Historic Preservation (ACHP).

Coordination with the Maryland Historical Trust (MHT) (the SHPO) occurred at the inception of the Chesapeake Bay Oyster Recovery Project in 1996. MHT indicated areas that should be avoided due to known or suspected historical resources. Subsequent shell placement activities have been conducted since 1997 and have avoided those areas MHT identified in the project area. There have been no adverse impacts on historical resources thus far. The alternate substrate project has the same footprint, as it is part of the Chesapeake Bay Oyster Recovery Project.

Follow up coordination to notify MHT of the change in substrate ensued on December 22, 2008 (Public Notice was issued) and USACE received a letter from Maryland Department of Planning on January 8, 2009 stating that MHT was forwarded a copy of the Public Notice by the State Clearinghouse which requested that if MHT (among other agencies) had comments they were to inform USACE directly by February 4, 2009; USACE received no comments from MHT at this time.

3.4.4 Hazardous, Toxic, and Radioactive Waste

In order to plan specific sites for project activities, a listing of Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and Resource Conservation Recovery Information System (RCRIS) sites within the project area were generated by the Baltimore District for the 1996 Decision Document.

3.4.5 Socioeconomic Conditions

According to the most recent census (2000) the population of Maryland is 5,618,344. Eight-four percent of the population are high school graduates and 31 percent are college graduates. Also the average income for Maryland is $25,614 http://quickfacts.census.gov/qfd/states/24000.html. Table 3-1 summarizes additional population statistics of Maryland.

Table 3-1. Summary of Population Statistics

Percent	Parameter
30	African American
0.3	Native American
5	Asian
24.2	Under 18

The Eastern oyster is highly valued as a source of food, a symbol of heritage, an economic resource supporting families and businesses, and a contributor to the health of the Chesapeake Bay ecosystem. Harvesting, selling, and eating oysters has historically been a central component and driver of social and economic development in the region. From the colonial period to the 20th century, oyster harvests supported a vibrant regional industry, which in turn supported secondary industries, fishing communities, and a culinary culture centered on the bivalve.

Oysters are an economic resource that supports unique communities and an industry that is an important component of the region's heritage and identity. Within these communities, oysters are a source of income for families of watermen and those employed in the processing of oysters (e.g., shuckers); they support multigenerational businesses and contribute to a regional economy.

The seafood industry contributes approximately $400 million each year (State of MD 2006) to Maryland's total gross domestic product of $257.8 billion (http://www.bea.gov/regional/gsp/). In 2005, commercial fisheries landings (i.e., the weight, number and/or value of a species of seafood caught and delivered to a port) alone earned $63,669,831 million in the state of Maryland (NMFS, 2006). Direct users include watermen, oyster growers, and oyster processors, packagers, shippers, and retailers.

More than 6,600 watermen work Chesapeake Bay, providing seafood to 74 seafood processing plants in Maryland; these plants employ more than 1,300 people (MD Seafood 2005). These jobs represent an assortment of positions including day laborers, sales representatives, managers, maintenance workers, delivery personnel, and others. The sector relies on immigrant workers, particularly in oyster and crab processing facilities (Kirkley 2005).

In Maryland, most oysters are harvested from public grounds during the winter (depending on the kind of equipment used, a designated time frame between October and March; MD DNR 2006). During the 1990s, more than 96 percent of the oyster harvest in Maryland came from public beds. Although oystering earns watermen much less money than they earn from crabbing during the spring and summer, dredging or tonging for oysters during fall and winter enables them to continue to earn a small income, providing a financial safety valve for watermen and their families (NRC 2004).

In Maryland, anyone seeking to harvest oysters must first obtain an Oyster Harvesting License (OHL) or a Tidal Fish License (TFL), which allows the holder to harvest a range of commercially valuable, marine species in the Bay. To qualify to harvest oysters in any particular year, holders of an OHL or TFL must pay an annual oyster surcharge, which currently costs $300. In any given year, many TFL holders elect not to fish for oysters; consequently, the number of oyster surcharges purchased by OHL and TFL holders is the best indicator of the number of Maryland harvesters active in the fishery during a year. In 2001, more than 1,000 watermen in Maryland paid the oyster surcharge. That same year, these harvesters earned an estimated $5,300 per license (either OHL or TFL) (NRC 2004). In 2004, only 284 watermen in Maryland paid the oyster surcharge (MD DNR 2006).

Aquaculture operations are equally diverse and can include growers singly engaged in oyster aquaculture, wild harvesters who also grow oysters, and processors engaged in aquaculture to serve their shucking needs. A small number of active growers operate in Maryland. Intensive aquaculture of native oysters can be undertaken in several different ways to serve a variety of markets. Historically, oyster grow-out operations involved moving wild seed to privately leased ground (Murray and Oesterling 2006). Due to increased rates of disease and mortality, this type of aquaculture is rarely practiced today. Intensive native aquaculture is conducted in contained racks, floats, or bags either on-bottom or off-bottom. Growers' dependence on oysters varies with the size and nature of their operation, the degree to which they are diversified or vertically integrated, and the markets they target. A significant number of growers are employed in oyster aquaculture part-time.

Despite the effects of severely reduced harvest levels, oysters in Chesapeake Bay remain important culturally and economically at the regional, community, at the regional, community, and household levels.

3.4.6 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order (E.O.) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The

E.O. requires Federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

As defined by the "Final Guidance for Addressing Environmental Justice Under NEPA" (CEQ, 1997), "minority" includes persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, black (not of Hispanic origin) or Hispanic. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a Census tract with 20 percent or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 percent or more below the poverty level (Census Bureau, 1995). Only two areas in the project area have poverty levels above the State average of 8.3 percent: Kent County has a poverty level of 12.7 percent and Dorchester County has a poverty level of 13.7 percent.

Based on recent survey work by the University of Maryland, no low-income or minority populations appear to be significantly involved in harvesting oysters in the Bay. Historically, significant numbers of African-Americans were employed in shucking houses, but today most shuckers are immigrant Hispanic workers. Most employment in the oyster industry today consists of harvesters, growers, and processors (including buyers); harvesters are the largest group. Although minorities participate in these activities, none dominate. Harvesters' incomes generally fall in the middle to lower-middle levels, and growers' and processors' into somewhat higher levels. Additionally there is no evidence of significant Native American involvement in oystering or the oyster industry in the Bay (UMD, 2008).

3.4.7 Visual and Aesthetic Resources

The Chesapeake Bay's diverse landscape has long been revered for its scenic beauty. The western shore of Chesapeake Bay in Maryland, from the Susquehanna River to the Potomac River, has comparatively high topographic relief, sandy beaches, and actively eroding coastal bluffs. Vegetation ranges from uplands dominated by oak and loblolly pine to bald cypress swamps and freshwater marshlands in the region's series of smaller tributaries. Low topographic relief, irregular shoreline, and offshore islands characterize the eastern shore of Chesapeake Bay and provide a unique aesthetic appeal. Areas of open water and extensive wetlands with tall marsh grasses, shrubs, and trees characterize much of the middle and lower eastern shore. Hummock-and-hollow microtopography (upland mounds surrounded by lowlands) is predominant in the near-shore habitats in this region.

In addition to the Chesapeake's natural beauty, the traditional waterfront communities are of particular aesthetic value. The historic watermen's communities along the Chesapeake's western and eastern shores offer an aesthetic charm and have contributed greatly to tourist-based industries in these areas. Traditional workboats operating in these areas bring aesthetic appeal to the region as well as cultural value. Notably, Maryland's historic skipjack fleet has become a visual symbol of the state and has received attention as the nation's last sail-powered, commercial fishing fleet.

3.4.8 Public Health and Safety

Contamination of oysters and other shellfish with bacteria and viruses has been associated with sewage discharges, septic leaching, and stormwater runoff. Oyster harvest is restricted in various areas by MDE for public health reasons, including areas with excessive coliform bacteria counts, and setbacks from marinas and municipal discharges. Consumption of oysters infected with MSX or Dermo does not affect humans.

3.4.9 Noise

Excess noise levels are not only annoying, but may cause adverse health effects in humans and disrupt wildlife behaviors. For purposes of regulation, noise is measured in dBA or A-weighted decibels. This unit uses a logarithmic scale and weights sound frequencies. Individuals with good hearing perceive a change in sound of 3 dB as just noticeable, a change of 5 dB as clearly noticeable and 10 dB is perceived as doubling (or halving) of the sound level. The threshold of human hearing is 0 dBA. Values above 85-90 dBA would be considered very loud (Table 2.1) and have the potential to harm hearing given sufficient exposure time. Noise levels above 140 dBA can cause damage to hearing after a single exposure. The proposed project area can be generally classified as urban with moderate noise levels. Ambient noise levels through the proposed project area include noise related to traffic along business/commercial roadways, public gatherings, and passive recreational activities (walking and bicycle riding). These activities can vary widely in the amount of noise produced, but according to the League for the Hard of Hearing (LHH), background noise levels are about 40 dBA on a quiet residential street. A typical maximum permitted sound level in rural and suburban areas is 55 dBA.

Table 2-1. Typical Noise Levels and Subjective Impressions

Source	Decibel Level (dBA)	Subjective Impression
Normal Breathing	30	Threshold of hearing
Soft Whisper	30	--
Library	40	Quiet
Normal conversation	60	--
Television Audio	70	Moderately loud
Ringing Telephone	80	--
Snowmobile	100	Very Loud
Shouting in Ear	110	--
Thunder	120	Pain Threshold

While the background noise level for residents within the vicinity of the project area might typically be 40 dBA, a resident may also hear acute noise sources, particularly in the daytime, associated with suburban neighborhoods such as a power mower, which will generate 65-95 dBA at 50 ft or a leafblower (110 dBA at 50 ft). Freeway traffic is in the range of 70 dBA at 50 ft, although large trucks may typically generate 90 dBA (LHH 2006). Sensitive noise receptors in the vicinity include, residents living near the water.

3.5 Executive Orders

3.5.1 Children's Protection Executive Order Compliance

On April 23, 1997, President Clinton issued Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." Under this Executive Order, Federal agencies are required to make it a high priority to identify and assess environmental health risks and safety risks resulting from its policies, programs, activities, and standards that my disproportionately affect children.

> *"A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks…Therefore, …each Federal agency: (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." (Executive Order 13045, April 21, 1997).*

In Maryland 24.2 percent of the population are less than 18 years of age. Children are not expected to be in the vicinity of the proposed project area because it is open water.

3.5.2 Floodplain Protection Executive Order Compliance

On May 24, 1977, President Carter issued Executive Order 11988 "Floodplain Management". This E.O. requires Federal agencies to provide leadership and take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

The project area is not in a floodplain area as it is located in open water.

4.0 ALTERNATIVES ANALYSIS

As discussed previously, habitat is a limiting factor for oyster populations. Phase I and Phase II construction activities were limited to restoration of oyster bars using clean oyster shell. With the discontinuation of dredging fossil shell in 2006 and the scarcity of oyster shell from shucking houses and restaurants, the remaining substrate option available to restore the hard substrate required for oyster habitat and enable oyster bed restoration is the use of alternate substrate.

The purpose of this EA is to evaluate the use of alternate substrate to restore oyster beds as was recently authorized by WRDA 2007.

4.1 Alternatives Considered

Alternative 1 No action alternative: The continuation of currently approved Chesapeake Bay Oyster Recovery Project activities (pending availability of clean shell).

Under this alternative, approved *Chesapeake Bay Oyster Recovery Project* restoration activities would continue with the use of clean oyster shell for oyster bar restoration which has limited availability. This alternative could also use fossilized oyster shell to the extent that it is available. However, in recent years fossilized shell has become less available because of concerns for the fishery habitat value of fossilized oyster shellbeds.

New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of natural oyster bars (NOBs) depending on availability of clean oyster shell. Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 2 Rehabilitate shell from existing oyster bars that are covered with sediment.

This alternative would involve locating and then rehabbing shell from existing NOBs that are currently covered by sediment. Rehabbing occurs when oyster dredges are used to pull up the shell, allowing the sediment to be washed off of the surface. The oyster shell is then replaced on the bar. This activity would occur in the targeted tributaries within the boundaries of NOBs using this shell resource. Once clean of sediment, bars could receive additional substrate to increase their elevation in the water column. Also, depending upon location and availability of seed, new bars could be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 3 Reclaim buried shell that has been previously placed through repletion programs or to restore oyster bars.

This alternative would involve locating and then dredging shell that has been placed in the past to restore oyster bars or provide seed bars through repletion programs. Millions of bushels of fresh and dredged fossil oyster shell have been placed since the 1960s in order to restore oyster

habitat and provide seed bars. The shell may be currently buried under sediment or may be clean shell that was placed in areas no longer receiving productive spat sets. New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of NOBs using this shell resource. Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set.

Alternative 4 (Proposed Action) Use alternate substrate for the restoration and rehabilitation of oyster bars within the boundaries of NOBs.

New bars could be constructed and existing bars enhanced in the targeted tributaries within the boundaries of NOBs using (but not limited to) any of the following alternate substrate: clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Bars would be constructed in flat and mounded morphologies. Depending upon location and availability of seed, new bars would be planted with hatchery-produced seed, with natural seed, or could remain unseeded to receive a natural set. Further, advances in technology and research may identify new substrate that could be used for the construction of oyster bars and reefs once approved by state and federal resource agencies.

4.2 Ecosystem Benefits

The following ecological functions are provided by oyster bars and reefs:

1. enhanced recruitment, growth, and survival of oyster populations
2. water filtration and regulation of water column phytoplankton dynamics
3. enhanced nitrogen (N) cycling between the benthic and pelagic system components
4. enhanced phosphorus (P) burial in sediments
5. nursery and predation refuge habitat for a diverse community of invertebrates and small fishes
6. foraging habitat for transient piscivorous and benthivorous fishes

(Rodney and Paynter, 2006; Newell, et al. 2004)

Oysters can affect other organisms by changing the physical and chemical environment of the Bay ecosystem. Oysters filter water while feeding, thereby removing sediment and other particles from the water and depositing it on the bottom in pellets called pseudo-feces. Filtration by large numbers of oysters can reduce the time that sediment remains suspended in the water column and increase the clarity of the filtered water. Oysters' pseudo-feces are rich in nutrients and, therefore, help to support primary production among bottom-dwelling organisms in areas immediately surrounding oyster bars and reefs. Local nutrient enrichment also stimulates the exchange of various forms of nitrogen and nitrogen compounds from one part of the system to another (Newell et al. 2002).

A study by Rodney and Paynter (2006) investigated the community supported by restored oyster bars and reefs. Total macrofaunal (animals visible to the naked eye) abundance (free living macrofauna plus fouling (sessile) organisms) was an order of magnitude higher on restored bars and reefs compared to unrestored bars and reefs, free living macrofauna were twice as abundant on restored bars and reefs and fouling organisms were two orders of magnitude more abundant. Epifaunal organism densities were on average 3 times higher in restored bars and reefs. Demersal (dwelling at or near the bottom) fish density was four times higher in restored plots. They found an average of 14.9 species on restored bars and reefs versus 12 on unrestored bars and reefs. Restored bar and reef plots supported a higher level of secondary production. Many of the organisms that were significantly more abundant on restored bars and reefs are also known to be important food items for several commercially and recreationally important finfish species. Additionally, Peterson et al. (2003) determined that $10m^2$ of restored oyster bars and reefs in southeast United States would likely yield an additional 2.6 kg/yr of production of fish and large mobile crustaceans over the functional lifetime of a bar or reef.

With respect to the nutrient sequestration ability of oyster bars and reefs, Newell et al. (2004) evaluated the potential of increased oyster populations to remove nitrogen (N) and phosphorus (P) in the Choptank River. Seasonal N and P removal of current oyster densities in summer in Choptank River is approximately 5 percent N and approximately 34 percent P (based on hydrochemical modeling performed by the study). An increase in oyster density to $10/m^2$ would increase N removal to approximately 50 percent and P removal to approximately 340 percent. On an annual basis, removal of N and P by current oyster stocks is 0.6 percent and 8 percent, respectively. On a restored bar or reef with 10 oysters per meter squared expected annual removal increases to 6 percent N and 80 percent P. This work determined that the value of the Choptank River oyster stock to remove 13,080 kg N per year is $314,836 which sums to $3.1 million over the lifetime of the oysters.

4.3 Evaluation of Alternatives

Alternative 1 No action/continuation of current Chesapeake Bay Oyster Recovery Project activities

Although, oyster shell is the preferred material for providing hard substrate for oyster bar restoration, it has become extremely scarce. In recent decades, clean oyster shell for restoration was available from shucking houses and restaurants, but the primary source has been dredged fossil oyster shell deposits. As discussed in Section 2.3.2, the dredging of fossil oyster shell was discontinued in 2006 due to concerns over the environmental impact to important spawning or nursery grounds for anadromous and other commercially important fish species. MD DNR plans to request a permit to dredge fossil shell in limited areas, but as of now the action is not authorized. Currently, the need for oyster shell for restoration greatly exceeds the amount of available shell. This alternative would provide for a very limited extent of oyster bar restoration, likely only a few acres per year. This assumes that USACE can obtain a great portion of the available clean oyster shell from restaurants and oyster shucking houses. Currently a significant portion of available shucking house shell in Maryland is bought by MD DNR and used in their hatchery to produce oysters. Since 1986, on average only 5 percent of the substrate placed for restoration has been clean shell from restaurants and shucking houses (MD DNR, Chris Judy,

email Feb 6, 2009). If all the available shell (obtained from restaraunts and shucking houses) were devoted to restoration, it is estimated that roughly 500 to 600 acres of habitat could be restored based on available shell resources (MD DNR, Chris Judy, email Feb 6, 2009). The shell however, would not all be available to USACE as there are many groups involved with oyster restoration that would be competing for the limited resource of clean oyster shell. Furthermore this would not leave shell for the hatchery to use to produce oysters. Since it is also estimated that 2600 acres of oyster habitat are lost each year in the Chesapeake Bay due to sediment and poor water quality, and lack of recruitment (USACE, 2008), this action alone will not result in a net benefit of increasing oyster habitat within the Bay. This alternative would provide the benefits discussed in Section 4.2, but on a limited scale. The alternative would not meet the objectives of the project due to its inability to restore significant acres of oyster bars and reefs and is therefore not considered acceptable. This alternative would contribute very minimally to Chesapeake 2000 goals of restoring significant oyster bar habitat in the Chesapeake Bay.

Alternative 2 Rehabilitate shell from existing oyster bars that are covered with sediment.

The MD DNR currently funds watermen to recover shell from existing oyster bars that have been buried by sediment. It is projected that 1000 acres can be reclaimed on an annual basis with given funding levels. Given that 2600 acres of oyster habitat are lost each year in the Chesapeake Bay due to sediment and poor water quality, and lack of recruitment (USACE, 2008) this action alone will not result in a net benefit of increasing oyster habitat within the Bay. Any bars restored by cleaning the sediment from the shell would provide the environmental benefits discussed in Section 4.2 however, there would be negative impacts associated with the recovery of the shell. Cleaning the sediment from the shell would result in a temporary increase in turbidity to the water column. Resources such as SAV would be negatively impacted by the sediment disturbed by the dredging. It is likely this activity would be restricted in areas near SAV resources. The release of nutrients into the water column from disturbed sediments could also be significant and would need to be assessed.

Alternative 3 Reclaim buried shell that has been previously placed through repletion programs or to restore oyster bars.

At this time, this alternative is not a permitted action within the State of Maryland. Therefore, it is not viewed as feasible at this time. However, MD DNR has recently submitted a permit that would enable them to recover historically placed shell. This alternative could recover vast amounts of shell that have been placed since the 1960s, which could substantially contribute to restoring significant oyster habitat acreage. Any bars restored using reclaimed shell would provide the environmental benefits discussed in Section 4.2, however, there would be negative impacts associated with the recovery of the shell. Recovering buried shell would result in a temporary increase in turbidity (that moves out of oyster habitat area) to the water column. Resources such as SAV would be negatively impacted by the sediment disturbed by the dredging. It is likely this activity would be restricted in areas near SAV resources. The release of nutrients into the water column from disturbed sediments could also be significant and would need to be assessed.

Alternative 4 Use alternate substrate for the restoration and rehabilitation of oyster bars within the boundaries of NOBs.

Table 4-1 provides a summary of potential alternate substrate, their costs, and availability, as well as a performance rating that was assigned based on completed scientific research and professional experience of restoration practitioners.

Table 4-1. Costs, Performance, and Availability of Alternate Substrate

Substrate	Delivered Cost per cy	Estimated Performance Rating***	Available
Dredged Oyster Shell	$15**	High	Not available
"Shucked" Oyster shell	$25*	High	Low
Hard Clam	$21*	Low	High
Surf Clam Shell	$15*	Low	High
Stone (gabion 2-7")	$26*	Medium	Moderate
Crushed Concrete (2-8")	$45**	High	Intermittent
Marl (marine limestone)	$50*	High	High
Slag	$23*	Undetermined	Moderate
Reef balls	$60*	High	High

Source: *NOAA alternative substrate website: http://chesapeakebay.noaa.gov/alternativesubstrates.aspx; **MD DNR;***USACE

Field trials to date have shown that free-swimming oyster larvae (in both a natural and hatchery setting) will settle on virtually all hard substrate tested or available. Significant differences exist, however, in the setting density and subsequent survival of those oyster spat. This apparently results from the significant differences in surface area of the various substrates, both of the individual pieces, and of the interstitial space between piles or layers of the material. Monitoring also suggests that the refuge provided by the irregular surfaces and pore spaces of certain materials (natural oyster shell, stone, crushed concrete, and marl) provide better predation protection than those materials that eventually align themselves such that surface area and crevices are minimized (clam shell and surf clam shell).

One benefit alternate substrate may provide over oyster shell is that burrowing organisms (e.g., oyster drills, etc) which predate on oysters may not be able or desire to burrow into the more dense and thicker alternate substrate. Therefore, there may be a reduction in burrowing organisms that have detrimental effects on oysters. Alternatively, some alternative substrates such as clam shell do not provide interstitial space comparable to natural oyster shell bars and reefs. The interstices within substrate provide oysters with increased surface area on which to set and protection from predation. When choosing an appropriate alternate substrate, interstitial

space provided by any given substrate is a significant consideration. If substrates such as clam shell that become consolidated and do not provide sufficient interstitial space are chosen for construction, a veneer of oyster shell and living oyster shell should be placed on top to provide good bar or reef structure.

Although no conclusive research program has evaluated the performance and benefits of all potential alternate substrate, there are multiple study results available that support the successful use of alternate substrate. Limestone has been used since the 1990s in Louisiana to catch oyster spat and has performed exceptionally well likely due to its calcium content. Although oyster larvae will set upon a variety of hard surface, calcium carbonate (or perhaps simply calcium) seems to be an important component of an effective substrate to attract larval sets (Hidu et al., 1975; Sonia et al., 1990). A concrete modular reef deployed subtidally in the Rappahannock River in 2000 had extremely good success. The reef was sampled after being deployed for 4.5 years and held densities of 1,085 oysters/m^2 of river bottom amongst a diverse assemblage of benthic organisms. This is 1000 times the average density of oysters on existing unrestored oyster habitat. Additionally, the size structure of oysters indicated the presence of four year classes, with approximately half of all oysters more than two years old and therefore of reproductive age (Lipcius and Burke 2006).

4.4 Preferred Alternative

Based on the evaluations discussed in Section 4.3, the preferred alternative is Alternative 4- Use alternate substrate for the restoration and rehabilitation of oyster habitat within the boundaries of NOBs. This is the only alternative that is able to achieve project objectives due to the scarcity of clean oyster shell and the degraded quality of existing oyster habitat. With the discontinuation of dredging fossil oyster shell, enough clean oyster shell does not exist to restore any significant level of oyster habitat. No other alternative, alone, is currently able to produce a net increase of oyster habitat. Acreage restored using alternate substrate would achieve similar benefits to those discussed in Section 4.2. Selecting this alternative does not eliminate the use of oyster shell. It is anticipated that alternate substrates would be used in conjunction with any available oyster shell.

5.0 IMPACT EVALUATION

This section is an assessment of impacts from the recommended plan. This section presents *direct* and *indirect* impacts resulting from the project. Direct impacts are those that occur directly as a result of the project while indirect impacts would occur as a result of natural or other processes modifying the project or adjacent areas.

The original Phase I project was described in the C*hesapeake Bay Oyster Recovery Project, Maryland*, report prepared by the Baltimore District in May 1996. The 1996 report covered construction activities and potential environmental impacts for the four-year period of 1997 through 2000. The report addressed alternatives, risk management, and included an EA and FONSI that were fully coordinated with the public and resource agencies. The magnitudes of the direct or indirect impacts are also considered. *Insignificant* impacts are those impacts having little effect on the environment. Insignificant impacts range from *minor to moderate* and may be referred to as such throughout this document.

Further, the direct or indirect impacts are evaluated from the standpoint of whether they are *short-term or long-term*. Short-term or temporary effects would last only during the project construction period while long-term effects would persist for many years.

This section also investigates the *cumulative impacts* of the project. Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions.

Furthermore, it is the intent of this document to assess the impacts of the proposed concepts in the entire watershed, beyond the physical construction footprint of the recommended alternative or real estate easement area. Hazardous, toxic, and radioactive waste (HTRW), environmental, social and cultural impacts have all been addressed in the watershed context and not solely based on specific stream alignments or treatment strategies. Therefore, design changes to the recommended alternative, which may result from buildability, constructability, operability or value added engineering are considered to be covered under this document (provided resource agency coordination occurs) unless proven to be substantial.

5.1 Physical Environment

5.1.1 Physiography and Topography

Oyster bar creation/alternate substrate placement activities will increase the elevation of the existing substrate, but will not impact existing drainage patterns. Due to the limited size and extent of underwater activities, they are not expected to have any hydraulic impacts.

5.1.2 Geology

Historically, oyster bar and reef communities covered large portions of the Bay bottom and its tributaries. Proposed activities will restore a small portion of their historic range. No impacts to geology are expected.

5.1.3 Soils

To minimize the potential for siltation and burial of alternate substrate, substrate will be placed on firm bottoms of sand, shell, gravel. No impacts to soils are expected.

5.1.4 Prime and Unique Farmlands

Since no prime and unique farmlands are located within the project area, there will be no impacts to this resource.

5.1.5 Bathymetry

According to Eric Campbell of MD DNR, existing oyster habitat in the project area is normally 6 to 8 inches and placement of oyster shell/alternate substrate would bring the oyster habitat to no more than 1 foot in depth (with a minimum of 8 feet of clearance) (E. Campbell, MD DNR personal communication March 3, 2009). Alternate substrate will not be placed in depths of less than -8 feet. Bathymetry will be affected by project activities, but no adverse impacts are anticipated.

5.1.6 Water Quality

Only clean alternate substrate will be utilized for the project. A temporary minor detrimental impact to water quality is anticipated as a result of the proposed project. A temporary increase in turbidity within the water column is expected during placement of alternate material. However, long-term impacts to water quality as a result of the creation and restoration of oyster habitat using alternate substrate are expected to be positive due to the ability of oysters to filter water at a rate of about two gallons per hour per oyster. In abundance, oysters help clarify the water, which allows bay grasses to receive more sunlight. Then in turn, plentiful grasses increase oxygen levels, reduce wave energy and shoreline loss, and habitat for aquatic life.

5.1.7 Climate

There will be no impact to climate due to project implementation.

5.1.8 Air Quality

Because the project area is located in a non-attainment area for ozone and particulate matter, a conformity analysis was completed. The basic intent of the Federal Conformity Program is to ensure that all Federal actions comply with the requirements of the applicable State

Implementation Plan (SIP) and do not cause or contribute to a new violation of the National Ambient Air Quality Standards in non-attainment or maintenance areas.

Ozone is created at ground level by a chemical reaction between nitrogen oxides (NOx) and volatile organic compounds (VOCs). The annual emission rates for these criteria pollutants in a non-attainment area are 25 tons/year for NOx and 25 tons/year for VOCs.

The term "particulate matter" (PM) includes both solid particles and liquid droplets found in air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. These solid and liquid particles come in a wide range of sizes. Particles less than 10 micrometers in diameter tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter are referred to as "fine" particles. Sources of fine particles include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. On July 17 2006, EPA published a direct final rule (71 FR 40420) establishing a 100 tons per year (TPY) *de minimis* levels for PM2.5, SO2, NOx, and 50 TPY for VOCs.

Total emissions from project activities were estimated to demonstrate that they are below established emission rate thresholds for non-attainment areas. The estimates from project construction represent only 1 percent of the annual limit for NOx, and less than 1 percent of the annual limit for VOCs, SO2 and PM 2.5. Although construction activities would result in short-term, increased air emissions, these emissions would be less than the *de minimus* thresholds. Further details on air quality emissions are located in Appendix D. No major, long-term or adverse impacts are anticipated. Coordination with MDE regarding air quality is ongoing at this time.

5.1.9 Wild and Scenic Rivers

The project is expected to benefit the aquatic environment, and will not result in adverse impacts to the two State-designated scenic rivers (Patuxent and Severn).

5.2 Biological Resources

5.2.1 Submerged Aquatic Vegetation

SAV coverage from the years 2002 through 2006 (VIMS, 2009) were compared with NOB boundaries. Over the vast extent SAV and oyster habitat are separate or adjacent. SAV bed locations and densities fluctuate annually, and therefore there are some small areas, particularly in the Choptank and Severn Rivers where SAV and oyster habitat overlapped. No oyster habitat will be restored where SAV grows on oyster bars and reefs. No long-term adverse impacts are expected to SAV.

5.2.2 Wetlands and Wetland Vegetation

Since the project is not located on shallow water or on land, no impacts to wetlands or wetland vegetation are expected.

5.2.3 Upland Vegetation

Since the project is not located on shallow water or on land, no impacts to uplands or upland vegetation are expected.

5.3 Animal Resources

5.3.1 Benthic Macroinvertebrates

The proposed project is expected to result in beneficial impacts to benthic macroinvertebrates. Through the creation of new seed bars a portion of historic oyster habitat will be restored. Placement of alternate substrate and seeding activities will form an elevated bar/reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). Some of the benthic organisms will be impacted by the placement of alternate substrate. The benthic community will be altered in the placement areas; benthic organisms that prefer soft (mud) bottom will not benefit, however, there is much more available soft bottom habitat in the Bay and there is a shortage of hard bottom substrate. It is expected that benthic macroinvertebrates will colonize the alternate substrate shortly after placement.

Oysters can affect other organisms directly through biological mechanisms of interaction such as competition and predation. Oysters feed primarily on phytoplankton and may compete for food with other filter-feeding invertebrates (e.g., hard clams, *Mercenaria mercenaria*, and Baltic clams, *Macoma balthica*), planktivorous fish (i.e., fish that eat minute, free-floating plants and animals collectively called plankton), and zooplankton (i.e., minute aquatic invertebrate animals) (Kennedy et al. 1996; NRC 2004). The extent of such competition depends on the food preferences of the competing species; moreover, significant competition is likely to occur only when the concentration of phytoplankton in the water is low in relation to the number of consumers. Currently, competition for phytoplankton is believed to be minimal because oyster numbers are low compared with their historical abundance and because nutrient input and the resultant production of phytoplankton are high (Newell 1988). No long-term impacts to benthic macroinvertebrates are expected.

5.3.1.1 Eastern Oyster

The proposed project is expected to result in beneficial impacts to the Eastern oyster as portions of historic oyster habitat will be restored.

Placement of alternate substrate is expected to increase oyster populations. Consideration will be taken when designing bars and reefs with alternate substrate to ensure appropriate interstitial

space to protect oyster from predation and to mimic natural bar and reef structures as closely as possible. There are no anticipated adverse impacts.

5.3.1.2 Clams

The proposed project is expected to result in beneficial impacts to clams. Through the placement of alternate substrate a portion of historic oyster habitat will be restored, and will form an elevated bar/reef structure with greatly increased surface area for the attachment of clams. Some of the clams that prefer soft substrate will be covered, but, this type of habitat is plentiful throughout the bay. However the proposed areas are NOBs and are likely to have more hard than soft bottom. No long-term, adverse impacts to clams are expected.

5.3.2 Blue Crabs

The proposed project is expected to result in beneficial impacts to blue crabs. Through the placement of alternate substrate, elevated bar/reef structure will be formed which will provide shelter and good cover for crabs. Clams are important food items for blue crabs and epibenthic fish (Hines et al. 1990). Therefore, the potential for reduction in the abundance of infaunal bivalves due to an increase in the abundance of oysters is an indirect mechanism of interaction that could trigger a shift in the prey selections of crabs from clams to oysters. Blue Crabs are usually only able to prey on young oysters. There are no long-term, adverse impacts expected.

5.3.3 Fish

The proposed project has the potential to indirectly benefit fish, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, and improves water quality. The project will provide bar/reef structure that will provide shelter and cover for finfish. The three-dimensional habitat of an oyster bar results in a higher level of primary and secondary production than is produced inmost-other benthic substrate.

Alternate substrate placement activities may cause resuspension of sediments and generate turbidity which could potentially impact fish eggs, larvae, and juvenile stages. However, this impact would be temporary, minor, and confined to a limited area. Most project activities will occur in June and July, which is after the spawning season for most anadromous fish. In addition, most spawning occurs in shallow, low salinity areas, which would not be used as a part of this project.

An increase in the amount (area and volume) of oyster bars and reefs in Chesapeake Bay could directly affect the populations of some species of bar/reef-oriented fish and indirectly affect others through increases in the availability of prey items and valuable habitat associated with bars and reefs. For the bar/reef dependent species, an increase in the amount of available habitat and the resultant increase in food resources could affect the population size. For bar/reef aggregating species, a change in bar/reef habitat could change the food resources associated with the habitat and, thus, the size of the croaker population. For species that prefer soft bottom there will be some loss. However, since the proposed areas are NOBs, the surfaces are most likely

primarily hard substrate and therefore not primary habitat for these species. Therefore, the project is not expected to have an adverse impact on these species.

Additionally, a change in the oyster population (abundance and distribution) could influence planktivorous fish directly through competition for food, and piscivorous fish could be influenced by the associated change in the availability of their fish and non-fish prey. No long-term impacts, adverse impacts are expected.

5.3.4 Essential Fish Habitat

USACE, after reviewing fisheries information, has determined that the proposed action is not likely to significantly affect EFH or species covered under the Magnuson-Stevens Act and is more likely to benefit these protected species than to have an adverse effect on them. The full EFH assessment is in Appendix B. NMFS concurred with the EFH assessment and recommended the placement of some of the substrate as "mounds" to provide some vertical relief for EFH conservation. USACE will follow NMFS EFH conservation recommendation and will place substrate in a few locations that will bring the area to a height of 3 to 6 feet above soft bottom bay floor. The "mounds" will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat.

5.3.5 Avifauna

The proposed project has the potential to indirectly benefit avifauna as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species on which they predate. The mechanism of interaction between some avian piscivores species such as the bald eagle and North American osprey species is indirect: a change in the oyster population could cause changes in the populations of planktivorous fish (particularly menhaden) through competition for food, which could affect avian piscivores. No long-term, adverse impacts to avifauna are expected.

5.3.6 Rare, Threatened, and Endangered Species

The proposed project is not expected to jeopardize the continued existence or critical habitat of any RTE species. A USFWS letter received February 10, 2009, and a follow-up email from Mr. George Ruddy (USFWS) on February 12, 2009, states that they do not expect any adverse effects on RTE's. Coordination with NMFS (email from J. Crocker on March 12, 2009) confirmed that NMFS does not expect any impacts to RTE species under their purview.

5.3.7 Mammals

The proposed project has the potential to indirectly benefit mammals such as raccoons or otters as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species on which they predate. No long-term, adverse impacts are expected.

5.4 Community Setting

5.4.1 Land Use

Historically, oyster bar/reef communities covered large portions of the bottom of the Bay mainstem and its tributaries. Proposed activities will restore a small portion of their historic range. No detrimental or beneficial impacts are predicted for land use in the area as a result of the proposed work as the project is compatible with current land use. Additional shoreline development is not anticipated as a result of the project.

5.4.2 Recreation

It is expected that oyster habitat restored as a result of the proposed project will support blue crabs and various species of finfish. This will have a minor positive impact to blue crab and finfish populations, and therefore to recreational fisheries. Oyster bars and reefs are a desirable place to fish for some recreational boaters because of the habitat they provide. Consequently, there are expected to be some benefits for recreational fishermen. However, during construction there will be temporary adverse impacts on recreational fishing of finfish and shellfish, which will be temporarily disrupted by the work. However oystering is not permitted in the summer which is when alternate substrate for the project would be placed. During placement some recreational boaters may be displaced due to barge activity; impacts to recreational boaters will be short-term and temporary. The oyster bars and reefs will not have great enough heights to impact navigation routes; therefore, long-term, adverse impacts to recreational or commercial boaters are not expected.

5.4.3 Cultural and Historic Resources

Since the approval of the 1996 project, USACE and its restoration partners have been actively working within the identified area, placing shell and spat. The alternate substrate would be placed along the same footprint as outlined in the 1996 report. The placement of alternate substrate would be done in the same manner and within the same footprint as the previously approved project. No deviation to the footprint or manner of placement is proposed. This footprint and the activity of placing shell on top of this footprint was coordinated with MHT in 1996. Based upon coordination with MHT, site selection would be sensitive to the nature of submerged resources. Project sites would be selected to avoid submerged resources in areas that have been previously surveyed or would be in locations with a low potential for containing significant cultural resources. Because of the large areas for placement, sensitive areas have been easily avoided and would continue to be avoided; therefore it is unlikely that the alternate substrate placement would have any adverse impacts to 106 resources. However, USACE and MHT agreed that additional investigations could become necessary if sensitive areas are selected for oyster recovery actions with the potential to affect significant cultural resources.

Project activities will continue to avoid submerged resources in areas that have been previously surveyed or will be in locations with a low potential for containing significant cultural resources.

5.4.4 Hazardous, Toxic, and Radioactive Wastes

The proposed project is not expected to result in the use or production of hazardous materials. All alternate substrate chosen for oyster bar and reef restoration would be determined to be clean and environmentally suitable by previous studies. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Determination of project sites would include coordination with appropriate agencies and a review of historical data concerning potential contaminants. The project will avoid known CERCLIS and RCRIS sites. No significant levels of contaminants would be released into the water column. Further, any new substrate identified by advances in technology or research that could be used for the construction of oyster bars/reef would be required to be clean and free of toxics and would be approved by state and federal resource agencies prior to use.

5.4.5 Socioeconomic Conditions

The proposed project is expected to have slight, temporary adverse impacts on recreational and commercial fishing of finfish and shellfish, which will be temporarily disrupted by the work. However oystering is not permitted in the summer which is when alternate substrate for the project would be placed. Upon completion of the work, however, it is likely that shellfish and finfish will return to the project areas. As a result of previous oyster projects, oyster populations in the Chesapeake Bay have increased, benefiting watermen harvesting oysters. A minor temporary beneficial impact by providing employment for a marine contractor and a few employees will occur. No long-term adverse impacts on population or growth are expected.

5.4.6 Environmental Justice

Environmental justice is the protection of every person regardless of color, race, or income from negative health, environmental, and economic impacts from a Federal project http://www.epa.gov/compliance/environmentaljustice/index.html. The project is expected to comply with Executive Order 12989, dated February 11, 1994 (*Environmental Justice in Minority Populations and Low-Income Populations)*. Any change in the Bay's oyster population that affects water quality and habitat in the Bay will affect all residents of the Bay area, regardless of minority or economic status. To the extent that minorities or low-income individuals are involved in oystering or in other components of the oyster industry they would be positively affected by alternatives that result in increases in oyster populations or oyster-related businesses. The project is not expected to adversely impact any minority or low-income communities. The economic and environmental impacts of the recommended plan of using alternate substrate for oyster restoration are expected to be beneficial, so there would be no adverse impact, either short- or long-term, related to environmental justice for all persons.

5.4.7 Visual and Aesthetics Values

Transport vehicles, boats, and heavy equipment associated with the proposed project could be a temporary adverse impact to aesthetics of the area. The location of the substrate would occur under water, and it would not have a visual impact once the project is complete. No long-term adverse impacts are expected.

5.4.8 Public Health and Safety

The proposed project is not expected to impact human health. Determination of project locations avoid pollution sources and areas where shellfish harvest is restricted.

5.4.9 Noise

The proposed project will generate noise through the use of barges and tugboats to transport alternate substrates to project sites and the use of a water cannon. The dBA level for a tug is estimated to be 82 at 50 feet, a barge is 79 at 160 feet, and the water cannon is 72 at 50 feet (E. Price, UMD email on March 17, 2009). In addition, no work is expected to take place in close proximity to residences. Noise would be no greater than current oyster restoration project which is ongoing.

5.5 Additional Executive Orders

5.5.1 Children's Protection Executive Order Compliance 13045

No health or safety risks to children associated with the project have been identified. The types of activities associated with the project will not generate chemical constituents that may pose health risks to children. Additionally, because the project is located offshore, children will not have general access to construction areas located on site.

5.5.2 Floodplain Protection Executive Order Compliance 11988

No detrimental or beneficial impacts are predicted for flood heights and drift as a result of the proposed work. No detrimental or beneficial impacts are predicted for floodplain values as a result of the proposed work.

5.6 Cumulative Impacts

In regulations implementing the procedural provisions of NEPA (40 CFR 1500-1508), CEQ defines cumulative effects as follows:

"…the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions…" (40 CFR 1508.7)

The proposed action evaluated in this EA achieves the purpose as stated in Section 2.1; it would affect local (and possibly beyond local) habitat and water quality and promote a healthy estuarine system in the Chesapeake Bay. The CBP (www.chesapeakebay.net) addresses in detail all major "…past, present and reasonably foreseeable future actions…." that may affect the Chesapeake Bay which is summarized below. Since its inception in 1983, the CBP has documented the major problems facing the Chesapeake Bay and the actions needed to resolve those problems. An

overview of past, current and future stressors drawn from the CBP web page provides a context for addressing the cumulative effects of oyster restoration.

The major pollutants affecting the Bay are excess nutrients, which come from agriculture, urban/suburban runoff, vehicle emissions, and many other sources. Excess nutrients fuel the growth of algae blooms, which block sunlight that underwater grasses need to grow. When algae die, they are decomposed in a process that depletes the water of oxygen, which all aquatic animals need to survive. Other major stressors on the Bay include erosion, chemical contaminants, air pollution, and landscape changes. Natural factors can have a great direct influence on the Chesapeake Bay ecosystem and also on the magnitude and scope of the effects of human activities. Total river flow into the Bay can vary dramatically from year to year, causing large fluctuations in salinity that affect the Bay's biological communities and oysters in particular, dramatically. Droughts result in high salinity throughout much of the Bay, which contribute to the range expansion and increase in severity of diseases that affect the Eastern oyster population. In wet years, when precipitation is frequent and heavy, normally brackish regions of the Bay can become fresh and cause mortality of oysters and other animals and plants that cannot survive in fresh waters. Some scientists contend that extremes of precipitation will become more frequent in the future due to climate change. Climate change and variability have caused water temperatures in the Bay to exhibit greater extremes during the 20th century than during the previous 2,000 years. Sea-level rise related to climate change is contributing to the loss of vital coastal wetlands. The amounts of pollutants entering the Bay continue to exceed target levels established by the CBP to restore the Bay's water quality. The human population in the Bay watershed is now growing by about 130,000 residents annually. The cumulative impact of centuries of population growth (currently nearly 17 million) and landscape change has taken its toll.

Historical over-harvest compounded by the effects of poor water quality and disease has resulted in the current low abundance of oysters in the Bay. Excess suspended sediment is one of the largest contributors to the Bay's impaired water quality. The culprits are the tiny clay- and silt-sized fractions of sediment. These particles frequently are suspended in the water because of their size and can be carried long distances during storms. In excess, these smaller grains of sediment cloud the water, reducing the amount of sunlight that reaches submerged grasses. Without enough sunlight, these underwater grasses are not able to grow and provide habitat for young fish and blue crabs. The excess suspended sediment can carry chemical contaminants that may affect fish and other living things in the Bay, as well as humans and animals that swim in it. When it settles to the bottom, the excess sediment also covers and degrades hard-bottom habitat that is essential for the growth of the oyster population and the well being of other aquatic organisms that require that kind of habitat.

The use of alternate substrate would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster bar/reef acreage and could result in ecosystem changes that would counteract some of the cumulative effects of watershed development and pollutant loading to the Bay, on a local scale. It is expected that in conjunction with the use of alternate substrate, other oyster restoration activities would also continue by various groups including some amount of restoration using oyster shell (Alternative 1) and rehabilitating oyster habitat that has been covered by sediment (Alternative 2). However, without the use of alternate

substrate, it is extremely unlikely that significant acreage could be restored and long-term goals achieved.

Other restoration activities include the activities discussed in the *Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster* (Released October 17, 2008 by U.S. Army Corps of Engineers, Norfolk District). For this project the proposed actions include introducing a non-native species, *Crassostrea ariakensis*, and to continue efforts to restore the native Eastern oyster. Another project that is occurring is the development of the Native Oyster Restoration Management Plan (NORMP) by both the Baltimore and Norfolk Districts of USACE. The NORMP presents a plan for pursuing wide-scale oyster restoration throughout the Bay that complements other Bay-wide restoration efforts and future uses of Chesapeake Bay. The MD DNR has recently been permitted to conduct an alternate substrate restoration project (described in Section 1) which involves the placement of alternate substrates within Maryland charted oyster bars in the Chesapeake Bay. MD DNR will also be developing infrastructure and training for aquaculture, continuing bar rehabilitation, (1000 acres planned over the next three years), reopening Piney Point Hatchery to produce spat, and placing cameras to continuously monitor oyster sanctuaries to deter poaching. Additionally there is a bill now under consideration to permit non-private entities to lease the Maryland Bay bottom. It contains restrictions that would require leaseholders to submit a "use" plan and if there is no proof of use, the lease will be transferred to another individual (exception is demonstration leases). Over the last 10 years, NOAA has coordinated community based restoration projects, hatchery infrastructure support, and oyster research and monitoring in the Bay. A recently passed Omnibus bill includes 2.4 million dollars for NOAA to conduct oyster restoration activities in MD; no specific plans have been developed yet. In the last 10 years through the Chesapeake Bay Oyster Recovery Project USACE has established new oyster habitat in the Choptank, Patuxent, and Chester Rivers (437 acres), and placed spat in the project area (1997-2008).

There are Federal channels that are periodically maintained by dredging as needed within all six tributaries. Any dredging of channels that occurs within 500 yards of an oyster bar is subject to time of year restrictions. Hydraulic dredging is restricted from June 1 to September 30 because of concerns over the potential of entrainment of larvae. Mechanical dredging is restricted from December 15 to March 14 due to concerns with increased turbidity.

This alternate substrate project is expected to increase the acreage of available oyster bar/reef habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MD DNR, ongoing Oyster Recovery Project activities, NOAA and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat) improve water quality and promote a healthy estuarine system in the Chesapeake Bay.

6.0 ENVIRONMENTAL COMPLIANCE AND COORDINATION

In addition to the environmental impacts discussed in this EA, a review of the proposed action has been made with regard to other potential areas of concern. Due to the expected impacts, a 404(b)(1) evaluation of the proposed project on waters of the United States was performed pursuant to the guidelines promulgated by the Administrator, U.S. EPA., under authority of Section 404 of the Clean Water Act. A report of that evaluation can be found in Appendix A along with the approved Section 401 Water Quality Certification for all Chesapeake Bay Oyster Recovery Project activities which will expire in April 2010.

EFH coordination was initiated by a letter sent to NMFS on December 22, 2008. NMFS provided technical information in an email dated February 9, 2009. Based on this coordination an EFH assessment was completed (Appendix B) and was submitted to NMFS for review and approval. NMFS concurred with the EFH assessment.

Coordination for Section 7 of the ESA and Fish and Wildlife Coordination Act were initiated by a letter sent to USFWS December 22, 2008. A USFWS response letter dated February 10, 2009, stated that the USFWS expects that there would be no impacts to federally listed or proposed endangered or threatened species under USACE jurisdiction, the letter also discussed recommendations for using alternate substrate and potential shortcomings of this new substrate when compared to native oyster shell substrate. A follow-up phone call with Mr. Ruddy took place on March 17, 2009. Overall, Mr. Ruddy is satisfied with USACE coordination up to this point and was open to continuing the coordination as the project progresses to design, construction, and monitoring phases. He suggested that monitoring include the investigation of the ecological community of constructed bars and reefs and use and coverage of spat on bars and reefs.

Coordination with NMFS regarding endangered species has been completed as of March 12, 2009. No adverse impacts to species under their purview are expected. Verbal coordination with Mr. Roland Limpert of MD DNR, on February 25, 2009, confirmed that no State listed rare or threatened species will be impacted by the placement of alternate substrate at the oyster bars in the project areas.

A Study Initiation Notice announcing an EA was being prepared for the project was issued on December 22, 2008. A public notice announcing the availability of the draft document was issued on April 13, 2009. The notice was distributed to Federal, State, and local agencies, special interest groups, and other interested parties. The notice was also available on the USACE website, and available for review at select public libraries.

The public review period ended on May 13, 2009. A letter received from Maryland Department of Planning informing USACE that the EA was received by the State Clearinghouse Review Process and that the following agencies were forwarded a copy of the document for review: the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including MDE, Maryland Department of Transportation (MDOT), MD DNR, and the Maryland Historical

Trust (SHPO). During this time, three coordinating agency comments were received. MDE corrected a statement in section 5.1.8 clarifying that the current *de minimis* levels for MD are 50 tons for VOC, 100 for NOx, SO2 and PM2.5. This change was made to the final document. NMFS recommended the placement of some of the substrate as "mounds" to provide some vertical relief for EFH conservation. USACE will follow NMFS recommendation and will place substrate in a few locations that will bring the area to a height of 3-6 feet above soft bottom bay floor. The "mounds" will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat. Additionally, MDE recommended that actual batches of alternate substrate (if the source and specific composition is unknown) be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water. USACE will follow MDE recommendations. The non-profit agency, the Oyster Recovery Partnership sent an email dated, May 7, 2009 suggesting the removal of the abbreviation of "ORP" to reduce confusion between the organization and the USACE program, as well as adding text describing the various Maryland partners that do work together in the oyster recovery efforts. These comments were incorporated into the final document. No comments were received from the general public.

A Section 401 Water Quality Certification for the Chesapeake Bay Oyster Recovery Project has been issued by MDE. The proposed project complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management (CZM) Program. The Public Notice for this EA requested the State's concurrence with this determination which was received. Table 6-1 outlines the statutes and executive orders that are potentially applicable to the project, including the level of compliance.

In compliance with the National Environmental Policy Act of 1969 and the Clean Water Act, the proposed project has been coordinated with concerned resource agencies and members of the public. USACE is working with a number of government agencies and non-profit organizations to facilitate oyster restoration in the Chesapeake Bay. The focus of the coordination efforts with Federal and State resource agencies is to ensure that environmental factors are considered while planning and executing a prudent and responsible project. These coordination efforts are expanded upon in Appendix C.

Table 6-1. Compliance with Applicable Federal Laws, Regulations, and Executive Orders

Federal Statutes	Level of Compliance[1]
Archeological and Historic Preservation Act	Full
Clean Air Act	Full
Clean Water Act	Full
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act	Full
Comprehensive Environmental Response, Compensation and Liability Act	Full
Endangered Species Act	Full
Estuary Protection Act	Full
Federal Water Project Recreation Act	N/A
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act	Full
Magnuson-Stevens Act	Full
Marine Mammal Protection Act	Full
National Historic Preservation Act	Full
National Environmental Policy Act	Full
Resource Conservation and Recovery Act	N/A
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	Full
Wild and Scenic Rivers Act	N/A
Executive Orders, Memoranda, etc.	
Migratory Bird (E.O. 13186)	Full
Protection and Enhancement of Environmental Quality (E.O. 11514)	Full
Protection and Enhancement of Cultural Environment (E.O. 11593)	Full
Floodplain Management (E.O. 11988)	N/A
Protection of Wetlands (E.O. 11990)	Full
Prime and Unique Farmlands (CEQ Memorandum, 11 Aug. 80)	N/A
Environmental Justice in Minority and Low-Income Populations (E.O. 12898)	Full
Invasive Species (E.O. 13112)	Full
Protection of Children from Health Risks & Safety Risks (E. O. 13045)	Full

[1] *Full Compliance (Full):* Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning. *Non-Compliance (NC):* Violation of a requirement of the statute, E.O., or other environmental requirement. *Not Applicable (N/A):* No requirements for the statute, E.O., or other environmental requirement for the current stage of planning. *Partial:* In process of meeting requirements of statute.

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APPENDICES

Appendix A: Clean Water Act 404(b)(1) Evaluation/
Chesapeake Bay Oyster Recover Project
Section 401Water Quality Certification

Appendix B: Essential Fish Habitat Assessment

Appendix C: Agency Coordination

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APPENDIX A

Clean Water Act Section404(b)(1) Evaluation
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CLEAN WATER ACT SECTION 404(B)(1) EVALUATION

Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND
April 2009

1. PROJECT DESCRIPTION

A. Location

The Project would occur within the Maryland portion of the Chesapeake Bay. Project activities would occur in Oyster Recovery Areas (ORA's) established by the Maryland Oyster Roundtable Action Plan in the Chester, Choptank, Nanticoke, Patuxent, Magothy, and Severn Rivers.

B. General Description

The United States Army Corps of Engineers (USACE) Oyster Recovery Project is recommending the use of alternate substrates to construct oyster bar and reef habitat.

C. Purpose

The purpose of the proposed project is to use alternate substrate for the approved native oyster restoration project in the Maryland portion of the Chesapeake Bay due to limited availability of native oyster shell. In addition to having economic value as a commercial fishery, oysters provide significant environmental benefits. Oysters are a keystone species in the Chesapeake Bay, serving both a water quality and habitat function. There is no substitute for a thriving oyster community in the Bay. The oysters filter the water, playing an important role in sediment and nutrient removal, and provide a hard structure that serves as habitat for not only future oyster generations, but also a variety of fish and benthic species, including juvenile striped bass and blue crabs. It is anticipated that restoring functioning oyster bars and reefs would provide habitat and water quality improvements, at least locally, that would promote a healthy estuarine system. Even in low setting areas, these materials are important as habitat to prepare a base for the planting of hatchery seed.

Oyster restoration is a significant component of current efforts to restore the Chesapeake Bay ecosystem. The proposed project supports objectives of the Chesapeake Bay Program and the Maryland Oyster Roundtable Action Plan. The project is also consistent with the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* of 1994.

D. General Description of Material

(1) Characteristics of Material- The alternate (non-oyster shell) materials suitable for use include, but are not limited to clam shell, marl, concrete, stone, slag, brick, porcelain, and cinderblock. Any concrete rubble to be used would be free of building

debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Only clean material free of contaminants and hazardous materials are suitable for disposal within State waters and would be used. Further, advances in technology and research may identify new substrates that could be used for the construction of oyster habitat once approved by State and Federal resource agencies. The size of individual pieces of material used would vary with the material type and project purpose. The larger the material, the greater the relief provided for the benthic population. No materials other than reef balls would be utilized larger than 12 inches in size.

(2) Fill Material Quantities -Fill material quantity is essentially dependent on funding and availability of resources such as substrate and oyster spat. Given sufficient substrate and spat, funding levels ultimately determine the amount of oyster habitat that can be restored. On average, an acre of oyster habitat receives 900 cubic yards (cy) of substrate material. This provides a base of hard substrate elevated 6 inches off the Bay floor. Some sites would be planted less than 6 inches thick (a 3 inch thickness equates to 450 cy/acre) and others include higher mounds. Based upon current cost projections for the procurement, transportation, and planting of alternate materials, it is estimated that approximately 25 to 40 acres of material could be planted per million dollars of available funding, requiring the placement of 22,500 to 36,000 cy of alternate substrate material.

(3) Source of Material -Sources of alternate materials varies. Some substrates such as reef balls are purchased from companies that make the reef balls. Stone can be purchased from regional quarries. Clam shell is available from wholesalers and is readily available. However, many of the substrates are byproducts of other uses and may only be available sporadically. Slag is a byproduct of metal smelting and has become increasing less available in recent years. Crushed concrete is generally produced from a demolition project such as the replacement of a bridge or building and is intermittently available. Cinderblock, porcelain, and brick are readily available for purchase or can possibly be obtained intermittently from demolition projects. Marl or marl limestone is a calcium carbonate or lime-rich stone which contains variable amounts of clays and aragonite. Marl is mined and is readily available. All materials used in this project would be clean and free of contaminants and hazardous materials.

E. Description of the Proposed Discharge Sites

New oyster habitat would be constructed in the targeted tributaries within the boundaries of natural oyster bars (NOBs). Targeted tributaries include the Chester, Choptank, Patuxent, Severn, Magothy, and Nanticoke Rivers. Specific locations for project activities would be determined based on bottom composition, salinity, water depth, water currents, levels of dissolved oxygen, and disease prevalence. GIS mapping would be utilized to identify sites.

F. Description of Placement Method

Project activities would involve the placement of alternate substrates to create oyster habitat. Alternate materials would be placed primarily by tugboat and barge but large

workboats may also be used. With either barges or large workboats, the material would be washed overboard using high pressure water hoses or cannons, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting. Materials may also be placed using a crane/excavator or front-end loader to place material on the oyster bar. To date, the majority of alternate material placements have been less than one foot in height off of the bottom. Restored areas may also receive a thin veneer of native oyster shell, if available; and would be planted with spat on shell.

2. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

(1) Substrate Elevation and Slope-The elevation of the discharge site would range from +3 inches to a (+) few feet off existing bottom. All elevations would maintain 8 feet of open water clearance above them. The minimum water depth in the oyster placement areas would be -8 feet.

(2) Sediment Type- Oyster bars and reefs would be constructed on firm bottom.

(3) Discharge Material Movement - It is not expected that the material would move off site once placed on a bar. There would likely be some settling of the material. Smaller pieces of material would likely be displaced off of higher relief bars and reefs and settle at the base of these bars and reefs.

(4) Other Effects-None expected.

(5) Actions Taken to Minimize Impacts- The substrate material would be discharged in a manner that minimizes the disruption of bottom sediments. Environmental protection measures, such as time-of-year restrictions on construction and proper site selection to avoid sensitive areas, would be employed at project sites to avoid and minimize impacts to the aquatic environment. Construction specification would state that compliance is mandatory for all applicable environmental protection regulations for pollution control and abatement.

Measures to protect SAV: The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by the Virginia Institute of Marine Sciences (VIMS) in coordination with the Maryland Department of Natural Resources (MDNR) Resource Assessment Service. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed.

Measures to protect existing oyster habitat: Time-of-year restrictions apply to activities occurring within 500 yards of NOBs.

B. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water Quality-Temporary, localized changes may occur in clarity, color, and quality of Bay waters in the immediate vicinity during substrate placement. No negative impacts are expected following construction.

(a) Salinity – No change expected.
(b) Chemistry – No negative impacts expected.
(c) Clarity – Minor and temporary changes are possible in the immediate vicinity during construction due to turbidity. There would likely be localized improvements in clarity due to oyster filtration following establishment of an oyster population on the substrate.

(d) Color – Minor and temporary changes are possible in the immediate vicinity during construction due to turbidity.
(e) Odor – No change expected.
(f) Taste – Not applicable.
(g) Dissolved Oxygen Levels –No change expected.
(h) Nutrients – Not expected to occur. There would likely be localized improvements in nitrogen (N) and phosphorus (P) due to oyster filtration following establishment of an oyster population on the substrate.
(i) Eutrophication – Not expected to occur.
(j) Temperature – No Change expected.

(2) Current Patterns and Water Circulation

(a) Current Patterns and Flow- Minimal effects are expected, but would likely be a positive improvement that benefits the restored oyster habitat. Elevation of an oyster bar or reef may increase flow and turbulence in the vicinity of the bar or reef, resulting in enhanced mixing and food delivery downstream.
(b) Velocity- No significant change in velocity is expected.
(c) Stratification- No change expected.
(d) Hydrologic Regime- No significant changes are expected.

(3) Normal Water Level Fluctuation-No change is expected.

(4) Salinity Gradients-Not applicable.

(5) Actions That Will Be Taken to Minimize Impacts-Not applicable

C. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site-A minor and temporary increase in suspended sediment and turbidity is expected in the immediate vicinity of the placement sites. Suspended sediment and turbidity in the vicinity of restored oyster habitat

is likely to be reduced after habitat is restored due to stabilizing the sediments with the hard substrate and oyster filtering capabilities.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column

(a) Light Penetration-Minor, temporary, and localized reduction in light penetration due to turbidity would occur in the immediate vicinity of the substrate plantings during placement. Light penetration would depend on placement thickness and the density of the material. Oyster bars and reefs are in 6 to 30 ft. depths and not in the photic zone.

(b) Dissolved Oxygen-Minor, temporary, and localized reduction in dissolved oxygen in conjunction with elevated turbidity levels may occur in the immediate vicinity of placement operations. However, sites that are typically characterized by low oxygen levels would likely be avoided for oyster habitat restoration.

(c) Toxic Metals and Organics-Placement operations are not expected to result in the release of any measurable amounts of contaminants into the water column.

(d) Pathogens-No pathogens are expected to be released into the water column.

(e) Aesthetics-Transport vehicles, boats, and heavy equipment associated with the proposed project would be a temporary negative impact. Project activities would occur under water, and therefore would not impact visual and aesthetic values.

(f) Temperature- No change expected.

(3) Actions Taken to Minimize Impacts-Construction activities would be limited to the immediate project area except for the barge loading sites which would vary with material type. All sites would be within NOB's. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MD DNR Resource Assessment Service.

D. Contaminant Determinations

All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Determination of project sites would include coordination with appropriate agencies and a review of historical data concerning potential contaminants. No significant levels of contaminants would be released into the water column.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton -As construction is a very short-term event and plankton are mobile, no effect is expected. The areas restored to oyster bars and reefs from open water would still be available to the plankton community.

(2) Effects on Benthos-The placement of alternate substrates would permanently cover the existing substrate and benthos. Non-sessile dwellers may be able to avoid burial, but sessile species could be buried. However, the restored oyster habitat would provide enhanced habitat for recolonization by benthic epifauna. Oyster bars and reefs are three-dimensional structures which provide more surface area for the attachments of oysters and other sessile organisms (mussels, barnacles, hydroids, algae, etc.) than that provided by relatively flat bottom.

(a) Primary Production/Photosynthesis-Any turbidity generated during construction may reduce photosynthesis within the area of the oyster bar or reef and possibly slightly outside.
(b) Suspension/ Filter Feeders-Minor, temporary, and localized impacts due to turbidity may occur during construction.
(c) Sight Feeders-Minor, temporary, and localized impacts due to turbidity may occur during construction.

(3) Effects on Nekton-No long-term negative impacts are expected. Nekton would be temporarily disturbed during construction, but would be able to avoid the area during substrate placement. Following construction, the restored oyster bar or reef would provide an enhanced habitat for species that rely on structure for habitat, protection, and foraging such as fish, amphipods, shrimp, worms, and crabs.

(4) Effects on Food Web-No adverse, long term effects are expected. The long-term project effects are expected to be positive by providing bar and reef habitat and subsequent oyster populations and associated assemblages. A great diversity of macroinvertebrates, fish, and shellfish have been shown to colonize restored oyster habitats (Rodney and Paynter 2006). Organisms associated with oyster habitat recycle nutrients and organic matter, and are prey for commercially and recreationally important finfish species.

(5) Effects on Special Aquatic Sites-Oysters are generally restricted to subtidal areas from 6 to 30 feet in depth. Therefore, project activities are not expected to displace or adversely impact SAV. However, appropriate measures such as time-of-year restrictions to minimize impact to NOBs and restrictions on construction near SAV, would be implemented during substrate placement to protect special aquatic sites in adjacent areas from elevated turbidity. There would be no significant negative impacts or effects to other special aquatic sites including marine sanctuaries and refuges, wetlands, or tidal flats.

(a) Sanctuaries and Refuges- Temporary and minor impacts would occur to designated oyster sanctuaries since the material would be placed within

existing areas designated as sanctuaries by MDDNR. These impacts would include temporary increased turbidity and covering the benthos with the newly placed substrate. There would be no impacts to any other marine sanctuaries or refuges.

(b) Wetlands- There would be no impacts to wetlands as wetlands do not occur in the project area.

(c) Tidal flats- No impacts since tidal flats do not occur in the project area.

(d) SAV – SAV habitat coverage of the Bay bottom is variable from year to year. A comparison was made of SAV coverage within the past 5 years using maps produced by VIMS to NOBs. There are some minor areas where SAV has occurred within the boundaries of NOBs. Any areas containing SAV would be avoided during site selection. Also, existing restrictions on construction within 300 yards of existing SAV beds would be upheld to prevent negative impacts associated with construction such as increased turbidity.

(e) Riffle and Pool Complexes- None in project area.

(6) Threatened and Endangered Species-No adverse effects are anticipated to threatened and endangered species as a result of this project.

(7) Other Wildlife- Construction would have expected noise associated with the machinery used to place the material. This noise would temporarily disrupt some species of wildlife during periods of work. Also, the presence of humans and equipment may disturb some species. Species are expected to return when construction is completed and the equipment leaves the area.

(8) Actions to Minimize Impacts-Construction activities would be limited to the immediate project area. All sites would be within NOBs. All alternate substrates chosen for oyster habitat restoration would be determined to be clean and free of toxics. Any concrete rubble to be placed would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. The placement of alternate materials would not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by VIMS in coordination with the MD DNR Resource Assessment Service.

F. Proposed Placement Site Determinations

(1) Mixing Zone Determinations- Not applicable.

(2) Compliance with Applicable Water Quality Standards Determinations-Alternate substrates used would be clean and would meet all applicable water quality standards. The proposed work would be performed in accordance with all applicable State of Maryland water quality standards. All work would be conducted in compliance with conditions specified in the project's Water Quality Certification.

(3) Potential Effects on Human Use Characteristics Determinations

(a) Municipal and Private Water Supply-No effect is expected.
(b) Recreational and Commercial Fisheries-The project is expected to enhance and create habitat for oysters and other organisms, including finfish and blue crabs.
(c) Water Related Recreation- As an indirect benefit of the proposed work, some increase in recreational fishing may occur following establishment of communities on the restored bars and reefs.
(d) Aesthetics-Minor during construction.
(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves- No effect expected.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

The use of alternate substrates would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster habitat acreage. Without the use of alternate substrates it is extremely unlikely that significant acreage could be restored due to the current degraded condition of existing oyster habitat and the limited availability of native oyster shell for habitat restoration. The project is expected to increase the acreage of available oyster habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MDNR, Federal agencies, and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat.

H. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are expected to be positive, resulting in increased habitat for finfish, blue crabs, and other species. Additional benefits from oyster restoration would include water filtration and regulation of water column phytoplankton dynamics; enhanced nitrogen (N) cycling between the benthic and pelagic system components; enhanced phosphorus (P) burial in sediments; nursery and predation refuge habitat for a diverse community of invertebrates and small fishes; and foraging habitat for transient piscivorous and benthivorous fishes.

The mandatory sequence of the Section 404(b)(l) Guidelines has been applied in evaluation of the proposed action. The proposed use of alternate substrates to restore oyster habitat is in compliance with the Section 404(b)(l) Guidelines. Parts II and IV of the analysis show that the proposed use of alternate substrates do not contribute to the significant degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites comply with the requirements of 40 CFR 230.10(c). Appropriate steps to minimize potential impacts of the placement of the alternate substrate in aquatic systems would be followed.

3. FINDING OF COMPLIANCE

a. Adaptation of the Section 404(b)(1) Guidelines to This Evaluation - No adaptations of the Guidelines were made relative to this Evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. – None of the alternatives are expected to provide the same benefits with fewer impacts.

c. Compliance with Applicable State Water Quality Standards. – In full compliance. WQC 05-WQ-001.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition under Section 307 of the Clean Water Act. – N/A.

e. Compliance With Endangered Species Act of 1973 – In full compliance. No impacts are anticipated to these resources.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 – N/A.

g. Evaluation of Extent of Degradation of Waters of the United States – No adverse impacts, permanent or temporary, to the aquatic ecosystem diversity, productivity, stability, recreation, and aesthetics and economic values would occur as a result of this project.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem – Best management practices such as targeted placement of material at bars and reefs would occur.

i. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material - On the basis of the guidelines, the proposed discharge sites for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

REFERENCES

Rodney, W.S., and K.T. Paynter. 2006. Comparisons of macrofaunal assemblages on restored and non-restored oyster reefs in mesohaline regions of Chesapeake Bay in Maryland. *Journal of Experimental Marine Biology and Ecology* 335: 39-51.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
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WATER QUALITY CERTIFICATION

NABOP

CERTIFICATION 05-WQ-001

PUBLIC NOTICE DATE August 24, 1995

TO: Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

RE: Implementation of the Chesapeake Bay Oyster Recovery Project involving numerous restoration and remediation activities to increase oyster habitat and populations.

This water quality certification is issued under authority of Section 401 of the Federal Water Pollution Control Act and its Amendments and the Environment Article, Sections 9-313 - 9-323, inclusive, Annotated Code of Maryland. A copy of this required certification has been sent to the Corps of Engineers. This certification does not relieve the applicant of responsibility for obtaining any other approvals, licenses or permits in accordance with federal, State, or local requirements and does not authorize commencement of the proposed project. The Maryland Department of the Environment has determined from a review of the plans that the construction of this facility and its subsequent operation as noted herein will not violate Maryland's water quality standards, provided that the following conditions are satisfied.

The applicant shall comply with the conditions marked (X) below:

(X) (1) The proposed project shall be constructed in a manner which will not violate Maryland's Water Quality Standards as set forth in COMAR 26.08.02. The applicant is to notify this department ten (10) days prior to commencing work. Verbal notification is to be followed by written notice within ten (10) days.

(X) (2) The proposed project shall be constructed in accordance with the plan and its revisions as approved by the:

(X) (a) Corps of Engineers
( ) (b) Water Management Administration

(X) (3) All fill and construction materials not used in the project shall be removed and disposed of in a manner which will prevent their entry into waters of this State.

(X) (4) The applicant shall notify this Department upon transferring this ownership or responsibility for compliance with these conditions to another person. The new owner/operator shall request transfer of this water quality certification to his/her name.

(X) (5) The certification holder shall allow the Maryland Department of the Environment or its representative to inspect the project area at reasonable times and to inspect records regarding this project.

Page Two Water Quality Certification

( ) (6) Construction of any bulkhead shall be completed prior to filling behind the bulkhead. The bulkhead shall be constructed in such a manner so as to prevent the loss of fill material to waters of this State. Only clean fill, which is free of organic, metallic, toxic or deleterious materials shall be used.

( ) (7) The disturbance of the bottom of the water and sediment transport into the adjacent State waters shall be minimized. The applicant shall obtain and certify compliance with a grading and sediment control plan which has been approved by the:

( ) (a) _____ Soil Conservation District or
( ) (b) Erosion and Control Representative, Division of Environmental Services, Bureau of Highways, Department of Public Works of the City of Baltimore or
( ) (c) The Department of the Environment, Water Management Administration or
( ) (d) Montgomery County Department of Environmental Protection.
The approved plan shall be available at the project site during all phases of construction.

( ) (8) The spoil disposal area(s), including dikes where applicable, shall be constructed to limit the suspended solids content in the discharge to the waters of this State to four hundred (400) parts per million or less.

( ) (9) _____ shall be done only in the period _____.

( ) (10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway. The natural vegetation shall be maintained and restored when disturbed or eroded. Stormwater drainage facilities shall be designed, implemented, operated and maintained in accordance with the requirements of the applicable approving authority.

( ) (11) _____ shall provide to the Water Management Administration a stormwater management plan including cross-sections which incorporates effective pollutant removal strategies in uplands to treat a minimum of the first one-half inch of runoff from impervious surfaces prior to release of stormwater into State waters or wetlands. There shall be no discharge of untreated stormwater to State waters or wetlands. The plan shall be provided by _____ and shall be implemented by _____.

( ) (12) _____ shall provide to the Water Management Administration a mitigation plan for the construction of - _____ acre(s) of _____ wetland for review and approval by _____. The plan shall be implemented by _____. The plan shall show:

- **the source of hydrology for the constructed wetland**
- **the source and amount of soil to be used in constructing the wetland**
- **the species, size and density of vegetation to be planted in the constructed wetland and a planting schedule.**
- **a monitoring/maintenance plan.**

( ) (13) _____ shall monitor the mitigation site for a period of five years and shall determine whether the wetland construction has been successful. A successful mitigation project shall result in: _____ plants/acre and 85% survivability of plants in forested and scrub/shrub wetlands and plants covering 85% of the area for emergent wetlands. If these standards are not met, _____ shall determine the reason(s) for failure, the problem(s) shall be corrected, and the area(s) shall be replanted and monitored.

Page Three Water Quality Certification

( ) (14) The mitigation site shall be constructed in accordance with the plan, dated_____.

( ) (15) _____ shall provide a _____ plan for review and approval by _____. This plan shall be implemented by _____.

( ) (16) At least one culvert in every stream crossing shall be depressed at least one foot below existing stream bottom under the low flow condition. A low flow channel shall be provided through any riprap structures. The culvert shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species.

( ) (17) Stormwater discharges from ponds, stormwater management outfalls, and stormwater facilities shall have a velocity no greater than four feet per second for the two year storm in order to prevent erosion in the receiving waterway or wetland.

( ) (18) Future stormwater discharges to certified pond(s) are prohibited unless the first one half inch of stormwater runoff from impervious surfaces is managed in uplands for effective pollutant removal.

( ) (19) Authorized stormwater detention ponds shall have a maximum detention time of _____ hours.

( ) (20) _____ shall restore and revegetate all temporarily disturbed waters and wetlands to original contours upon completion of construction.

Failure to comply with these conditions shall constitute reason for suspension or revocation of the Water Quality Certification and legal proceedings may be instituted against the applicant in accordance with the Annotated Code of Maryland. In granting this certification, the Department reserves the right to inspect the operations and records regarding this project at anytime.

CERTIFICATION APPROVED

Ellen A. Whitcarella
Water Management Administration

April 15, 2010
Expiration Date

APPENDIX B

Essential Fish Habitat Assessment

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Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

Chesapeake Bay Oyster Recovery Project, Maryland

Essential Fish Habitat Assessment

May 2009

Prepared By: Baltimore District, U.S. Army Corps Of Engineers

Pursuant to Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation & Management Act, the U.S. Army Corps of Engineers (USACE) is required to prepare an Essential Fish Habitat [EFH] Assessment for the placement of alternate substrate on natural oyster bars (NOBs) as part of the Chesapeake Bay Oyster Recovery Project, Maryland that began in 1996.

Based on the prescribed protocol for preparation of an EFH Assessment, the assessment is comprised of the following components:

1. A description of the proposed action;
2. A listing of the life stages of all species with EFH designated in the project area;
3. An analysis of the effects of the proposed action;
4. The Federal agency's opinions regarding the effects of the proposed action; and,
5. Proposed mitigation, if applicable.

DESCRIPTION OF THE PROPOSED ACTION

The Baltimore District, U.S. Army Corps of Engineers proposes to place alternate (non-shell) substrate at existing oyster bars within Oyster Recovery Areas (ORAs) in Maryland of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers. Figure 1 provides a map of the project area. The material would be brought to the project area by tug and barge and it would be removed from the barge by means of a water cannon, a crane, or other mechanical means. All previous oyster restoration efforts by USACE have been limited to the use of clean oyster shell as substrate. Construction using alternate substrates rather than oyster shell is targeted to begin in spring/summer 2009. In subsequent years, additional placement of substrates would occur between June and September. Potential alternate substrates for construction could include, but are not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be used would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). Further, advances in technology and research may identify new substrates that could be used for the construction of oyster bars and reefs once approved by state and federal resource agencies.

SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

After consultation with John Nichols, NMFS, (email dated February 9, 2009- Appendix C) it was determined that some areas of the Bay under consideration for oyster restoration as part of this project lie within the general area that may provide EFH for some of the species managed by NMFS. Species for which EFH is a concern are as follows: summer flounder (*Paralichthys dentatus*), juvenile and adult life stages; bluefish (*Pomatomus saltatrix*), juvenile and adult life stages; windowpane flounder (*Scopthalmus aquosus*), juvenile and adult life stages; cobia (*Rachycentron canadum*), all life stages; red drum (*Sciaenops ocellatus*), all life stages; king mackerel (*Scomberomorus cavalla*), all life stages; and Spanish mackerel (*Scomberomorus maculatus*) (National Marine Fisheries Service, Northeast Region, Habitat Conservation Division EFH web site; *www.nero.nmfs.gov/ro/doc/hcd.htm*).

Due to specific habitat needs, it is unlikely that cobia, king mackerel, Spanish mackerel, or windowpane flounder would be in the project area (Murdy et al., 1994). Windowpane flounder prefers sandy substrates which would be avoided for this project. Cobia more commonly inhabit areas of higher salinity than would be found at most of the project area. Spanish mackerel are most abundant from the mouth of the Chesapeake Bay region to south Florida. They prefer polyhaline regions (18-30ppt) of the lower Bay. Finally, none of the life stages of king mackerel are typically found within the project area. As a result, this EFH analysis will focus on bluefish, summer flounder, and red drum.

IMPACTS TO SPECIES WITH EFH DESIGNATED IN THE PROJECT AREA

The following section provides a brief overview of pertinent natural history information of: 1) bluefish, 2) summer flounder, and 3) red drum. Additionally, an analysis of the direct, secondary, and cumulative impacts of the proposed use of alternate substrate on federally managed species, and prey species consumed by managed species that occur in the project vicinity is provided.

1. BLUEFISH (*Pomatomus saltatrix*) (juvenile and adult stages)

Bluefish are usually found high in the water column. In some years, large numbers of bluefish penetrate far up the Bay; in other years, bluefish schools are sparse, with larger bluefish concentrating in Virginia waters. For juveniles, all major estuaries between Penobscot Bay, Maine and St. Johns River, Florida are considered EFH.

Juvenile and adult bluefish enter the Chesapeake Bay during spring through summer, leaving the Bay in late fall.

Adults – Adults are uncommon north of Annapolis, and generally do not occur above the U.S. 50 bridge, except during years of greater up-Bay salt wedge encroachment. Adults are not typically bottom feeders and are strong swimmers. No impacts expected.

Juveniles - Juveniles tend to concentrate in shoal waters. In contrast to adults, the young have a wide range of salinity tolerance and penetrate much farther up the Bay and its tributaries, where they can be found in shallow waters of very low salinity (Murdy et al., 1997). Therefore, juveniles are more common in the upper Bay above the U.S. 50 Bridge, occurring as far north as the Susquehanna Flats and the lower Elk River (Lippson, 1973).

Spawning - Spawning is oceanic and does not occur in the Chesapeake Bay.

Prey- Juveniles tend to be opportunistic feeders, foraging on a wide variety of estuarine life in the pelagic zone and over a variety of bottom types (Lippson, 1973). Small fish such as Menhaden that bluefish prey upon are widely dispersed across the Bay and do not depend upon the bottom. With respect to prey, there is nothing particularly unique or valuable to bluefish at the project area. Therefore, bluefish prey species should not experience adverse effects on population levels from the proposed project.

Impact on Bluefish- Adults and juveniles would occur in the Bay at the same time as project activities. However, no significant impacts are expected to bluefish as a result of project activities. The use of alternate substrate is not expected to have any negative impacts on any life stage of bluefish. No impacts are expected because there is sufficient open water habitat outside of the project area during the short construction season and turbidity impacts are expected to be local, minimal, and short-lived. As a transient species, bluefish are expected to be able to avoid any direct, minor construction impacts to water quality.

Cumulative impacts: The use of alternate substrates would permit oyster restoration to continue on a scale that could address goals of restoring significant oyster bar and reef acreage. It is expected that in conjunction with the use of alternate substrates, other oyster restoration activities would also continue by various groups and include some amount of restoration using oyster shell to rehabilitate oyster habitat that has been covered by sediment. However, without the use of alternate substrates it is extremely unlikely that significant acreage could be restored and long-term goals achieved. The project is expected to increase the acreage of available oyster bar and reef habitat as well as enhance recruitment, growth, and survival of oyster populations. The cumulative impact of this project and other oyster restoration projects constructed by MD DNR, ORP and various non-profit and citizens groups is expected to be positive, with the creation of more diverse and productive habitat. No adverse negative cumulative impacts are expected.

There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during placement of substrate, whether alternate substrates or native shell. This impact is expected to be direct, but minor and temporary. Alternate substrates used for restoration would be clean and would not impact water quality negatively. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive throughout the Bay.

Other restoration activities include the activities discussed in the *Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster* (Released October 17, 2008 by U.S. Army Corps of Engineers, Norfolk District). For this project, the proposed actions include introducing a non-native species, the Suminoe oyster, and to continue efforts to restore the native Eastern oyster. Another project that is occurring is the development of the Native Oyster Restoration Management Plan (NORMP) by both the Baltimore and Norfolk Districts of USACE. The NORMP presents a plan for pursuing wide-scale oyster restoration throughout the Bay that complements other Bay-wide restoration efforts and future uses of Chesapeake Bay. Finally, the MD DNR has a permitted alternate substrate restoration project within Maryland charted oyster bars in the Chesapeake Bay

Cumulatively, the oyster restoration impacts are not anticipated to have any significant impacts, either direct or secondary to bluefish populations within the Bay.

2. SUMMER FLOUNDER (*Paralicthys dentatus*) (juvenile and adult stages)

Juvenile and adult summer flounder enter the Chesapeake Bay during spring and early summer, and exit the Bay in fall (Murdy, 1997). Both adults and juveniles exhibit a marked preference for sandy bottom and/or submerged aquatic vegetation (SAV) beds, particularly areas near shorelines (Murdy, 1997). The Magnuson-Stevens Act has identified SAV as a Habitat of Particular Concern for both juvenile and adult summer flounder. Summer flounder is not known to use oyster bars.

Adults - Summer flounder adults inhabit shallow coastal and estuarine waters during warmer months. Adults utilize deep channels, ridges, sandbars, and shallow water with sandy bottoms.

Juveniles- Juveniles prefer shallower waters.

Spawning- Summer flounder are ocean spawners. Larvae are not likely to be present in the project area during placement because they begin to migrate into the Bay in October well after summer construction activities are completed.

Prey- Summer flounder feed mainly on fish, squids, shrimp, and crabs. The summer flounder prefers sandy substrate and is frequently seen near sandy shores, partly buried in the sand.

Impact on Summer Flounder- Juvenile and adult summer flounder would occur in the Bay during project activities. However, no significant direct negative impacts are expected on adults or juveniles as a result of proposed activities. Secondarily, it is likely that the creation of oyster bars and reefs would serve as an attractant and provide habitat for the small creatures that the summer flounder prey upon.

Since oysters are generally restricted to water depths between- 6 and- 30 feet (MLW), oyster reef restoration using alternate substrates would not generally occur within SAV growing range. However, restored oyster bars and reefs do occur in areas adjacent to SAV beds. To minimize any potential direct impacts, no alternate material placement would occur within 300 feet of SAV beds. Further, NMFS has indicated that time-of-year restrictions may be necessary to protect SAV from elevated turbidity within 500 yards of the activity. Given these provisions, no adverse impacts to SAV are anticipated as a result of the proposed project.

Successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to summer flounder by promoting SAV habitat, which is designated as a Habitat of Particular Concern for summer flounder.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to summer flounder.

3. RED DRUM (*Sciaenops ocellatus*)

Red drum are bottom-feeding fish. The young prefer grassy (SAV) or mud bottoms.

EFH for red drum includes all of the following habitats to a depth of 50 meters offshore: tidal freshwater; estuarine emergent vegetated wetlands (flooded salt marshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster bars and reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial bars and reefs. The area covered includes Virginia through the Florida Keys (Reagan, 1985).

Adults- Adults are found in SAV beds and on mud bottoms, but another preferred habitat is oyster bars and reefs. During construction, it is expected that any adults in the vicinity of the project area would be temporarily displaced. As transient species, adult red drum would be able to avoid the disrupted area and find comparable habitat in the nearby vicinity. Restored oyster bars and reefs would provide enhanced habitats for adult red drum.

Juveniles- Juveniles occur throughout Chesapeake Bay from September to November.

Spawning – Spawning is oceanic.

Prey - Red drum prey includes crabs, shrimp and fish. No negative impacts to prey are expected. Oyster bar and reef restoration would provide habitat for red drum prey species and therefore is expected to increase desired species.

Impact on Red Drum- The use of alternate substrates is not expected to have any negative impacts on any life stage of red drum and would likely have a positive

secondary impact by promoting prey species that use oyster bars and reefs for habitat. As oyster bars and reefs are designated EFH for red drum, oyster bar and reef restoration would directly improve and increase EFH habitat for red drum.

As discussed in the section on bluefish, the proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to red drum by promoting SAV habitat, which is designated as EFH for red drum.

Finally, cumulative effects from other projects discussed in the bluefish section are not anticipated to have any significant negative impacts, either direct or secondary, to red drum.

FEDERAL AGENCY'S OPINION ON PROJECT IMPACTS TO EFH

1. Discharge from the site during alternate shell placement operations must comply with state (Maryland Department of the Environment) water quality standards, and should result in only short term, minor perturbations to local water quality.

2. There would be short-term increases in turbidity and possibly the release of nutrients from bottom sediments during construction. This impact is expected to be direct, but minor and temporary. Alternate substrates used for restoration would be clean and would not impact water quality negatively. Long-term impacts to local water quality as a result of the restoration of oyster habitat are expected to be positive.

3. The proposed project is expected to result in direct and secondary, beneficial impacts to aquatic resources. Through the restoration of existing non-productive oyster bars, a portion of historic oyster habitat would be directly restored. Placement of alternate substrates would form an elevated bar/reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). In addition, this bar/reef structure would provide, as a secondary benefit, shelter and cover for mobile invertebrates and finfish.

4. Most project activities would occur between June and September, when most species identified are present in the Bay. However, as discussed in the individual sections, no direct negative impacts are expected to the identified species as they are transient and similar habitat is abundant throughout the Bay, or prefer different habitats than those being targeted with the project. Impacts to spawning are not a concern as this is after the spawning season for most anadromous fish and most spawning occurs outside the project area in oceanic waters or in shallow, low salinity areas, which are not expected to be used as a part of this project.

5. The proposed action is not expected to negatively impact SAV. Alternatively, successful oyster restoration is expected to improve local water quality which would

benefit SAV beds in the local vicinity. Therefore, oyster restoration would provide secondary beneficial impacts to SAV habitat.

6. The proposed project would directly increase EFH for red drum by restoring oyster bars and reefs. The proposed project would indirectly benefit EFH for red drum and Habitat of Particular Concern for summer flounder by promoting SAV habitat.

7. The Baltimore District, after reviewing fisheries information, has determined that the proposed action is not likely to have significant negative, direct or secondary, affects on EFH or species covered under the Magnuson-Stevens Act and is more likely to benefit these protected species than to have an adverse effect on them.

Mitigation: No significant adverse environmental impacts are expected as a result of the proposed project and mitigation is not necessary.

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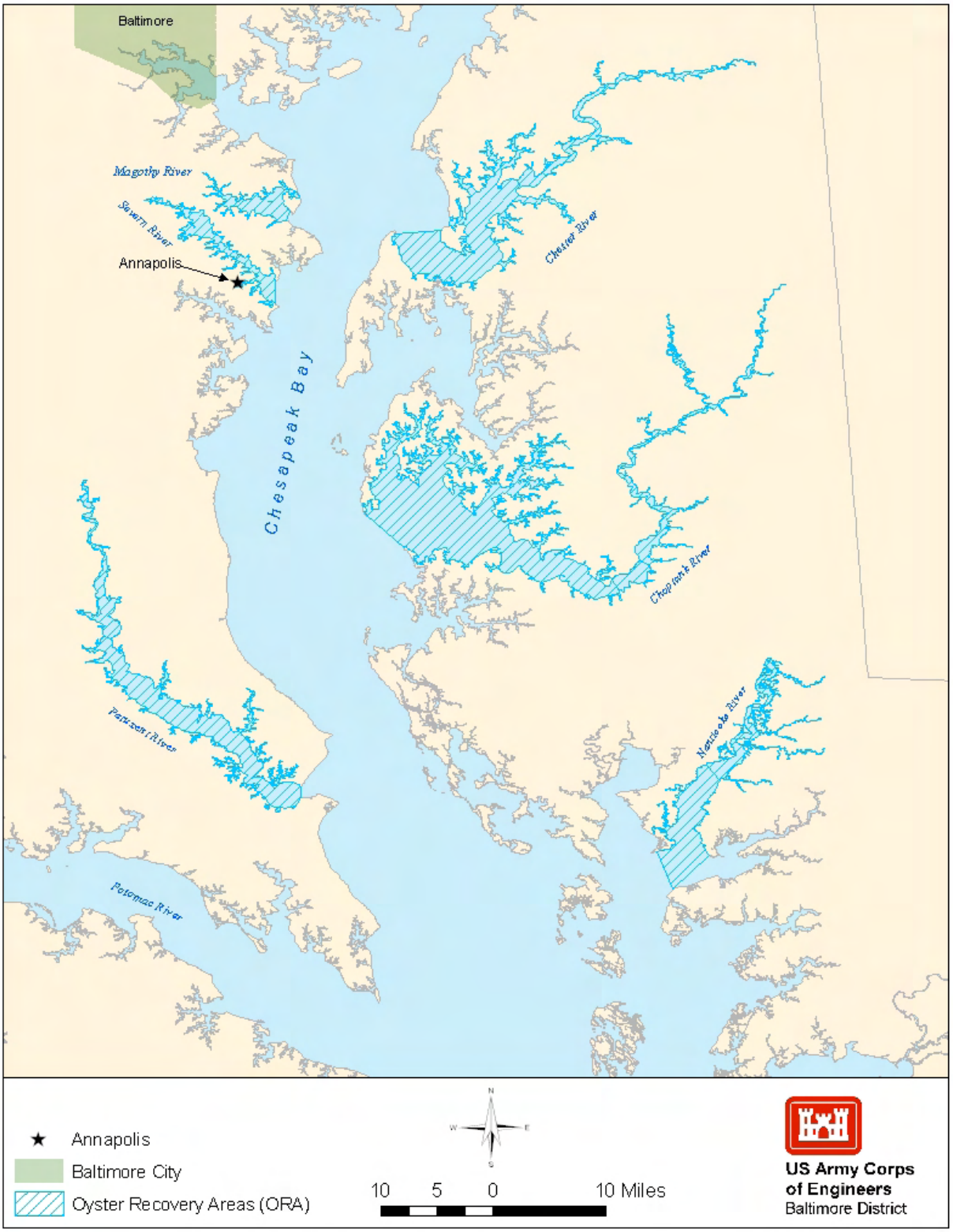
Figure 1. Chesapeake Bay Oyster Recovery Areas



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APPENDIX C

Agency Coordination

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AGENCY COORDINATION

Coordination for the following applicable Federal Laws, Regulations, and Executive Orders was performed:

(1) Fish and Wildlife Coordination Act requires coordination with the USFWS,
(2) Endangered Species Act requires coordination with USFWS, MD DNR, and NMFS,
(3) Magnuson-Stevens Act (MS), as amended, requires coordination with NMFS on EFH,
(4) National Historic Preservation Act requires coordination with MHT (SHPO),
(5) Clean Water Act, as amended requires coordination with MDE,
(6) Clean Air Act, as amended requires coordination with MDE, and
(7) Coastal Zone Management Act, as amended requires coordination with MDE

22 December 2008 Public notice initiating study published notifying interested parties of USACE's intent to prepare an Environmental Assessment evaluating the use of alternate (non-oyster shell) substrate for oyster reef restoration.

22 December 2008 Coordination letter from USACE to John Nichols at NMFS initiating coordination for compliance with the provisions of the Magnuson-Stevens Fishery Conservation and Management Act, as amended and requesting information to support development of an Essential Fish Habitat (EFH) assessment.

22 December 2008 Coordination letter from USACE to Bob Zepp at USFWS initiating coordination for compliance with the Fish and Wildlife Coordination Act and requesting information on the presence of Federally protected species in the project area listed by Section 7 of the Endangered Species Act (ESA).

8 January 2009 Letter received from Maryland Department of Planning informing USACE that the Public Notice was received by the State Clearinghouse Review Process and that the following agencies were forwarded a copy of the Public Notice for review: Maryland Department of the Environment, Maryland Department of Transportation, Maryland Department of Natural Resources, and the Maryland Department of Planning including the Maryland Historical Trust (SHPO).

27 January 2009 Letter received from Maryland Department of the Environment (MDE) informing USACE that the Public Notice was received by the State Clearinghouse Review Process and that this project is consistent with MDE's plans, programs, and objectives.

9 February 2009 Email received from John Nichols at NMFS communicating NMFS's support for using alternate substrates and identifying EFH species of concern.

10 February 2009 Letter from USFWS to USACE communicating USFWS recommendations and issues to consider when using artificial substrates. The letter was followed up by an email sent 12 February 2009 to George Ruddy at USFWS from USACE requesting additional information on ESA species and confirmation of compliance with Fish and Wildlife Coordination Act. These issues were not mentioned in letter received from USACE.

12 February 2009 Email received from George Ruddy at USFWS confirming that letter dated 10 February 2009 fulfilled ESA and Fish and Wildlife Coordination Act requirements.

25 February 2009 Dr. Roland Limpert, MD DNR was contacted via phone and was asked if there are any State listed rare or threatened species that could be affected by the placement of alternate substrate at the oyster bars in the project areas. He said a review was undertaken for the State's permit application and it was determined that there are no listed species in the area the USACE is considering.

12 March 2009 Email received from Julie Crocker at NFMS confirming that there is no indication that the proposal to use alternate substrate as opposed to shell for the proposed oyster rehabilitation project would negatively impact any RTE species. This conclusion is consistent with the determinations made by USACE and NMFS for other similar projects (i.e., the Lynnhaven River oyster rehab project in VA and the Potomac River fisheries commission project).

13 April 2009 A public notice released announcing the availability of the draft document. The public review period ended on 13 May 2009.

28 April 2009 Letter received from Maryland Department of Planning informing USACE that the EA was received by the State

Clearinghouse Review Process and that the following agencies were forwarded a copy of the document for review: the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including the Maryland Department of the Environment, Maryland Department of Transportation, Maryland Department of Natural Resources, and the Maryland Historical Trust (SHPO).

5 May 2009 Email received from Brian Hug at MDE confirming that the emission's created from the USACE air quality analysis fall below the current de minimis thresholds for general conformity.

11 May 2009 A memo was received from John Nichols at NMFS confirming that the agency is in support of the proposed activities. NMFS recommended the placement of some of the substrate as “mounds” to provide some vertical relief for Essential Fish Habitat (EFH) conservation. NMFS suggests mounds of 5-6 feet in areas that are prone to silt accumulation that are not subject to commercial harvest activities. A follow-up conversation with Mr. Nichols occurred on May 13, 2009 clarifying that substrate placement will occur on existing hard bottom habitat that often has a vertical height (above bay bottom) already as shown by MGS Bathymetry data. Mr. Nichols changed his recommendation to from 5-6 to 3-6 feet "mounds." USACE provided a written response confirming that recommendations will be adopted into the alternate substrate placement plan.

12 May 2009 A memo was received from Ms. Joane Mueller at MDE. MDE recommended that unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water. USACE provided a written response confirming that recommendations will be adopted into the alternate substrate placement plan.

22 May 2009 A letter was received from MDE stating that MDE concurs with USACE findings of impacts and that the project is consistent with the federal Coastal Zone Management Act

5 June 2009 A public notice released announcing the availability of the singed Finding of No Significant Impact Statement.

Included for reference: Original Oyster Recovery Project MHT coordination

26 October 1995 Letter from MHT to USACE communicating MHT recommendations to conduct a Phase I underwater survey before work can proceed and requesting maps to look at specific areas to aid in determination.

2 December 1995 Letter from MHT to USACE communicating that MHT compared the maps, provided by USACE of natural and legal oyster bars in a number of Maryland rivers with their records of submerged cultural resources and listed potential areas that may be impacted by the oyster recovery project that should be avoided.

US Army Corps of Engineers
Baltimore District

Planning Division

PUBLIC NOTICE
CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES:

DEC 8 2 2008

The U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project is preparing an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA). The EA addresses the use of artificial (non-oyster shell) substrate in Maryland waters.

The USACE has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by Section 5021 of the Water Resources Development Act (WRDA) of 2007), which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Areas addressed in the 1996 report are designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/EA was also prepared in 2002 that evaluated the cost effectiveness of USACE-led oyster restoration.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009. Potential alternate substrates for construction include clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e. reef balls).

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

Sincerely,

Amy M. Guise
Chief, Civil Project Development Branch
Planning Division

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF

Planning Division

Mr. Bob Zepp
Chesapeake Bay Field Office
U.S. Fish & Wildlife Service
177 Admiral Cochrane Drive
Annapolis, MD 21401

22 December 2008

Dear Mr. Zepp:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project, Maryland. USACE currently has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by WRDA 2007, Section 5021) which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Actions are not limited to, but have been focused in designated Oyster Recovery Areas (ORAs) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/Environmental Assessment (EA) was also prepared in 2002.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009.

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

The purpose of this letter is to initiate coordination for compliance with all requirements of the Fish and Wildlife Coordination Act. USACE is also requesting any information your office may have on the presence of and potential impacts you foresee to federally protected species listed under Section 7 of the Endangered Species Act (ESA) from the use of alternative substrates in oyster restoration. Please provide this office with any preliminary comments for this project by 30 January 2009.

If you have any questions regarding this matter, please contact Ms. Angie Sowers, Ph. D., at 410-962-7440.

Sincerely,

Amy Guise

Amy Guise, Chief
Civil Project Development Branch

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

REPLY TO
ATTENTION OF

Planning Division

Mr. John Nichols
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Chesapeake Bay Field Office
410 Severn Avenue, Suite 107A
Annapolis, MD 21403

22 December 2008

Dear Mr. Nichols:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Recovery Project, Maryland. USACE currently has authority to construct oyster habitat under Section 704(b) of the Water Resources Development Act of 1986 (amended recently by WRDA 2007, Section 5021) which authorizes the construction of alternative or beneficially modified habitats for indigenous fish and wildlife, including man-made reefs for fish habitat in the Maryland portion of the Chesapeake Bay. In 1996, USACE completed a report, the Chesapeake Bay Oyster Recovery Project, which documents the plan formulation conducted by USACE and the non-Federal sponsor, Maryland Department of Natural Resources (MDNR). Implementation of the recommendations made by this plan began in 1997 and is ongoing, but is restricted to using only oyster shell for substrate. Actions are not limited to, but have been focused in designated Oyster Recovery Areas (ORAs) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers, and near Smith and James Islands. A supplemental report/Environmental Assessment (EA) was also prepared in 2002.

In order for USACE to construct and cost share oyster reef restoration using alternative (non-oyster shell) substrates, as was authorized by the Water Resources Development Act of 2007, USACE is undertaking the preparation of an EA. Construction using alternative substrates rather than oyster shell is targeted to begin in spring 2009.

On 13 August 2008, USACE (Baltimore Operations Division) signed a Finding of No Significant Impact (FONSI) in response to a Permit Evaluation and Decision Document (EA) to permit MDNR to use alternative materials to construct oyster sanctuaries and harvest reserves (CENAB-OP-RMN (MDNR/Alternate Material) 2007-03659-M24). The proposed action is the USACE-led equivalent of the permitted MDNR action.

The purpose of this letter is to initiate coordination for compliance with all requirements of the Magnuson-Stevenson Fishery Management and Conservation Act. USACE is requesting any information your office may have on the presence of and potential impacts you foresee to essential fish habitats from the use of alternative substrates in oyster restoration. Please provide this office with any preliminary comments for this project by 30 January 2009.

If you have any questions regarding this matter, please contact Ms. Angie Sowers, Ph. D., at 410-962-7440.

Sincerely,

Amy Guise, Chief
Civil Project Development Branch

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

January 8, 2009

Ms. Amy M. Guise
Chief, Civil Project Development Branch, Planning Division
U.S. Army Corp of Engineers, Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

STATE CLEARINGHOUSE REVIEW PROCESS
State Application Identifier: MD20090107-0010
Reviewer Comments Due By: February 4, 2009
Project Description: EA: Chesapeake Bay Oyster Recovery Project: to allow use of artificial (non-oyster) substrate in the State's waters: per Public Notice 2007-03659-M24; FONSI signed on 8/13/08
Project Location: Maryland
Clearinghouse Contact: Bob Rosenbush

Dear Ms. Guise:

Thank you for submitting your project for intergovernmental review. Participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps ensure project consistency with plans, programs, and objectives of State agencies and local governments. MIRC enhances opportunities for approval and/or funding and minimizes delays by resolving issues before project implementation.

The following agencies and/or jurisdictions have been forwarded a copy of your project for their review: the Maryland Departments of Natural Resources, the Environment, Transportation; and the Maryland Department of Planning; including the Maryland Historical Trust. They have been requested to contact your agency directly by **February 4, 2009** with any comments or concerns and to provide a copy of those comments to the State Clearinghouse for Intergovernmental Assistance. Please be assured that after **February 4, 2009** all MIRC requirements will have been met in accordance with Code of Maryland Regulations (COMAR 14.24.04). The project has been assigned a unique State Application Identifier that should be used on all documents and correspondence.

A "Project Survey" form is enclosed with this letter. Please complete and return it within 14 days of the date of this letter. If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us. Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary
for Clearinghouse and Communications

LCJ:BR
Enclosure
cc: Beth Cole - MHT*
Greg Golden – DNR*
Nat Brown - MPA
Roland Limpert – DNR*
Joane Mueller – MDE*
Cindy Johnson – MDOT*
Tracey Gordy – MDPLL*
Steve Allan – MDPL*

09-0010_NDC.NEW.doc

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

PROJECT SURVEY

Would you please take a few moments and tell us the source of information used by your agency to apply to the **U.S. Department of Defense (DOD/ARMY)** for this grant and/or service. Please complete this form and return it to the State Clearinghouse within 14 days of **January 8, 2009,** to the address or fax number noted below.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2305

DATE: _____
(Date form completed)

FROM: _____
(Name of person completing this form.)

PHONE: _____-_____-_____
(Area Code & Phone number)

RE: State Application Identifier: MD20090107-0010
Project Description: EA: Chesapeake Bay Oyster Recovery Project: to allow use of artificial (non-oyster) substrate in the State's waters: per Public Notice 2007-03659-M24; FONSI signed on 8/13/08

☐ Chronicle of Philanthropy	☐ GrantsNet	☐ Nonprofit Organization Website
☐ Commerce Business Daily	☐ Health Grants and Contracts Weekly	☐ Previous Grantee
☐ Community Health Funding Report	☐ LISTSERV	☐ Red Book (Catalog of State Assistance)
☐ E-Mail Automatic Notification	☐ Local/State Funding Report and Grant Alert	☐ Seminar or Workshop Attended
☐ Federal Agency Website	☐ Maryland Department of Planning Website	☐ State Agency Website
☐ Federal Assistance Monitor	☐ Maryland Grants (MD Grants)	☐ The Catalog of Federal Domestic Assistance (CFDA)
☐ Federal Grants and Contracts Weekly	☐ Maryland Register	☐ The Foundation Center
☐ Federal Register	☐ NIH Guide for Grants and Contracts	☐ Grants.Gov
☐ Please Identify Other Source(s) Not Listed Above:		

Thank you.

Sowers returned call to Rosenbush on 22 Jan 09
Agreed this is not applicable to us+
I clarified that 8/13/08 FONSI was separate action.

MDPCH-1K

301 West Preston Street • Suite 1101 • Baltimore, Maryland 21201-2305
Telephone: 410.767.4500 • Fax: 410.767.4480 • Toll Free: 1.877.767.6272 • TTY Users: Maryland Relay
Internet: www.MDP.state.md.us

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore, Maryland 21230
410-537-3000 • 1-800-633-6101 • http://www.mde.state.md.us

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

January 27, 2009

Ms. Amy M. Guise
Chief, Civil Project Development Branch
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203

RE: State Application Identifier: MD20090107-0010
Project: Chesapeake Bay Oyster Recovery Project

Dear Ms. Guise:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the above-referenced project. Copies of the documents were circulated throughout MDE for review, and it has been determined that this project is consistent with MDE's plans, programs and objectives.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 537-4120.

Sincerely,

Joane D. Mueller
MDE Clearinghouse Coordinator
Science Services Administration

cc: Bob Rosenbush, State Clearinghouse

From: John Nichols [John.Nichols@noaa.gov]
Sent: Monday, February 09, 2009 3:17 PM
To: Sowers, Angela NAB02
Subject: COE Oyster Recovery Project

Angie:
This pertains to your letter, dated December 22, 2008, concerning issues on the proposed modifications to the Corps of Engineers, Baltimore District, Chesapeake Bay Oyster Recovery Project. Modifications include use of alternative (non-oyster shell) substrates for modifying habitats for indigenous fish in the Maryland portion of the Bay.

NOAA Fisheries had no objections to the Maryland Department of Natural Resources proposed placement of alternative cultch materials for oyster recovery purposes. Similarly, we do not object to the Corps' use of alterative non-shell materials for enhancing fish habitat.

We understand that your agency is preparing as Essential Fish Habitat Assessment for the proposed modification to this project. As was done doing your previous EFH consultation on this project, your assessment should address impacts to the same federally managed species and life stages, listed below.

bluefish (juvenile and adult stages)
summer flounder (juvenile and adult stages) windowpane (juvenile and adult stages)
cobia, red drum, Spanish mackerel, King mackerel (all life stages for each)

Based on ecological and salinity tolerance parameters for each species, we anticipate that only bluefish (juveniles and adults), summer flounder (juveniles and adults), and red drum (juveniles) will be affected by this project.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573-4575

February 10, 2009

Amy Guise
Chief, Civil Project Development Branch
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Attn: Angie Sowers

Re: Chesapeake Bay Oyster Recovery Project

Dear Ms. Guise:

This responds to your letter dated December 22, 2008, requesting comments on your proposal to use alternative (i.e., non-oyster shell) substrates to construct oyster reefs in numerous areas of the Maryland portion of the Chesapeake Bay and tributaries. Your letter did not describe the types of alternative substrates that are being considered, but a subsequent discussion with Angie Sowers on February 2 revealed the existence of an undated Public Notice which described the material as consisting of clam shell, marl, concrete rubble (must be free of wiring, pipes, and protruding rebar), stone, slag, brick, cinderblock, and preformed products such as reef balls.

We believe these materials are suitable to use in the Bay for establishing human-made reef habitat. They appear to be free of pollutants and the non-shell products are generally dense enough to resist being moved about by waves and currents. We expect that there would be no impacts to federally listed or proposed endangered or threatened species under our jurisdiction.

However, the alternative substrate materials have some noteworthy shortcomings in their ability to replace oyster shell in oyster reef restoration efforts. While oysters can be expected to attach to any of the identified hard substrates, studies have indicated that the degree to which they do so will vary, and none are expected to be as attractive as oyster shell (Haven et al. 1987; Mann et al. 1990; Haywood et al. 1999). In contrast to oyster shell, the alternative materials would not provide the abundant small interstices where oysters can set and be more protected from predation (Haven et al. 1987; Bartol and Mann 1999; O'Beirn 2000). Therefore, the best use of the alternative substrates may be as core material that supports an outer layer of oyster shell and living oysters above the surrounding bottom.

All substrates tend to become colonized by fouling organisms that successfully compete with oysters for space and by organisms that may be direct predators of oysters (e.g., bay anemone predation on larval oysters). Sedimentation on the hard substrates is also a progressive problem that greatly diminishes the likelihood of a good spat set. Management actions such as the use of bagless dredging to resuspend sediment and expose clean cultch on the reef would be precluded or made less effective with the non-shell substrates. The harvesting of oysters for the purpose of replanting seed, removing diseased oysters, or accomplishing commercial profit (from the harvest reserves) would be more difficult on reefs developed on many of the alternative substrates.

We encourage you to consider these shortcomings as you decide how to best utilize these alternative materials in your oyster restoration effort. If there are any questions, please contact George Ruddy at (410) 573-4528.

Sincerely,

Leopoldo Miranda
Field Office Supervisor

Citations:

Bartol, I.K. and R. Mann. 1999. Small-scale patterns of recruitment on a constructed intertidal reef: the role of spatial refugia. Pp. 159-170 in M. Luckenbach, R. Mann, and J. Wesson (eds) Oyster reef habitat restoration: a synopsis and synthesis of approaches; proceeding from the symposium, Williamsburg, VA April 1995.

Haven, D.S., J.M. Zeigler, J.T. Dealteris, and J.P. Whitcomb. 1987. Comparative attachment, growth and mortalities of oyster (*Crassotrea virginica*) spat on slate and oyster shell in the James River, Virginia. Journal of Shellfish Research 6(2): 45-48.

Haywood, E.L., III, T.M. Soniat, and R.C. Broadhurst, III. 1999. Alternatives to clam and oyster shell as cultch for eastern oysters. Pp. 295-304 in M. Luckenbach, R. Mann, and J. Wesson (eds) Oyster reef habitat restoration: a synopsis and synthesis of approaches; proceeding from the symposium, Williamsburg, VA April 1995.

Mann, R., B.J. Barber, J.P. Whitcomb, and K.S. Walker. 1990. Settlement of oysters, *Crassostrea virginica* (Gmelin 1791), on oyster shell, expanded shale and tire chips in the James River, Virginia. Journal of Shellfish Research 9(1): 173-175.

O'Beirn, R.X., M.W. Luckenbach, J.A. Nestlerode, and G.M. Coates. 2000. Toward design criteria in constructed oyster reefs: oyster recruitment as a function of substrate type and tidal height. Journal of Shellfish Research 19(1): 387-395.

From: George_Ruddy@fws.gov
Sent: Thursday, February 12, 2009 11:59 AM
To: Sowers, Angela NAB02
Cc: Bob_Zepp@fws.gov
Subject: RE: Proposal for Use of Alternative Oyster Substrates

Angie: As stated in the letter, we expect that there will be no effect on T&E Federally listed species under our jurisdiction. You should check with NMFS for their opinion on possible effects to sturgeon and sea turtles. In the past some have suggested that the Eastern oyster should be listed, but of course this has not happened. I suppose that if the Asian oyster is introduced, the possibility of listing the Eastern oyster might be revisited. Our letter can be taken as an acknowledgment of your coordination and compliance with the ESA and the FWCA. However, your letter was quite general and did not give me a good impression of the scale and precise use of the alternative substrates. I trust that the oyster restoration program includes adaptive management provisions to determine how well the alternative substrate material is functioning. --George

"Sowers, Angela NAB02" <Angela.Sowers@usace.army.mil> To <George_Ruddy@fws.gov>
cc
02/12/2009 10:22 AM Subject RE: Proposal for Use of Alternative Oyster Substrates

Thanks George. Did you want to identify any RTE species that we should discuss in our evaluations. Can I state that this response covers coordination for both ESA and the Fish and Wildlife Coordination Act?

Thanks,
Angie

-----Original Message-----
From: George_Ruddy@fws.gov [mailto:George_Ruddy@fws.gov]
Sent: Thursday, February 12, 2009 10:18 AM
To: Sowers, Angela NAB02
Subject: Proposal for Use of Alternative Oyster Substrates

Angie: I am attaching a copy of our response letter which has been signed and mailed. --George (See attached file: oyster substrates.doc)

From Mark Mendelsohn (CENAB-PL)
To: Anna Compton (CENAB-PL)
February 25, 2009

Phone conversation with Mr. Roland Limpert, Heritage Program, Maryland Department of Natural Resources on February 25, 2009.

I asked Dr. Limpert if there are any state listed rare or threatened species that could be impacted by the placement of alternative substrate at the oyster bars in the project areas. He said a review was undertaken for the State's permit application and it was determined that there are no listed species in the area the Corps is considering.

Prepared by

Mark Mendelsohn
Biologist

USACE-CENAB-PL

PHONE CONVERSATION RECORD

SUBJECT: Oyster Project Essential Fish Habitat
CONTACT: John Nichols at National Marine Fisheries Service (NMFS)
DATE: March 9, 2009

I called Mr. Nichols to ask about species and essential fish habitat (EFH). He said that as far as EFH the species of concern are: Summer Flounder, Bluefish, Window Pane Flounder, Cobia, King Mackerel, Spanish Mackerel and Red Drum. He said the ones of primary concern are Summer Flounder, Bluefish, and Red Drum.

Prepared by

Mark Mendelsohn
Biologist
USACE -PL

Compton, Anna M NAB

From: Mendelsohn, Mark NAB02
Sent: Thursday, March 12, 2009 3:44 PM
To: Sowers, Angela NAB02; Compton, Anna M NAB
Subject: FW: Oyste rEA
Attachments: Julie_Crocker.vcf

Some good news!

From: Julie Crocker [mailto:Julie.Crocker@Noaa.Gov]
Sent: Thursday, March 12, 2009 2:33 PM
To: Mendelsohn, Mark NAB02
Subject: Re: Oyste rEA

Hi Mark.

As you know, several species listed by NMFS as threatened or endangered occur in the project area (sea turtles and shortnose sturgeon). Based upon the information you provided in your 3-9-09 email, there is no indication that the proposal to use alternative substrate as opposed to shell for the proposed oyster rehabilitation project would negatively impact any of these species. This conclusion is consistent with the determinations made by ACOE and NMFS for other similar projects (i.e., the Lynnhaven River oyster rehab project in VA and the Potomac River fisheries commission project).

Julie

Mendelsohn, Mark NAB02 wrote:
Dear Ms. Crocker:

The Baltimore District, USACE, has determined that oyster reef construction using alternative substrate is not likely to impact any of the endangered species under your purview. We are requesting your concurrence. Project information is enclosed. Please contact me if you need further information.

Thank You.

Mark Mendelsohn
Biologist
Baltimore District
USACE-PL
(410) 962-9499

Compton, Anna M NAB

From: Sowers, Angela NAB02
Sent: Thursday, March 19, 2009 3:04 PM
To: Gomez, Michele NAB02; Compton, Anna M NAB
Subject: Summary of phone conversation with George Ruddy on 17 Mar 2009

All,
I had a phone conversation with George Ruddy on Tuesday, March 17, 2009 regarding the alternative substrate EA for oysters restoration. We discussed any specific ideas he had for monitoring sites restored using alternative substrates. I told George that typically we monitor growth, density, and disease. Recently we have also looked at mapping the extent and profile of reefs. He raised some ideas in designing the reefs. He suggested we vary profile and relief, but highlighted that he wouldn't expect the orientation of the reef to be that significant in Maryland since these tributaries experience much weaker currents than Virginia waters. We discussed how to control placement of the material to achieve the desired profiles. Our recent monitoring has shown that earlier placement of materials did not usually achieve the even distribution across the targeted area, but rather tracked the course of the boat. So, we realize the difficulty with achieving precise geometry, but should still include plans to look at different profiles and relief. The other issue we discussed was since the alternative substrates are likely heavier and denser than natural oyster shell, there could be some issue with settlement into the bottom. That is, how well will the bottom support the heavier materials? I think the profile mapping Ken Paynter has been doing for us could assess any settlement issues. George proposed that we look at ecological benefits. That is, do reefs constructed with alternative substrates provide habitat for the same reef community that uses reefs constructed of oyster shell? There is the possibility that not all the critters that attach to natural shell would attach to alternative substrates. Now, this can get complicated and affect some species possitively and some negatively- I won't get into that in an email, but he had been thinking there could only be negative consequences and I think I convinced him that there would be some trade-offs in the food web. We discussed whether the alternative substrate would provide sufficient reef characteristics for oysters or whether a veneer of shell would need to be placed on top of the alternative substrate. I explained to George that we always seed our reefs with spat on shell. He did not know this. I think he thought we just put the substrate out and we looking for it to catch a natural spat set. Given that we seed, I don't think this is as big an issue anymore, but is still worth doing some comparisons of reefs constructed with alt. substrate and then seeded with those constructed with alt. substrate, a shell veneer, and then seeded. One final point we discussed monitoring is how well does spat placed cover the artificial substrate.

Overall, he is satisfied with our coordination up to this point and was open to us continuing the coordination as we go through the design and construction phases and into monitoring. I requested an email stating this, but am not sure we will get one since I haven't seen anything yet.

In summary, points to include in a monitoring plan
-density
-growth
-disease
-WQ
-profile, placement, settlement
-ecological community and use
-coverage of spat on substrate used for base
-include comparison of reefs constructed only of alternative substrate with spat on shell with reefs that also hold a veneer of oyster shell on top of the alternative substrate

I am planning on pulling together a page or two for Claire describing a basic monitoring plan.

Thanks,
Angie

Angie Sowers, Ph.D.
U.S. Army Corps of Engineers
Baltimore District- Planning Division
Civil Project Development Branch
Biologist

MARYLAND HISTORICAL TRUST

Archaeology Office

Parris N. Glendening
Governor

Patricia J. Payne
Secretary, DHCD

October 26, 1995

Dr. James F. Johnson, Chief
Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dr. Johnson:

This office has reviewed only the underwater sections of the Public Notice application (and are therefore speaking for underwater concerns - terrestrial issues will be addressed by our compliance office) for the Chesapeake Bay Oyster Recovery Project in Maryland. Our office recognizes that several areas on the proposed project have significant historical properties within their boundaries. In order to preserve and protect these properties, this office should be contacts on specific areas selected, to preform our review and make appropriate determinations. Some zones represented may require a Phase I underwater survey before work can proceed. For example, Kedges Straits is an historically important area with a high potential for significant submerged cultural resources. A Phase I survey will be required here.

We also have concerns about comments made in the Corps letter of October 11, 1995, "Generally, the actions will mimic historic oystering activities in the same areas, which have been done for centuries. The bed formation will only minimally impact the surface of the submarine sites". While it is true bed formation will have minimal impact, harvesting will have and historically has had, a devastating effect on submerged heritage resources. Hence our concern that beds be created only in areas where cultural remains have first been inventoried, assessed, evaluated, and where necessary avoided or mitigated.

This office should be contacted for each specific area selected as the project proceeds, so the effect can be determined. Phase I underwater survey should be carried out by a qualified professional archeologist, and performed in accordance with the "Standards and Guidelines for Archeological Investigations in Maryland" (Shaffer and Cole 1994) and with Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (1983). Based upon the results of the survey, we will be able to determine whether or not the project will effect any submerged archeological resources and make appropriate recommendations. Further consultation with our office will be necessary to fulfill compliance with Section 106 of the National Historic Preservation Act of 1966; and we will discuss field methods and techniques with the archeologist selected to perform the requested survey.

Thank you for your cooperation and assistance. If you have any questions or require further information, please contact Dr. Susan Langley at (410) 514-7662 or Mr. Bruce Thompson at (410) 514-7663.

Sincerely,

Susan B.M. Langley, Ph.D.
State Underwater Archaeologist

SBML/BFT/SRB
9502235
cc: Mr. William Matuszeski
Ms. Elizabeth Gillelan
Mr. Timothy E. Goodger
Mr. Jeri L. Berc, Ph.D.
Ms. Elizabeth J. Cole
Honorable Jane T. Nishida
Mr. Daniel J. O'Leary
Mr. W. Peter Jensen
Honorable John R. Griffin
Mr. William C. Baker
Mr. John P. Wolflin
Mr. Roy E. Denmark, Jr.
Mr. W. Michael McCabe
Mr. Mark Mendelsohn
Dr. Gary Shaffer

MARYLAND HISTORICAL TRUST

Archaeology Office

Parris N. Glen
Gov

Patricia J. Payne
Secretary, DHCD

December 2, 1995.

Dr. James F. Johnson, Chief
Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Dr. Johnson:

This office has compared the maps, provided by your office, of natural and legal oyster bars extant in a number of Maryland rivers with our records of submerged cultural resources and NOAA charts for these same areas. Remains which may be potentially impacted by the proposed oyster seeding and subsequent dredging are highlighted in green. Discussion of these follows with additional commentary on areas where survey is recommended.

Figure 4a: Chester River - activities do not appear to impact known cultural resources.
Figure 7a: Magothy River - only one site may be impacted; however, because of the scale and schematic nature of the maps provided it is difficult to determine the exact placement of the site. Activities in this area may proceed with caution.
Figure 5a: Choptank River - five sites, all in Section C, fall within or lie extremely close to proposed activity areas; these areas may be avoided or plans for further investigation for assessment and evaluation made through a Phase I survey.
Figure 6a: Severn River - eight sites, all in Section A, fall within or lie extremely close to proposed activity areas; these areas may be avoided or plans for further investigation for assessment and evaluation made through a Phase I survey.
Figures 8a: Kedges Straits and 3a: Nanticoke River - on both maps the legend obscures areas where oyster bars exist. Few sites are documented for these areas because they have not yet been surveyed and the only information at hand is from NOAA charts. Because of the historic significance of the former and the absence of records for the latter, Phase I survey is recommended for areas where activities are planned for both of these regions.
Figure 2a: Patuxent River - fifteen sites fall within or lie in close proximity to proposed activity areas. However, for the most part these sites tend to cluster and this should facilitate avoidance; some also appear to lie within Navy restricted areas. It is presumed that areas farther up this river are not being considered for activity. Because of the presence of the remains of the entire Chesapeake Flotilla which served, under the command of Commodore Joshua Barney, during the War of 1812 activities outside of

Section C are not recommended without Phase I survey. Plans for a remote sensing survey in this region are currently being formulated by the Maryland Historical Trust in cooperation with the U.S. Navy and Maryland National Capital Park and Planning. It is also presumed that no activities are planned at this time for the areas of the Potomac (eg. Breton Bay) which appears at the bottom of this figure.

Phase I underwater survey should be carried out by a qualified professional archaeologist and performed in accordance with the "Standards and Guidelines for Archaeological Investigations in Maryland" (Shaffer and Cole 1994) and with Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (1983). Based upon the results of the survey, we will be able to determine whether or not the project will affect any submerged archaeological resources and make appropriate recommendations. Further consultation with our office will be necessary to fulfill compliance with Section 106 of the National Historic preservation Act of 1966; and we will discuss field methods and techniques with the archaeologist selected to perform the requested survey.

We appreciate your cooperation and assistance. If you have any questions or require further information, please contact me at (410) 514-7662.

Sincerely,

Susan B.M. Langley, Ph.D
State Underwater Archaeologist

/sl
9502235
cc: Mr. William Matuszeski
Ms. Elizabeth Gillelan
Mr. Timothy E. Goodger
Dr. Jeri L. Berc
Ms. Elizabeth J. Cole
Honorable Jane T. Nishida
Mr. Daniel J. O'Leary
Mr. W. Peter Jensen
Honorable John R. Griffin
Mr. William C. Baker
Mr. John P. Wolfin
Mr. Roy E. Denmark, Jr.
Mr. W. Michael McCabe
Mr. Mark Mendelsohn
Dr. Gary Shaffer

US Army Corps of Engineers
Baltimore District

Notice of Availability

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES: In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) has prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA has been prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem; temporary construction impacts to water, air, navigation, and traffic; endangered and threatened species; hazardous and toxic materials; aesthetics and recreation; cultural resources; and the general needs and welfare of the public.

Any person who has an interest in the project may make comments and/or request a public hearing within 30 days of the date of publication of this notice. Comments must clearly set forth the interest that may be adversely affected by this proposed action and the manner in which the interest may be adversely affected.

USACE has determined that the proposed activity complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management Program. By copy of this public notice, the USACE is requesting the State's concurrence with this determination.

Individuals wishing to obtain a copy of, or wanting more information about the EA or draft Finding of No Significant Impact, may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to Anna.M.Compton@usace.army.mil or by telephone at (410) 962-4633. The EA is available at the USACE website: http://www.nab.usace.army.mil/PN/CW/OysterEA_April2009.pdf. The EA will also be available at the following libraries:

Kent County Public Library, 408 High Street, Chestertown, MD, 21620

Wicomico County Free Library, 122 S. Division Street, Salisbury, MD, 21801

Somerset County Library, 11767 Beechwood Street, Princess Anne, MD 21853

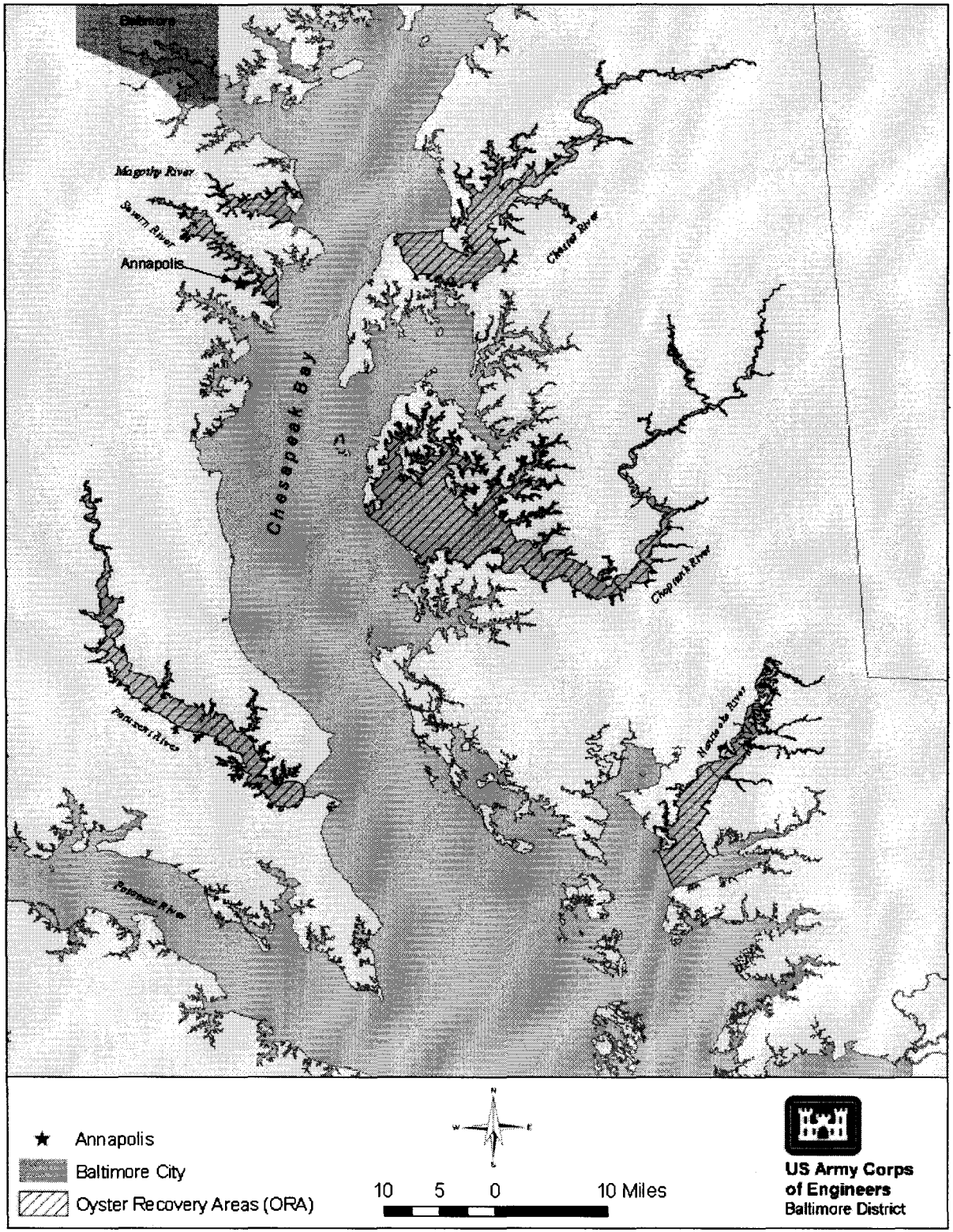
Calvert County Public Library, 20 Duke Street, Prince Frederick, MD 20678

Dorchester County Public Library, 303 Gay Street, Cambridge, MD 21613

Anne Arundel County Public Library, 1410 West Street, Annapolis, MD 21401

Amy M Guise
Chief, Civil Project Development Branch
Planning Division

Figure 1. Chesapeake Bay Oyster Recovery Areas



Compton, Anna M NAB

From: Brian Hug [bhug@mde.state.md.us]
Sent: Tuesday, May 05, 2009 1:37 PM
To: Compton, Anna M NAB
Cc: Gomez, Michele NAB02
Subject: Re: Draft EA-Oyster Alternate Substrate

We did and MDE concurs that the emission's created from this analysis fall below the current de minimis thresholds for general conformity

one correction - the current de mimimis levels for MD are 50 tons for VOC, 100 for NOx, SO2 and PM2.5

Brian J. Hug
Deputy Program Manager
Air Quality Planning Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
410-537-4125

>>> "Compton, Anna M NAB" <Anna.M.Compton@usace.army.mil> 5/5/2009 1:14
>>> PM >>>
Brian-

I just wanted to confirm that you received the Draft EA-Chesapeake Bay Oyster Restoration using Alternate Substrate which was distributed on April 13 for a 30-day public review and comment period. Please let me know if you received the document and if you concur with USACE findings regarding the Air Quality Conformity Analysis.

Please let me know of any questions or comments.

Thanks,

Anna Compton
Study Manager, Planning Division
Baltimore District, Corps of Engineers
10 South Howard Street
Baltimore, MD 21201
Phone: (410) 962-4633
Fax: (410) 962-4698

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Northeast Region
Habitat Conservation Division
410 Severn Avenue, Suite 107A
Annapolis, MD 21403
Commercial Phone: (410) 267-5675
FAX#: (410) ~~267-5666~~ (410) 295-3164

FAX TRANSMITTAL

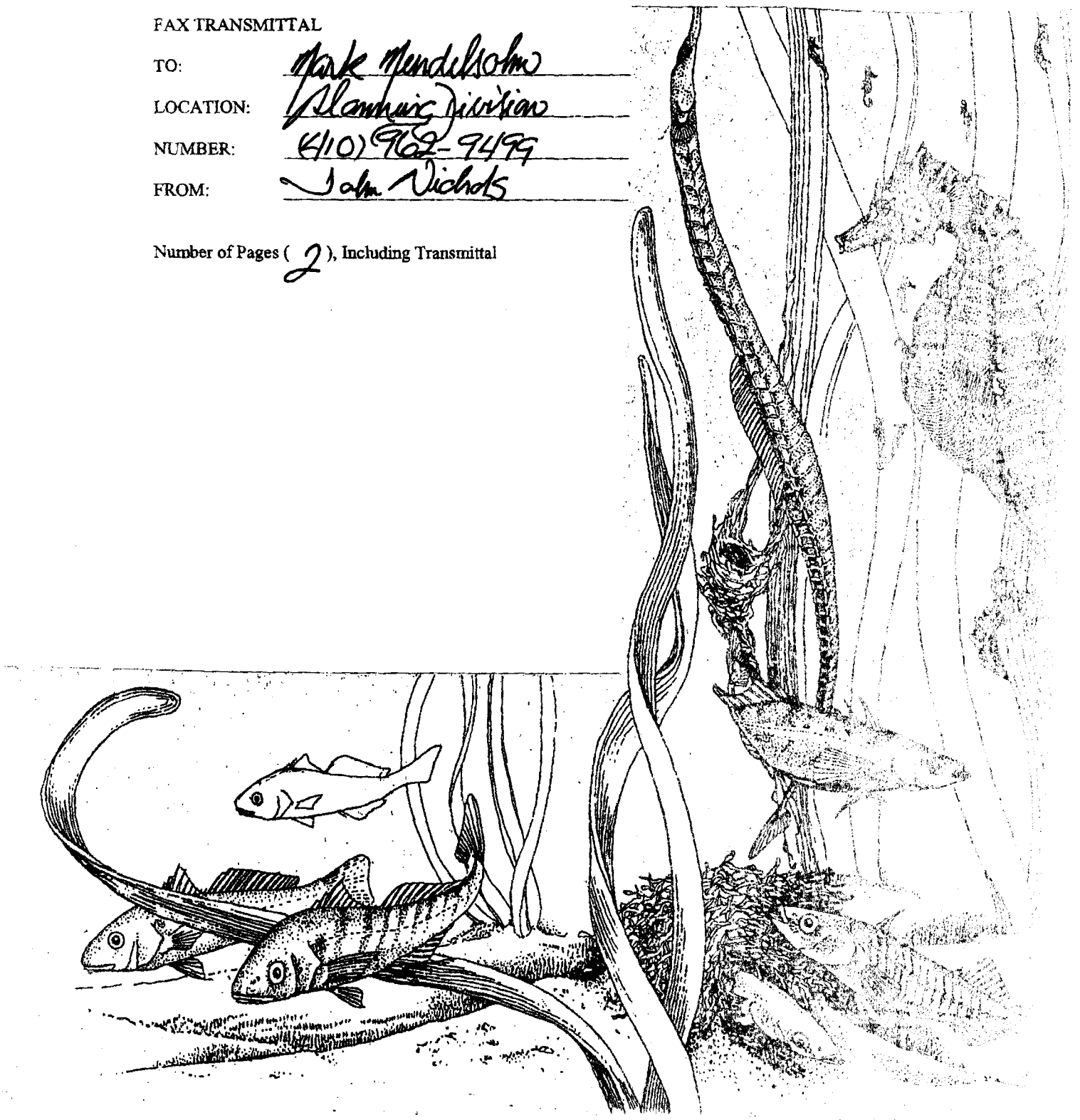
TO: Mark Mendelsohn

LOCATION: Plankuic Division

NUMBER: (410) 962-9499

FROM: John Nichols

Number of Pages (2), Including Transmittal



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
Chesapeake Bay Program Office
410 Severn Ave., Suite 107A
Annapolis, Maryland 21403

May 7, 2009

MEMORANDUM TO: Amy M. Guise
Chief, Civil Project Development Branch, Planning Division
Baltimore District, Corps of Engineers

FROM: John Nichols JSN

SUBJECT: Chesapeake Bay Oyster Restoration Using Alternative Substrate

National Marine Fisheries Service (NMFS) has reviewed the draft Environmental Assessment & Finding of No Significant Impact, and Essential Fish Habitat Assessment, dated April 2009, for the proposed Chesapeake Bay Oyster Restoration Using Alternative Substrate, Maryland.

NMFS has been an advocate of using alternative substrate materials as oyster cultch, to replace dwindling fossil shell supplies. Therefore, we are supportive of this proposal.

As discussed in your EFH Assessment, oyster cultch, including alternative materials, provides finfish habitat enhancement in the way of improved shelter and forage opportunities. The way in which cultch is deployed on the bottom also affects the degree of fish habitat use. For example, mounding of cultch increases surface area of and interstitial pockets within the material for fouling community development and fish shelter. Mounded cultch, similar to that of materials used for fish reefs, also structurally diversifies the bottom, providing cover for fish over a broad area adjacent to and between mounds.

In accordance with Section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation & Management Act (MSA), we provide the following EFH Conservation Recommendation.

1. For deployment of alternative materials by mechanical means other than use of water cannon, mounding of materials on the oyster bar bottom should be practiced in some locations. Mounds should be approximately 5 – 6 feet in height above the bottom surface, especially in areas prone to silt accumulation, to elevate the cultch above the bottom silt layer. Mounding of cultch materials may be most appropriate on bars not subject to commercial harvest activities (e.g., oyster sanctuaries).

Section 305(b)(4)(B) of the MSA requires the Corps of Engineers to provide NMFS with a detailed written response to these EFH Conservation Recommendations, including a description of measures adopted for mitigating project impacts. In the case of a response that is inconsistent with NMFS' recommendation, your agency must explain its reasons for not following the recommendation. Included in such reasoning would be the scientific justification for any disagreement with NMFS over the anticipated effects of the proposed action and measures needed to mitigate such effects [50 CFR 600.920(k).

If you have any questions, please contact me at (410) 267-5675.

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

April 28, 2009

Ms. Amy Guise, Chief, Civil Projects Development Branch
U.S. Army Corps of Engineers, Baltimore District
CENAB-PL-P
P.O. Box 1715
Baltimore, MD 21203-1715

STATE CLEARINGHOUSE REVIEW PROCESS
State Application Identifier: MD20090422-0447
Reviewer Comments Due By: May 10, 2009
Project Description: Draft Environmental Assessment and FONSI: Chesapeake Bay Oyster Restoration Using Alternate Substrate: completed Water Quality Certification and Department of Army's Permit Evaluation and Decision Document (see MD20090107-0010)
Project Location: Maryland
Clearinghouse Contact: Bob Rosenbush

Dear Ms. Guise:

Thank you for submitting your project for intergovernmental review. Participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps ensure project consistency with plans, programs, and objectives of State agencies and local governments. MIRC enhances opportunities for approval and/or funding and minimizes delays by resolving issues before project implementation.

The following agencies and/or jurisdictions have been forwarded a copy of your project for their review: the Maryland Departments of Transportation; the Counties of Calvert, Caroline, Charles, Dorchester, Wicomico, Anne Arundel, Prince George's, Queen Anne's, Somerset, St. Mary's, and Talbot; the Maryland Department of Planning including the Maryland Historical Trust. They have been requested to contact your agency directly by **May 10, 2009** with any comments or concerns and to provide a copy of those comments to the State Clearinghouse for Intergovernmental Assistance. Please be assured that after **May 10, 2009** all MIRC requirements will have been met in accordance with Code of Maryland Regulations (COMAR 14.24.04). The project has been assigned a unique State Application Identifier that should be used on all documents and correspondence.

A "Project Survey" form is enclosed with this letter. Please complete and return it within 14 days of the date of this letter. If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us. Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey, J.D., Assistant Secretary
for Clearinghouse and Communications

LCJ:BR
Enclosure
cc: Beth Cole – MHT*
09-0447_NDC.NEW.doc
Greg Golden – DNR
Cindy Johnson – MDOT*
Gregory Bowen – CLVT*
Katheleen Freeman – CRLN*
Joane Mueller – MDE*
Reed Faasen – CHAS*
Steven Dodd – DRCH*
Gary Pusey – WCMC*
John Dodds – ANARP*
Beverly Warfield – PGEO*
J. Steven Cohoon – QANN*
Samuel Boston – SMST*
John Savich – STMA*
Stacey Dahlstrom – TLBT*

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Maryland Department of Planning

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

PROJECT SURVEY

Would you please take a few moments and tell us the source of information used by your agency to apply to the **U.S. Department of Defense (DOD/ARMY)** for this grant and/or service. Please complete this form and return it to the State Clearinghouse within 14 days of **April 28, 2009,** to the address or fax number noted below.

TO: **Maryland State Clearinghouse**
Maryland Department of Planning
301 West Preston Street
Room 1104
Baltimore, MD 21201-2305

DATE: _____
(Date form completed)

FROM: _____
(Name of person completing this form.)

PHONE: _____-_____-_____
(Area Code & Phone number)

RE: State Application Identifier: MD20090422-0447
Project Description: Draft Environmental Assessment and FONSI: Chesapeake Bay Oyster Restoration Using Alternate Substrate: completed Water Quality Certification and Department of Army's Permit Evaluation and Decision Document (see MD20090107-0010)

☐ Chronicle of Philanthropy	☐ GrantsNet	☐ Nonprofit Organization Website
☐ Commerce Business Daily	☐ Health Grants and Contracts Weekly	☐ Previous Grantee
☐ Community Health Funding Report	☐ LISTSERV	☐ Red Book (Catalog of State Assistance)
☐ E-Mail Automatic Notification	☐ Local/State Funding Report and Grant Alert	☐ Seminar or Workshop Attended
☐ Federal Agency Website	☐ Maryland Department of Planning Website	☐ State Agency Website
☐ Federal Assistance Monitor	☐ Maryland Grants (MD Grants)	☐ The Catalog of Federal Domestic Assistance (CFDA)
☐ Federal Grants and Contracts Weekly	☐ Maryland Register	☐ The Foundation Center
☐ Federal Register	☐ NIH Guide for Grants and Contracts	☐ Grants.Gov
☐ Please Identify Other Source(s) Not Listed Above:		

Thank you.

COMPTON spoke with Rita Wallace on 12-May2009 and she confirmed this form does not need to be filled out

MDPCH-1K

301 West Preston Street • Suite 1101 • Baltimore, Maryland 21201-2305
Telephone: 410.767.4500 • Fax: 410.767.4480 • Toll Free: 1.877.767.6272 • TTY Users: Maryland Relay
Internet: www.MDP.state.md.us

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore, Maryland 21230
410-537-3000 • 1-800-633-6101 • http://www.mde.state.md.us

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

May 12, 2009

Ms. Amy Guise
U.S. Army Corps of Engineers, Baltimore District
CENAB-PL-P
P.O. Box 1715
Baltimore, MD 21203

RE: State Application Identifier: MD20090422-0447
Project: Chesapeake Bay Oyster Restoration Using Alternate Substrate

Dear Ms. Guise:

Thank you for the opportunity to review the above referenced project. The document was circulated throughout the Maryland Department of the Environment (MDE) for review, and the following comment is offered for your consideration.

1. Unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions, please feel free to call me at (410) 537-4120.

Sincerely,

Joane D. Mueller
Clearinghouse Coordinator

cc: Bob Rosenbush, State Clearinghouse

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

Planning Division

Ms. Joane Mueller
Maryland Department of the Environment,
1800 Washington Blvd
Baltimore, MD 21230

JUN 4 2009

Dear Ms. Mueller:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate, Draft Environmental Assessment (EA).

USACE received a comment on May 12, 2009 (Maryland Department of the Environment State Application Identifier: MD20090422-0447) from your agency. The comment provided is as follows:

"Unless the source and specific composition is known, actual batches of alternate substrate should be tested to assure that there are no unexpected contaminants that would not be a problem in air but could leach into water."

USACE will follow MDE's recommendation to test actual batches of alternate substrate, if materials from an unknown source are used, to ensure that no unexpected contaminants leach into the air or water. USACE intends to utilize clean material, free of contaminants and hazardous materials that are suitable for disposal within State waters as alternate substrate for oyster restoration. Additionally, USACE intends to use only material in which the source and specific composition is known. All material will be examined for foreign material prior to placement.

If you have any questions or comments regarding this matter, please contact Ms. Anna Compton, at (410) 962-4633, or email Anna.M.Compton@usace.army.mil.

Sincerely,

Amy M. Guise, Chief
Civil Project Development Branch

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Shari T. Wilson
Secretary

Robert M. Summers, Ph.D.
Deputy Secretary

May 22, 2009

Anna Compton
Study Manager, Planning Division
Baltimore District, Corps of Engineers
10 South Howard Street
Baltimore, MD 21201

RE: Chesapeake Bay Oyster Restoration Using Alternate Substrate

Dear Ms. Compton:

I am responding to the Corps of Engineers' (Corps) request for a Federal Consistency determination, pursuant to Section 307 of the Federal Coastal Zone Management Act of 1972, as amended (CZMA), for the referenced project. The Maryland Department of the Environment (MDE) has reviewed the Draft Environmental Assessment (EA) and Finding of No Significant Impact, Chesapeake Bay Oyster Restoration Using Alternate Substrate, Maryland, released by the Corps in April, 2009. The non-Federal sponsor of the project is the Maryland Department of Natural Resources (DNR).

The Draft EA evaluates the proposed use of alternate substrate in addition to oyster shell to construct oyster bars and reefs within the Maryland portion of the Chesapeake Bay and its tidal tributaries. The use of alternate substrate has become necessary due to the dwindling supply of oyster shell.

Construction using alternate substrate rather than, or in addition to, oyster shell is scheduled to begin in spring/summer 2009 and continue thereafter in annual placement cycles subject to the availability of funds. Potential alternate substrate includes, but is not limited to, clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be placed would be free of building debris such as wiring, pipes and other debris. No protruding re-bar would be allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e., reef balls). It is also noted that the Corps and the State issued authorizations to DNR in 2008 for the use of alternate substrate to construct oyster sanctuaries and harvest reserves.

The document assesses the overall effects of the use of alternate substrate and finds that there will be minor, temporary impacts during construction to benthic organisms, local turbidity, recreational and commercial fishermen, and fish (eggs, larval, and

juvenile stages). It concludes that there will be a long-term beneficial impact to the aquatic environment and no long-term adverse impacts associated with the project.

MDE concurs with the findings and conclusions of the Draft EA. Accordingly, the proposed action is consistent with the Maryland Coastal Zone Management Program, as required by Section 307 of the CZMA. In addition, MDE issued a Section 401 Water Quality Certification (WQC) for the Oyster Restoration Project on April 15, 2005, which does not specify the type of substrate (WQC # 05-WQ-001). The WQC remains in effect until April 15, 2010. Please note that the Corps must request an extension of the WQC prior to the expiration date.

If you have any questions, please contact me at (410) 537-3763 or by e-mail at eghigiarelli@mde.state.md.us.

Sincerely,

Elder Ghigiarelli, Jr.
Deputy Administrator
Federal Consistency Coordinator
Wetlands and Waterways Program

US Army Corps
of Engineers
Baltimore District

PUBLIC NOTICE

JUN 4 2009

FINDING OF NO SIGNIFICANT IMPACT
CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE, MD

ALL INTERESTED PARTIES:

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA was prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

The Draft EA was made available for a 30-day public review period on April 13, 2009 which ended on May 13, 2009. The EA found that the potential negative impacts to benthic and open water habitat associated with the implementation of the project will occur over a small area and will be short-term. The project will produce a net beneficial impact to the environment through the restoration of habitat for oysters and other species associated with oyster communities and does not constitute a major Federal action significantly affecting the quality of the human environment. Based upon this finding, preparation of an Environmental Impact Statement (EIS) was not required and the USACE Baltimore District Engineer signed a Finding of No Significant Impact (FONSI) on May 29, 2009.

Should you have any questions, you may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to anna.m.compton@usace.army.mil or by telephone at (410) 962-4633.

Amy M. Guise, Chief
Civil Project Development Branch

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1715
BALTIMORE, MARYLAND 21203-1715

Planning Division

Mr. John Nichols
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Chesapeake Bay Field Office
410 Severn Avenue, Suite 107A
Annapolis, MD 21403

JUN 8 2009

Dear Mr. Nichols:

This letter is in reference to the U.S. Army Corps of Engineers, Baltimore District (USACE) Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate, Draft Environmental Assessment (EA).

USACE received written comments on May 7, 2009, from you which stated that your agency, National Marine Fisheries Service (NMFS), is in support of the proposed activities and included the recommendation of "...mounding of materials on the oyster bar bottom in some locations." The recommended height was 5 to 6 feet. In a telephone conversation with Ms. Anna Compton from my office on May 12, 2009, you provided a final recommendation of 3 to 6 feet due to the fact that the substrate placement will occur on existing hard bottom habitat that often has a vertical height (above bay bottom) as shown by Maryland Geological Survey bathymetry data.

In response to your letter, USACE will follow NMFS recommendation to place substrate in a few locations that will bring the area to a height of 3 to 6 feet above soft bottom bay floor. The "mounds" will be incorporated into the site design to provide heterogeneity and varying vertical relief to constructed oyster habitat.

In accordance with Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, USACE is required to provide NMFS with a detailed written response to Essential Fish Habitat (EFH) Conservation recommendations, including a description of measures adopted for mitigating project impacts. This letter provides the required response and is consistent with NMFS recommendations.

If you have any questions or comments regarding this matter, please contact Ms. Anna Compton, at (410) 962-4633, or email Anna.M.Compton@usace.army.mil.

Sincerely,

Amy M. Guise, Chief
Civil Project Development Branch

20090272

US Army Corps of Engineers
Baltimore District

Notice of Availability

APR 13 2009

F
COE
BAJ

RECEIVED
APR 17 2009
By

The Maryland Historical Trust has determined that this undertaking will have no adverse effect on historic properties.
Date 5/21/09

CHESAPEAKE BAY OYSTER RESTORATION USING ALTERNATE (NON-OYSTER SHELL) SUBSTRATE

CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

ALL INTERESTED PARTIES: In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the U.S. Army Corps of Engineers, Baltimore District (USACE) has prepared an Environmental Assessment (EA) for the use of alternate substrates including, but not limited to clam shell, marl, concrete, stone, slag, brick, and cinderblock, as part of the Chesapeake Bay Oyster Recovery Project, Maryland. This project is being conducted under the authority of Section 704(b) of the Water Resources Development Act (WRDA) of 1986, as amended.

In conjunction with the ongoing Chesapeake Bay Oyster Recovery Project, an EA has been prepared for the actions relating to the placement of alternate (non-oyster shell) substrate in designated Oyster Recovery Areas (ORA's) of the following tributaries: Patuxent, Severn, Magothy, Chester, Choptank and Nanticoke Rivers (see attached Figure). Oyster restoration activities have occurred in these areas since 1996 as part of the Chesapeake Bay Oyster Recovery Project with oyster shell only, and are expected to continue annually, as funding allows.

Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem; temporary construction impacts to water, air, navigation, and traffic; endangered and threatened species; hazardous and toxic materials; aesthetics and recreation; cultural resources; and the general needs and welfare of the public.

Any person who has an interest in the project may make comments and/or request a public hearing within 30 days of the date of publication of this notice. Comments must clearly set forth the interest that may be adversely affected by this proposed action and the manner in which the interest may be adversely affected.

USACE has determined that the proposed activity complies with and will be conducted in a manner consistent with Maryland's federally approved Coastal Zone Management Program. By copy of this public notice, the USACE is requesting the State's concurrence with this determination.

Individuals wishing to obtain a copy of, or wanting more information about the EA or draft Finding of No Significant Impact, may write to the U.S. Army Corps of Engineers, Baltimore District, ATTN: Anna Compton, U.S. Army Corps of Engineers, Baltimore District, CENAB-PL-P, P.O. Box 1715, Baltimore, Maryland 21203-1715 or by electronic mail to Anna.M.Compton@usace.army.mil or by telephone at (410) 962-4633. The EA is available at the USACE website: http://www.nab.usace.army.mil/PN/CW/OysterEA_April2009.pdf. The EA will also be available at the following libraries:

Kent County Public Library, 408 High Street, Chestertown, MD, 21620

APPENDIX D:

Air Quality Conformity Calculations

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Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate

Chesapeake Bay Oyster Recovery Project, Maryland

General Conformity Review and Emission Inventory

May 2009

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS).

In the case of the *Chesapeake Bay Oyster Restoration Using Alternate (Non-Oyster Shell) Substrate*, Maryland, the Federal action is to place alternate substrate such as clam shell, concrete, and rubble on existing oyster beds (25-40 acres) at several locations in Maryland portions of the Chesapeake Bay on an annual basis, subject to availability of funding. The U.S. Army Corps of Engineers, Baltimore District would be responsible for construction.

There are two types of Federal Conformity: Transportation Conformity (TC) and General Conformity (GC). TC does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system because all project activities will be on the water. GC however is applicable. The oyster restoration activities would be subject to detailed conformity determinations unless these actions are clearly considered *de minimus* emissions; use of these thresholds assures that the conformity rule covers only major federal actions. The Baltimore region and D.C. metropolitan region are in non-attainment status for particulate matter 2.5 (PM2.5) per EPA final rule of January 5, 2005. On July 17 2006, EPA published a direct final rule (71 FR 40420) establishing a 100 tons per year (TPY) *de minimis* levels for PM2.5,SO2 and NOX, 50 TPY for VOCs.

On March 29, 2007 the EPA published specific guidance on requirements for states to update SIPS to meet the new federal PM 2.5 standard. This rule is general in nature and does not change the requirements of the July, 2006 direct rule. It simply provides direction on the approach states must follow to consistency with federal requirements. State plans must be completed by April 2008. Compliance with the new ambient PM2.5 standard is required by 2010.

Jim Matters of Langenfelder Marine (contractor that has performed shell placement for USACE since 1996) was contacted to provide guidance on assumptions for equipment, hours of operation, and engine size for this project. In general it is assumed that the project will be 15, 10-hour workdays, and a water cannon will be used 2 hours out of the work day. The tug boat and water pump engines would be 800 hp. Calculations for air emissions and fuel consumption expected from project activities are shown in Table 1 and total emission rates from project activities are shown in Table 2.

Conclusions

The total estimated emissions that would result from this project construction are 1.26 tons of NOx 0.022 tons of VOCs, 0.216 tons of SO2 and 0.029 tons of PM 2.5. These emissions are below the GC trigger levels of 100 tons per year. The estimates from project construction represent only 1% of the annual limit for NOx, less than 1% of the annual limit for VOCs, SO2 and PM 2.5. Although construction activities would result in short-term, increased air emissions, these emissions would be less than the *de minimus* thresholds. Because projected emissions are below threshold levels, the action is exempt from further Conformity analysis.

Table 1 Marine Engine Emission Factor and Fuel Consumption Algorithms (in g/kW-hr for all marine engines)

Pollutant	Exponent(x)	Intercept (b)	Coefficient (a)
PM	1.5	0.2551	0.0059
NOx	1.5	10.4496	0.1255
NO2	1.5	15.5247	0.18865
SO2	0	0	2.3735
CO	1	0	0.8378
HC	1.5	0	0.0667
CO2	1	648.6	44.1

1 All regression but SO2 are in the form of:
Emissions Rate (g/kW-hr) = a (fractional load)-x + b

2 Fractional load is equal to actual engine output divided by rated engine output

3 The SO2 regression is the form of:
Emissions rate (g/kW-hr) = a(fuel sulfur flow in g/kW-hr) + b

4 Fuel Consumption (g/kW-hr) = 14.12/(fractional load) + 205.717

5 n/a means not applicable, n/s means not statistically significant

Fuel Sulfur Concentration	3300	ppm
Fuel consumption	233.957	g/kW-hr
Assuming Load Factor of	50%	

Table 2 Marine Engine Emission Rate based on Table 1

Pollutant	Emission Rate (g/kW-hr)	**lb/hp-hr**	
PM	0.272	**0.0004**	**assume all PM is PM 2.5**
NOx	10.805	0.0175	
NO2	16.058	0.026	
SO2	1.832	0.003	
CO	1.676	0.0027	
VOC	0.189	0.0003	

		lbs	Tons
For marine tug (800 hp) PM 2.5 emissions would be :	**800 hp x 0.0004 X 10 hrs/day x 15 days =**	**48**	**.024**
For water cannon (800 hp) PM 2.5 emissions would be :	**800 hp x 0.0004 X 2 hrs/day x 15 days =**	**9.6**	**.005**
	Total PM 2.5		**.029**
For marine tug (800 hp) NOX emissions would be :	**800 hp x 0.0175 X 10 hrs/day x 15 days =**	**2100**	**1.05**
For water cannon (800 hp) NOX emissions would be :	**800 hp x 0.0175 X 2 hrs/day x 15 days =**	**420**	**.21**
	Total NOX		**1.26**
For marine tug (800 hp) NO2 emissions would be :	**800 hp x 0.026 X 10 hrs/day x 15 days =**	**3120**	**1.56**
For water cannon (800 hp) NO2 emissions would be :	**800 hp x 0.026 X 2 hrs/day x 15 days =**	**624**	**.312**
	Total NO2		**1.872**
For marine tug (800 hp) SO2 emissions would be :	**800 hp x 0.003 X 10 hrs/day x 15 days =**	**360**	**.18**
For water cannon (800 hp) SO2 emissions would be :	**800 hp x 0.003 X 2 hrs/day x 15 days =**	**72**	**.036**
	Total SO2		**.216**
For marine tug (800 hp) CO emissions would be :	**800 hp x 0.0027 X 10 hrs/day x 15 days =**	**324**	**.162**
For water cannon (800 hp) CO emissions would be :	**800 hp x 0.0027 X 2 hrs/day x 15 days =**	**64.8**	**.032**
	Total CO		**.194**
For marine tug (800 hp) VOC emissions would be :	**800 hp x 0.0003 X 10 hrs/day x 15 days =**	**36**	**.018**
For water cannon (800 hp) VOC emissions would be :	**800 hp x 0.0003 X 2 hrs/day x 15 days =**	**7.2**	**.004**
	Total VOC		**.022**

APPENDIX E:

Department of the Army Permit Evaluation and Decision Document: MD DNR Alternate Material Placement

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Department of the Army Permit Evaluation and Decision Document

APPLICATION NUMBER: CENAB-OP-RMN (MD DNR/Alternate Material)2007-03659-M24

This document constitutes my Environmental Assessment, Statement of Findings, and review and compliance determination according to the 404(b)(1) Guidelines for the proposed work (applicant's preferred alternative) described in the enclosed public notice.

MEMORANDUM FOR RECORD

SUBJECT: Department of the Army Environmental Assessment and Statement of Finding for Above-Numbered Permit Application.

I. Applicant:

Maryland Department of Natural Resources
Fisheries Service
580 Taylor Avenue B-2
Annapolis, MD 21401

II. Location, Existing Site Conditions, Project Description, Changes to Project:

A. *Location*: The proposed project is located in the Chesapeake Bay and its tidal tributaries in Maryland and Maryland's Coastal Bays (See attached drawings.)

B. *Existing Site Conditions*: The project sites are open water with hard shell bottom, portions of which have been previously dredged over the past 40+ years for oyster restoration efforts. The plantings of alternate material will predominantly take place on charted Natural Oyster Bars and Historic Oyster Bars in the Chesapeake Bay, but may also occur in the Maryland Coastal Bays, where the oyster bars have not been mapped. Alternate materials will be placed in harvest, reserve and sanctuary areas.

C. *Project Description*: This project will permit the Maryland Department of Natural Resources (MD DNR) to plant alternate (non-oyster shell) materials within Maryland charted oyster bars in the Chesapeake Bay for the purpose of rehabilitating oyster bar habitat to work towards the re-establishment of an abundant and self-sustaining oyster population in support of the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan.

Permit Time Period: A 10-year period from 2008 through 2017 is being requested.

Location of Alternate Material Plantings: Alternate material plantings will be made in the Maryland Chesapeake Bay and its tributaries upon charted oyster bars as mapped on the legal oyster bar charts maintained by the Department.

The identification of alternate material planting areas will be coordinated on an annual basis with the Oyster Advisory Commission, the Tidewater Oyster Committees composed of harvesters, and other interested parties, and will be consistent with the guidelines provided in the Chesapeake Bay Program Oyster Management Plan.

Alternate material plantings may occur within the following oyster bar management designations: sanctuaries, harvest reserves and open harvest areas.

Type of Alternate Materials: This permit will approve the planting of the following alternate (non-oyster shell) materials: clam shell, marl, concrete, stone, slag, brick, and cinderblock. Any concrete rubble to be planted would be free of building debris such as wiring, pipes, and other debris. No protruding re-bar is allowed. Concrete may also include man-made products formed into various shapes to provide benthic habitat (i.e. reef balls).

Sizes of Alternate Materials: The size of individual pieces of material used will vary with the material type and project purpose. For example, a harvest bar would be planted with smaller sized material (1" to 3" estimated) that would not interfere with harvest gear, while a sanctuary area could use larger materials to provide relief for the benthic population. No materials will be utilized larger than 12" in size.

Note that even in low setting areas, these materials are important as habitat to prepare a base for the planting of hatchery seed. If other types of materials become available, MD DNR will present the new information to the regulatory agencies, Oyster Advisory Commission and the Tidewater Oyster Committees for review to determine if the planting of this material could be approved through an amendment to this permit, or if a new permit application would be required.

Amount & Acreage of Alternate Material: Authorization is requested for the planting of up to 1.5 million cubic yards of alternate material from 2008-2018. This volume can create about 1,600 acres of habitat at a planting thickness of approximately 6" per acre. Some sites will be planted less than 6" thick and others higher, therefore the value of 1,600 acres is a reasonable estimate for this program.

The amount of material to be planted on an annual basis will be based upon the objectives and strategies of Maryland's oyster recovery program as well as the availability of the materials and funding. Based upon current cost projections for the procurement, transportation, and planting of alternate materials, it is estimated that approximately 25 acres of material could be planted per million dollars of available funding (assumes average planting thickness of 6-inches).

Planting Methods: Alternate materials will be planted primarily by tugboat and barge but may also be planted using large workboats. With either barges or large workboats, the material will be washed overboard using high pressure water hoses or cannons, with the vessel moving continuously through the planting area to control the thickness and acreage of the planting. Alternate materials may also be planted using a crane/excavator or front-end loader to place material on the oyster bar. To date, the majority of alternate material plantings have been less than one foot in height off of the bottom.

Additional Planting Restrictions:

- *Minimum water column clearance:* The planting of alternate materials will maintain a minimum eight feet of clearance in the water column at mean low water.
- *Protection of submerged aquatic vegetation:* The planting of alternate materials will not be permitted within 300 feet of submerged aquatic vegetation as mapped and reported annually by the Virginia Institute of Marine Sciences in coordination with the MD DNR Resource Assessment Service.

D. *Changes to Project*: In a letter dated April 28, 2008, the Maryland Historic Trust (MHT) has determined that the planting of alternate materials seed will have no adverse effect on historical or archeological properties in a majority of the oyster bars within the original "area of review." However, MHT has requested that the Corps defer approval for the 246 oyster bars that are in proximity to historic and/or archeological sites. MHT provided a list of these 246 oyster bars and as a result, MD DNR has eliminated those 246 oyster bars from the project area.

III. Project Purpose:

A. *Basic*: To deposit alternate material on charted oyster bars in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay.

B. *Overall*: The overall purpose of the proposed projects is to enhance oyster propagation efforts in the Chesapeake Bay, Coastal Bays and its tributaries in Maryland. The planting of alternate material is an essential component in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay. The alternate materials may be seeded with native oysters.

IV. Scope of Analysis:

A. Department of the Army authorization is required for this work and the degree of Corps discretion over this project relates to its impact on navigable waters of the United States under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

B. There has been no Federal financial aid given to this project.

C. The overall Federal involvement with this project is not sufficient to turn this private action into a Federal action.

D. The extent of cumulative Federal control and responsibility relates to evaluation of the DA permit application pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

V. Statutory Authority: These applications for DA authorization were reviewed pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

VI. Other Federal, State, and Local Authorizations Obtained or Required and Pending:

A. *State water quality certification (WQC)*: Since it has been over six months since the project was advertised on public notice, WQC is considered waived.

B. *Coastal Zone Management (CZM) consistency determination:* Since it has been over six months since the project was advertised on public notice, CZM is considered waived.

C. *Other authorizations:* A tidal Wetlands License for the proposed work is required from the Maryland Department of the Environment (MDE), however the license has not been issued, to date. There are no previous Corps authorizations for alternate material placement bay wide, but there was a permit issued for a 5 acre site in the Upper Bay for rubble and concrete structures (2002-61637).

VII. Date of Public Notice and Summary of Comments:

A. The alternate materials application was received on July 16, 2007. This application was initially reviewed on July 18, 2007, additional information was requested on July 18, 2007, and considered complete on December 14, 2007. A public notice was issued on December 26, 2007, and sent to all interested parties including appropriate State and Federal agencies. All comments received on this application have been reviewed and are summarized below:

(1) *U.S. Environmental Protection Agency (EPA)*: No written comments were received. Therefore, it is assumed they have no objections to the proposed work.

(2) *U.S. Fish and Wildlife Service (USFWS)*: No written comments were received. Therefore, it is assumed they have no objections to the proposed work.

(3) *National Marine Fisheries Service (NMFS):* NMFS concurs with measures discussed in the EFH Assessment for: 1) Requiring the applicant to survey planting areas for SAV prior to placing material; and, 2) and restricting planting within 300' of documented SAV.

(4) *State Historic Preservation Officer (SHPO)*: The Maryland Historic Trust *(MHT)* requested additional information and detailed mapping in a letter dated August 3, 2007. In a letter dated May 15, 2008, MHT stated, “Out of the 1105 distinct historic oyster bars (HOB) sent to the Trust, it is our opinion that 954 will have *no effect* on submerged historic properties”. Out of the 326 distinct natural oyster bars (NOB), 245 will have *no effect* on submerged historic properties. Activities cited under this permit *may impact* historic or archeological resources located on or in proximity to 151 HOBs, 81 NOBs, and an additional 15 NOBs that were supplied in AutoCadd by another division in DNR. Therefore, MHT has requested that the Corps restrict its permit to those activities which will have no effect on submerged historic properties, and should defer approval for the 246 bars listed until the agencies have successfully concluded the Section 106 consultation on the 246 oyster bars.

(5) *State and Local Agencies*: MDE has taken no formal action on this proposal.

(6) *Organizations*: This office received no comments on the proposed project from organizations.

(7) *Individuals*: This office received one comment on the proposed project from a private individual concerning potential ammonia nitrogen release during bottom disturbance associated with shell recovery.

(8) *United States Coast Guard (USCG*): The USCG will require a 250 ft buffer zone around all federal aids to navigation and 75 ft buffer of designated channels. All proposed reef coordinates including minimum depth information must be forwarded to USCG three weeks in advance of the proposed placement date.

(9) *Others, Including Internal Coordination*: A meeting was held on August 6, 2007 with the applicant and the Maryland Department of the Environment to discuss permitting issues.

B. *Response to the comments*: MHT sent comments before the application was advertised by public notice. MHT comments of August 3, 2007 and October 23, 2007 were coordinated with the applicant on August 7, 2007 and October 29, 2007, respectively. The applicant responded to the comments in March, 2008 by providing the additional information to MHT. MHT sent a letter to the Corps pursuant to Section 106 of the National Historic Preservation Act of 1966, which was received by this office on May 28, 2008. These comments were sent to the applicant, and after several discussions, the applicant agreed to eliminate the 246 oyster bars that MHT determined may be adversely affected by the project.

VIII. Alternatives:

A. *Avoidance (No action, uplands, availability of other sites)*: The "no action" alternative would avoid impacts to the aquatic environment, but would not meet the project purpose of restoring oyster habitat.

B. *Minimization (modified project designs, etc.)*: As a result of the permit review process, the applicants have eliminated oyster bars identified by MHT as potentially having adverse effects from the "area of review." This involved the elimination of 246 oyster bars.

C. *Project as Proposed (Outline impacts of project as proposed)*: The project as revised would impact less than 1600 acres of oyster bar over a ten-year period. The project impacts have been minimized to the most practicable extent possible (see minimization section above). This project has beneficial impacts to the aquatic environment.

D. *Conclusions of Alternatives Analysis*: The project as proposed is the least environmentally damaging practicable alternative that meets the project needs.

IX. Evaluation of the 404(b)(1) Guidelines:

A. Restrictions on discharges:

(1) Alternatives (See paragraph VIII):

(a) The activity is located in a special aquatic site (wetlands, sanctuaries and refuges, mudflats, vegetated shallows, coral reefs, riffle and pool complexes, etc.)

Yes ☒ No ☐

(b) The activity needs to be located in a special aquatic site to fulfill its basic purpose.

Yes ☒ No ☐

(c) All practicable alternatives have been reviewed in paragraph VIII above. It has been demonstrated that the alternative with the fewest impacts on the aquatic ecosystem (least damaging alternative), has been identified.

Yes ☒ No ☐

(d) The least damaging alternative has no other significant environmental effects.

Yes ☒ No ☐

(2) Other program requirements:

(a) The proposed activity violates applicable State water quality standards or Section 307 prohibitions or effluent standards.

Yes ☐ No ☒

(b) The proposed activity jeopardizes the continued existence of federally listed threatened or endangered species or affects their critical habitat.

Yes ☐ No ☒

(c) The proposed activity violates the requirements of a federally designated marine sanctuary.

Yes ☐ No ☒

(3) The activity will cause or contribute to significant degradation of water of the United States, including adverse effects on human health; life stages of aquatic organisms; ecosystem diversity, productivity and stability; and recreational, esthetic, and economic values.

Yes ☐ No ☒

(4) Minimization of adverse effects:

(a) Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Yes ☒ No ☐

(b) Compensatory Mitigation (wetland enhancement, creation, etc.): No mitigation is proposed or required for impacts to shallow water habitat.

X. Public Interest Review:

A. All public interest factors have been reviewed, including but not limited to the effects the work might have on conservation, economics, esthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, land use, navigation, shore erosion and accretion, recreation, water quality, safety, and consideration of property ownership. It has been determined that the proposed work will not adversely impact any of the public interest factors.

(1) *Conservation*. The proposed project is expected to have a positive impact on the conservation of aquatic resources, since the purpose of rehabilitating oyster bar habitat is to work towards the re-establishment of an abundant and self-sustaining oyster population in support of the Chesapeake Bay Program 2000 Agreement and 2005 Oyster Management Plan.

(2) *Economics* (33CFR320.4(q)). The proposed project is expected to have temporary adverse impacts on recreational and commercial fishing of finfish and shellfish, which will be temporarily disrupted by the work. Upon completion of the work, however, it is likely that shellfish and finfish will return to the project areas. As a result of previous oyster projects, oyster populations in the Chesapeake Bay have increased, benefiting watermen harvesting oysters. A minor beneficial impact by providing employment for a marine contractor and employees will occur.

(3) *Aesthetics*. No detrimental or beneficial impacts to aesthetics are expected to occur as a result of the proposed projects. During construction the dredging equipment would be visible. However, the extent and perception of the aesthetic alteration would vary depending upon the nature of the surrounding area and the values of the public using the waterway.

(4) *General environmental concerns* (33CFR320.4(p)). General environmental concerns are addressed in my evaluation of the following public interest factors.

(5) *Wetlands* (33CFR320.4(b)). No detrimental or beneficial impacts are anticipated to wetlands as a result of the proposed project.

(6) *Historic and cultural resources* (33CFR320.4(e)). Since the applicant has eliminated 246 oyster bars that MHT had identified may impact submerged historic properties, the proposed project will have no detrimental or beneficial impacts on historic or cultural resources.

(7) *Fish and wildlife values* (33CFR320.4(c)).

(a) *Endangered or threatened species.* No endangered or threatened species or their identified critical habitats occur within the project area, therefore, there will be no detrimental or beneficial impacts to this resource.

(b) *Anadromous fish.* The proposed project has the potential to indirectly benefit anadromous fish, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species and improve water quality.

(c) *Submerged aquatic vegetation (SAV).* SAV is an important component of the food chain, providing a food source for waterfowl, fish, and shellfish, as well as providing habitat and nursery areas for many species of fish and invertebrates. SAV also substantially contributes to maintaining water quality at the level necessary to support fisheries as it removes nitrogen, phosphorus, and suspended sediments from the water. The applicant is required to survey recovery/planting areas for SAV prior to dredging and planting. No alternate material placement will occur within 300 feet of SAV beds. Therefore, no adverse impacts to SAV are anticipated as a result of the proposed project.

(d) *Fish habitat and benthics.* The proposed project has the potential to indirectly benefit fish and wildlife values, as a result of rehabilitating oyster bar habitat, which provide valuable habitat for fish, blue crabs and other aquatic species. Benthics should colonize the alternate material shortly after placement.

(e) Essential Fish Habitat (EFH). The project site lies in or adjacent to EFH as described under Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) for *Scopthalmus aquosos* (windowpane flounder) juvenile and adult; *Pomatomus saltatrix* (blue fish) juvenile and adult; *Paralicthys dentatus (summer flounder)* juvenile and adult; *Peprilis triacanthos* (Atlantic butterfish) eggs, larvae, juvenile and adult ; *Centropristus striata* (black sea bass) juvenile and adult; eggs, larvae, juvenile, and adult stages of *Sciaenops ocellatus* (red drum), *Scomberomorus cavalla* (king mackerel), *Scomberomorus maculatus* (spanish mackerel), and *Rachycentron canadum* (cobia), all managed species under the MSFCMA. NMFS concurred with the measures discussed in our EFH Assessment, which include 1) Requiring the applicant to survey recovery/planting areas for SAV prior to placing material; and, 2) restricting planting within 300' of documented SAV. The project has the potential to beneficially impact forage and/or shelter habitat since rehabilitated oyster bar habitat will provide a more productive area for forage and shelter for smaller species.

(8) *Flood hazards*. No detrimental or beneficial impacts are predicted for flood heights and drift as a result of the proposed work.

(9) *Floodplain values* (33 CFR 320.4(l)). No detrimental or beneficial impacts are predicted for floodplain values as a result of the proposed work.

(10) *Land use*. No detrimental or beneficial impacts are predicted for land use in the area as a result of the proposed work as the project is compatible with current land use in the area and additional shoreline development is not anticipated as a result of the project.

(11) *Navigation* (33 CFR 320.4(o)). A temporary minor detrimental impact to navigation is anticipated to occur during the actual work as boat traffic may be temporarily impacted due to the presence of work boats/barges in the area. The Coast Guard requires a 250 foot buffer zone around all federal aid to navigation and a 75 foot buffer of designated channels.

(12) *Shore erosion and accretion*. No detrimental or beneficial impacts to shore erosion or accretion are anticipated as a result of the proposed project. Normal shoreline processes would influence erosion and accretion much more than the minimal depth changes proposed for this project; any minimal impacts the proposed project may have on shore erosion or accretion may not be discernable from normal waterway evolution.

(13) *Recreation*. No impact on recreation is anticipated to occur.

(14) *Water supply* (33 CFR 320.4(m)). No detrimental or beneficial impacts to water supply and conservation are expected as a result of the project as the project site is within a marine water system that is not a source of potable water.

(15) *Water quality* (33 CFR 320.4(d)). A temporary minor detrimental impact to water quality is anticipated as a result of the proposed project. A temporary increase in turbidity within the water column is expected during placement of alternate material. However, oysters have a positive impact of water quality due to their ability to filter water at a rate of about two gallons per hour per oyster. In abundance, oysters help clarify the water, which allows bay grasses to receive more sunlight. Then in turn, plentiful grasses increase oxygen levels, reduce wave energy and shoreline loss, and habitat for aquatic life.

(16) *Energy needs* (33 CFR 320.4(n)). No detrimental or beneficial impacts are anticipated on energy needs as a result of the proposed project.

(17) *Safety*. No detrimental or beneficial impacts are anticipated on safety as a result of the proposed project.

(18) *Food and fiber production*. Beneficial impacts are anticipated on food production, especially for oysters, as a result of the proposed project since the purpose is to increase oyster populations. The proposed project would not effect fiber production as the area is not used for fiber production.

(19) *Mineral needs*. No detrimental or beneficial impacts are anticipated on mineral needs as a result of the proposed project.

(20) *Considerations of property ownership*.

(a) *Public rights to navigation.* No impact is anticipated on public rights to navigation as a result of the proposed project.

(b) *Public interests in environmental protection.* The project is unlikely to be contrary to the public's interest in environmental protection as the purpose of the project is to rehabilitate oyster fisheries. Benthic organisms that are important to the aquatic food web will be temporarily impacted due to the project, but re-colonization will occur after placement is completed. Therefore, the impacts to living aquatic resources will be minimal.

(c) *Riparian rights.* This project will not affect riparian rights because the disturbance by the presence of work boats will be temporary.

(d) *Ownership rights.* Property owners along the waterway have an inherent right to reasonable private use of the waterway. This project will not affect private property owners because the disturbance by the presence of work boats will be temporary.

(e) *Public lands.* There are no public land issues associated with this project. The oyster seeding is proposed in natural or historic oyster bars in the Chesapeake Bay.

B. *Describe the relative extent of the public and private need for the proposed structure or work.* The project is proposed to benefit all citizens because oysters are economically and ecologically important.

C. *Describe the practicability of using reasonable alternative locations and methods to accomplish the objective of the purposed work where there are unresolved conflicts as to resource use*. There are no alternative locations for the proposed project that meet the purpose and need of the project. The projects will have minor to no permanent detrimental impacts on the aquatic environment, minor temporary detrimental impacts, and permanent beneficial impacts.

D. *Describe the extent and permanence of the beneficial and/or detrimental effects which the proposed work is likely to have on the public and private uses to which the area is suited*. The proposed project is unlikely to have permanent detrimental effects on public or private uses. The proposed project is expected to have permanent beneficial effects on public uses such as economics, fisheries and water quality of the Chesapeake Bay.

E. *Threatened or Endangered Species*. The proposed project will not jeopardize the continued existence or critical habitat of any threatened or endangered species.

F. *Corps wetland policy*. There are no wetland alterations associated with the proposed project. Therefore, the projects are in accordance with the Corps wetland policy.

G. *Cumulative and Secondary Impacts*: The proposed project is not likely to have more than minimal secondary, long-term impacts to the aquatic environment. The overall purpose of the proposed project is to enhance oyster propagation efforts in the Chesapeake Bay, Coastal Bays and its tributaries in Maryland. The placement of alternate material is an essential component in attempts to reestablish an abundant and self-sustaining oyster population within the Chesapeake Bay.

XI. Public Hearing Evaluation: There were no requests for a federal public hearing; therefore, a federal public hearing was not held for the projects.

XII. Essential Fisheries Habitat (EFH): The National Marine Fisheries Service (NMFS) did not request any EFH information in addition to that provided in the Pubic Notice. The Baltimore District's findings are that the proposed project will have negligible short or long-term detrimental impacts to EFH. NMFS concurs with measures discussed in the EFH Assessment for: 1) Requiring the applicant to survey recovery/planting areas for SAV prior to placing material; and, 2) restricting planting within 300' of documented SAV. Therefore, the proposed project is not expected to have substantial detrimental impacts to fish and wildlife resources or EFH.

XII. Determinations:

A. *Finding of No Significant Impact (FONSI).* Having reviewed the information provided by the applicant and all interested parties and an assessment of the environmental impacts, I find that this permit action will not have a significant impact on the quality of the human environment. Therefore, an Environmental Impact Statement will not be required.

B. *Compliance with 404(b)(1) Guidelines*. Having completed the evaluation in paragraph VIII above, I have determined that the proposed discharge complies with the 404(b)(1) Guidelines.

C. *Section 176(c) of the Clean Air Act General Conformity Rule Review.* The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed *de minimus* levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit action.

D. *Environmental Justice*. In accordance with Title III of the Civil Rights Act of 1964 and Executive Order 12898, each Federal agency must ensure that all programs that affect human health or the environment do not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin. Each Federal Agency must analyze the environmental effects, human health effects, economic effects, and social effects of Federal actions, including effects on minority communities and low-income communities. The undertaking of the proposed projects is not expected to discriminate on the basis of race, color, or national origin, nor will they have a disproportionate effect on minority or low-income communities.

E. *Public Hearing Request*. There were no requests for a public hearing on this project; therefore, one was not scheduled.

F. *Public Interest Determination.* I find that issuance of a Department of the Army permit is not contrary to the public interest.

PREPARED BY: Mary Frazier DATE: 12 Aug 08
Mary Frazier
Regulatory Project Manager, Maryland Section Northern

REVIEWED BY: Joseph P. DaVia DATE: 8/13/08
Joseph P. DaVia
Chief, Maryland Section Northern

APPENDIX F:

USACE Oyster Decision Documents

Chesapeake Bay Oyster Recovery Project Report January, 1996.

Environmental Assessment for the Construction of Seed Bars in Eastern Bay as Part of the Chesapeake Bay Oyster Recovery Project, July, 1999.

Decision Document Chesapeake Bay Oyster Recovery Project, Maryland; dated May 2002.

Programmatic Environmental Impact Statements for Oyster restoration in Chesapeake Bay Including the Use of a native and/or Nonnative dated October 2008.

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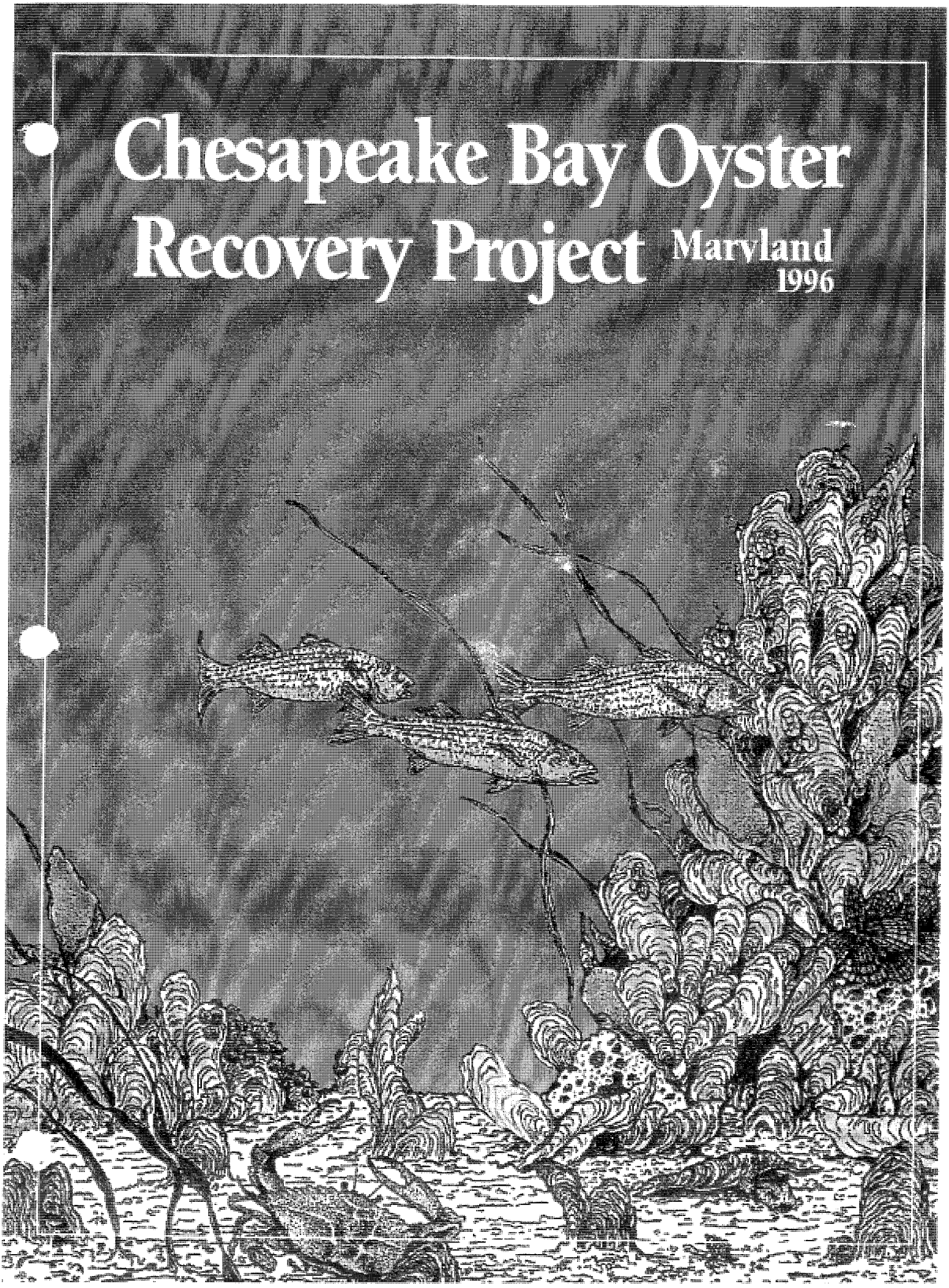
Chesapeake Bay Oyster Recovery Project

Maryland
1996



FINDING OF NO SIGNIFICANT IMPACT

CHESAPEAKE BAY OYSTER RECOVERY PROJECT

MARYLAND

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources, is conducting the planning, engineering, and design of the Chesapeake Bay Oyster Recovery Project in Maryland. Project construction will be initiated in 1996 with upgrades to the Piney Point hatchery. Construction activities will occur over a five-year period and include the following: creation of new oyster bars and rehabilitation of existing non-productive bars; upgrading of state-owned hatcheries at Horn Point and Piney Point; construction of seed bars for production and collection of seed oysters or "spat"; and planting of spat produced at hatcheries and harvested from seed bars on new and rehabilitated bars. Monitoring of implemented projects will continue for three years after project implementation. Project activities will occur within Oyster Recovery Areas (ORAs) established by the Maryland Oyster Roundtable Action Plan in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay.

The purpose of the project is to restore oyster habitat and to increase oyster populations in the Maryland portion of the Chesapeake Bay. Oyster populations have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and a loss of habitat. Oysters, which are filter feeders, improve water quality in the Chesapeake Bay, and oyster bars provide valuable habitat for fish, blue crabs, and other species.

An Environmental Assessment (EA) has been prepared which evaluates the potential environmental impacts associated with the proposed project. The EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analysis determined that the project would result in beneficial impacts to the aquatic environment.

Upon reviewing the EA, I find that potential negative environmental impacts to benthic and open water habitat associated with implementation of the project will occur over a relatively small area and will be primarily short-term in nature. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities. Based upon this finding, preparation of an Environmental Impact Statement is not required.

Randall R. Inouye P.E.
Colonel, Corps of Engineers
District Engineer

January 29, 1996

US Army Corps
of Engineers
Baltimore District

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

FOR THE CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF THE CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MARYLAND

Prepared By:
Baltimore District
U.S. Army Corps of Engineers
Baltimore, Maryland 21203-1715

July 1999

FINDING OF NO SIGNIFICANT IMPACT

CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF THE CHESAPEAKE BAY OYSTER RECOVERY PROJECT PROJECT, MARYLAND

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources, is constructing approximately 18 acres of seed bars in Eastern Bay in Queen Anne's County. This supplemental environmental assessment (EA) identifies and assesses the potential environmental impacts associated with the construction of these seed bars in Eastern Bay as part of the Chesapeake Bay Oyster Recovery Project in Maryland which was begun in 1997. Project activities were planned in Oyster Recovery Areas (ORAs) established by the Maryland Oyster Roundtable Action Plan in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay.

The Chesapeake Bay Oyster Recovery Project in Maryland is authorized under Section 704(b) of the Water Resources Development Act of 1986, which provides authority for the Corps to conduct projects for fish and wildlife, including but not limited to man-made reefs for fish. The purpose of the project is to restore oyster habitat and to increase oyster populations in the Maryland portion of the Chesapeake Bay. Oyster populations have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and a loss of habitat. Oysters, which are filter feeders, improve water quality in the Chesapeake Bay, and oyster bars provide valuable habitat for fish, blue crabs, and other species.

An Environmental Assessment (EA) has been prepared which evaluates the potential environmental impacts associated with the proposed project. The EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analysis determined that the project would result in beneficial impacts to the aquatic environment.

Upon reviewing the supplemental EA, I find that potential negative environmental impacts to benthic and open water habitat associated with implementation of the project will occur over a relatively small area and will be primarily short-term in nature. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities. Based upon this finding, preparation of an Environmental Impact Statement is not required.

Bruce A. Berwick P.E.
Colonel, Corps of Engineers
District Engineer

DECISION DOCUMENT

CHESAPEAKE BAY OYSTER RECOVERY PROJECT
MARYLAND

May 2002

Baltimore District
U.S. Army Corps of Engineers

XI. Recommendations

The proposed Phase II activities have been developed as part of a major goal of the EPA Chesapeake Bay Program's Chesapeake 2000 Agreement, of which the Corps is a partner, to increase oyster populations ten-fold by 2010. The Corps project was developed in conjunction with, and is supported by environmental interests such as the Chesapeake Bay Foundation, and the Oyster Recovery Partnership, and is a key part of EPA's oyster restoration goal. The project has been designed to complement activities undertaken by private citizens, environmental groups, and local, state and Federal agencies. Baltimore District has worked closely with these interests to efficiently allocate resources based upon the particular expertise and missions of the respective parties.

MdDNR, who has demonstrated expertise in the field of oyster habitat restoration, has proven to be a willing and able sponsor. Moreover, the inclusion of this cost-shared project will contribute in part to a much larger Virginia-Maryland Chesapeake Bay-wide effort to increase oyster populations ten-fold by 2010. The Phase II oyster recovery activities will demonstrate the Baltimore District's continued ability and dedication to preserve aquatic ecosystems and its commitment to the health of the Chesapeake Bay.

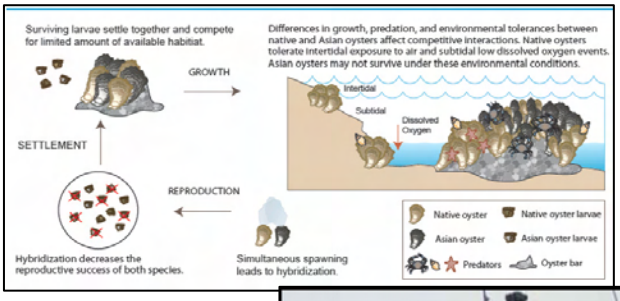
Therefore, I recommend that the oyster project be extended by two construction years with an associated cost increase of $3.4 million.

Date: 29 May 02

CHARLES J. FIALA, JR.
COL, Corps of Engineers
District Engineer

Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster

Volume 1



US Army Corps of Engineers

MARYLAND DEPARTMENT OF NATURAL RESOURCES

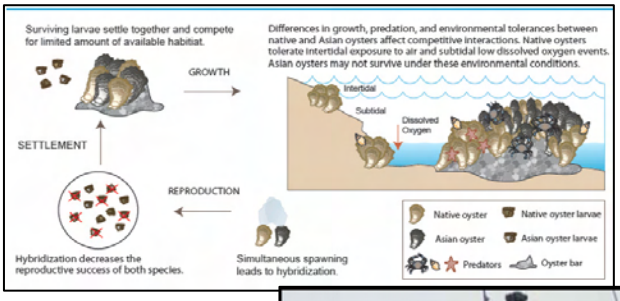
VIRGINIA MARINE RESOURCES COMMISSION

NOAA

U.S. FISH & WILDLIFE SERVICE

Draft Programmatic Environmental Impact Statement for Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster

Volume 2



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