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ENVIRONMENTAL ASSESSMENT
CHESAPEAKE BAY
NATIVE OYSTER RESTORATION PROJECT
PIANKATANK RIVER
THE COMMONWEALTH OF VIRGINIA

Appendices

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Appendix A

RARE, THREATENED AND ENDANGERED SPECIES

FEDERAL AND STATE LISTED SPECIES THAT ARE KNOWN OR LIKELY TO OCCUR WITHIN A 3 MILE RADIUS AROUND THE PROJECT AREA.

Common Name	Scientific Name	Status*
Sturgeon, shortnose	*Acipenser brevirostrum*	FESE
Sturgeon, Atlantic	*Acipenser oxyrinchus*	FESE
Turtle, Kemp's ridley sea	*Lepidochelys kempii*	FESE
Turtle, leatherback sea	*Dermochelys coriacea*	FESE
Turtle, loggerhead sea	*Caretta caretta*	FTST
Plover, piping	*Charadrius melodus*	FTST
Beetle, northeastern beach tiger	*Cicindela dorsalis dorsalis*	FTST
Turtle, green sea	*Chelonia mydas*	FTST
Rail, black	*Laterallus jamaicensis*	SE
Salamander, eastern tiger	*Ambystoma tigrinum*	SE
Falcon, peregrine	*Falco peregrinus*	ST
Sandpiper, upland	*Bartramia longicauda*	ST
Shrike, loggerhead	*Lanius ludovicianus*	ST
Sparrow, Henslow's	*Ammodramus henslowii*	ST
Salamander, Mabee's	*Ambystoma mabeei*	ST
Treefrog, barking	*Hyla gratiosa*	ST
Shrike, migrant loggerhead	*Lanius ludovicianus migrans*	ST
Knot, red	*Calidris canutus rufa*	FP
Bat, northern long-eared	*Myotis septentrionalis*	FP
Alewife	*Alosa pseudoharengus*	FC
Herring, blueback	*Alosa aestivalis*	FC
Eagle, bald	*Haliaeetus leucocephalus*	FS
Fritillary, Diana	*Speyeria diana*	FS
Terrapin, northern diamond-backed	*Malaclemys terrapin terrapin*	CC
Turtle, spotted	*Clemmys guttata*	CC

FE - Federally Endangered FT - Federally Threatened
SE - State Endangered ST - State Threatened
FP - Federal Proposed FC - Federal Candidate
FS - Federal Species of Concern CC- Collection Concern
(Last Updated: November 14, 2014 using the VDGIF Fish and Wildlife Information Service.)

Many of these species have no association with the proposed project and will not be addressed further in this document. These species include the eastern tiger salamander, the peregrine falcon, the upland sandpiper, the loggerhead shrike, Henslow's sparrow, Mabee's salamander, the barking treefrog, the northern long-eared bat, the Diana fritillary, the spotted turtle and the migrant loggerhead shrike.

Shortnose sturgeon (*Acipenser brevirostrum*) – Federally Endangered, State Endangered
Adult sturgeon in estuarine waters feed primarily on small mollusks (*Mya arenaria, Macoma balthica*). Juvenile sturgeon forage on insect larvae (*Hexagenia sp., Chaborus sp.,* and

Chrionamus sp.) and small crustaceans (*Gammarus sp., Asellus sp.,*and *Cyathura polita*)(NMFS 1998). They reach lengths of up to 100 cm, are long-lived (15-20 years), mature late in life, and are highly fecund. They are anadromous and migrate to freshwater to spawn during late winter and early summer. Juveniles migrate to and from freshwater for several years, eventually and remaining in estuarine waters joining adult migration patterns (FWS 2004). Shortnose sturgeon were once abundant in Chesapeake Bay; however, the population has declined significantly since the first published account of their presence in 1876 (NMFS 1998). In 1996, eight shortnose sturgeon were captured in the upper Bay between Kent Island and the Chesapeake and Delaware Canal, and one in the Potomac River. In 1997, nine shortnose sturgeon were captured in the upper Chesapeake Bay between Miller's Island and the mouth of the Susquehanna River. In 2006, two female, egg-bearing shortnose sturgeon were found in the Potomac River (Blankenship 2007).

Atlantic sturgeon (*Acipenser oxyrhynchus*) – Federally Endangered, State Endangered
The basic life history pattern of the Atlantic sturgeon is similar to that of the shortnose except for more wide-ranging marine movements of adults. Both species are bottom feeders, but the Atlantic sturgeon is larger than the shortnose, reaching lengths of up to 200 cm. Atlantic sturgeon begin their freshwater spawning migration later than shortnose; juveniles move to brackish waters for a few months before migrating to coastal waters. Adults migrate extensively along the coast. Juveniles may occur in the Bay and its tributaries (NMFS 2007). A combination of overfishing and deterioration of habitat have caused the Atlantic sturgeon population in Chesapeake Bay to decline drastically. In 1996, 3,000 tagged, juvenile, hatchery-raised Atlantic sturgeon were released into Chesapeake Bay; 1,700 of these were subsequently recaptured, confirming their use of existing Bay habitats. The lack of clean hard substrate for the attachment of eggs, an important habitat requirement for the Atlantic sturgeon, limits the species' use of Chesapeake Bay as a spawning habitat (Atlantic Sturgeon Status Review Team 2007).

Kemp's ridley turtle (*Lepidochelys kempii*) – Federally Endangered, State Endangered
Fishermen of Chesapeake Bay often refer to this turtle, the smallest of the Bay's sea turtles, as the green fin turtle. In Chesapeake Bay, they are found during May through November in shallow, near-shore sea grass beds, especially where their preferred food, blue crabs, are found. They also prey on clams, snails, and occasionally marine plants. The Bay is a major developmental habitat for immature ridleys; no other location in the world harbors as many individuals in this size class each summer. The Kemp's ridley turtle is the world's most endangered sea turtle. Declines in its numbers have been attributed to environmental contaminants, pollution, shore-line modification/development, oil spills, commercial exploitation, poaching, incidental capturing/killing, and subsistence hunting, fishing and trapping (VAFWIS 2007).

Leatherback turtle (*Dermochelys coriacea*) – Federally Endangered, State Endangered
This species, the largest marine turtle, is sometimes called the leathery turtle, and fishermen in Chesapeake Bay often refer to it as the rubberback turtle. Breeding is not likely to occur in Chesapeake Bay. The leatherback is the most pelagic of the sea turtles, coming to shore only to nest and occasionally to feed. Leatherback turtles feed on soft-bodied pelagic invertebrates, primarily the moon jellyfish.

Loggerhead sea turtle (*Caretta caretta*) – Federally Threatened, State Threatened
The loggerhead turtle accounts for nearly 90% of the summer sea turtles population in the Chesapeake Bay. Juvenile loggerheads enter Chesapeake Bay during the late spring and early summer (Lutcavage and Musick 1985) and migrate out of the Bay from late September to early November, as water temperatures drop (Klinger and Musick 1995). They have been documented throughout the mainstem as far north as the Magothy River, and in several of the tributaries, including the Potomac, Patuxent, Choptank, and Severn rivers. Chesapeake Bay provides ideal foraging habitat for the development of juvenile sea turtles. Loggerheads eat a variety of foods including horseshoe crabs, crustaceans, jellyfish, and mollusks. They concentrate their feeding along channels near the mouths of rivers and areas of the Bay that are deeper than 13 feet.

Piping plover (*Charadrius melodus*) – Federally Threatened, State Threatened
Piping plover habitat includes sandy beaches and associated intertidal areas within the Bay, where it feeds on invertebrates. It nests above the high-tide line on beaches, sand flats, barrier islands, foredunes, and blowout areas behind primary dunes. Loss of habitat along with increased recreational use of beaches has led to a continuing decline in the breeding populations in coastal states (FWS 2004).

Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) - Federally Threatened, State Threatened
The northeastern beach tiger beetle is a predatory insect that spend their entire two year life cycle on wide, dynamic, undisturbed beaches of the Atlantic coast. There are 50 sites where this species is currently found in the Chesapeake Bay area. There is only on known population of beetles north of Maryland. Most of these populations are threatened by development and beach usage. These insects are extremely sensitive to habitat disturbances, including foot traffic, off-road vehicle traffic and controlling the access to tiger beetle habitat is necessary to stop the decline of beetle populations.

Green Sea turtle (*Chelonia mydas)* - Federally Threatened, State Threatened
When not migrating, green turtles prefer sea grass flats, which occur in shallow areas of Chesapeake Bay. Their nesting beaches are distributed widely in tropical and subtropical regions. The green turtle has the unique ability among marine turtles to digest plant material. Juvenile green turtles are primarily carnivorous, and mature specimens eat marine animals, particularly cniderians, mollusks, crustaceans, sponges, and jellyfish, along with vascular sea grass. Stomach contents of individuals stranded in Virginia included both eelgrass and macroalgae, especially the sea lettuce *Ulva*.

Black Rail (*Laterallus jamaicensis*) – State Endangered
The black rail is a small bird that inhabits salt and fresh water marshes that are dominated by grasses and sedges. The bird can be found from New Jersey to Florida and from Florida to Texas in the Gulf of Mexico. There is a population in California. This species feeds on insects, spiders, small crustaceans, snails and seeds. Significant amounts of rail habitat have been lost with the destruction of emergent wetlands in the United States (Audubon 2014).

Red Knot (*Calidris canutus rufa*) – Federal Proposed

Red knots can be found out of breeding season in intertidal, marine habitats, such as estuaries, bays and coastal inlets. During breeding season, this species moves inland to sparsely vegetated areas, where they dig a shallow depression which is lined with dried leaves, grasses and lichens. Red knots feed on bivalves, small snails and crustaceans. Large concentrations of this bird at staging areas during migration make the vulnerable to pollution and loss of habitat. Populations of red knot have declined by 50% from the mid-80's to 2003 (The Cornell Lab of Ornithology 2014).

Alewife (*Alosa pseudoharengus*) – Federal Candidate
Also known as the big-eye or branch herring, the alewife is a thin silver fish with a single dark spot located its shoulder, behind the head. The species is anadromous, spending most of its life in coastal waters and migrates inland to spawn in freshwater. The alewife can be found in coastal waters from North Carolina to Newfoundland, with landlocked populations in the Great Lakes and Finger Lakes. This species feeds on zooplankton, shrimp, small crustaceans, small fish and fish eggs in the water column or near the surface. The fishery (which includes both alewife and blueback herring) has been one of the most valuable in the Bay, with annual catches once exceeding 30 million pounds in Virginia. The degradation and destruction of spawning habitat and the restriction of spawning migration (or Fish passage) by dams have contributed to the decline of these stocks" (Chesapeake Bay Program 2014).

Herring, blueback (*Alosa aestivalis*) – Federal Candidate
The blueback herring is a small, anadromous fish that spending most of its life in coastal waters and migrates inland to spawn in freshwater. It's back is a blue-green color, while the rest of its body is silver, with a dark spot located behind the gill cover. The blueback herring can be found from Florida to Nova Scotia. This fish is often confused with the alewife. Populations of this species have shown drastic declines due to habitat degradation, fishing, bycatch, impediments to fish passage and predation (NOAA 2007).

Bald eagle (*Haliaeetus leucocephalus*) – Federal Species of Concern
The bald eagle is a large raptor that requires large areas of undisturbed mature forest close to aquatic foraging areas. Bald eagles eat fish when they are available but will shift to a variety of other birds, mammals, and turtles – both live and as carrion – when fish are scarce. Chesapeake Bay may once have provided habitat for as many as 3,000 breeding pairs of bald eagles. The population declined dramatically due to habitat destruction, poaching, and contamination with DDT. In 1973, the bald eagle was listed as endangered in 43 of the lower 48 states. After a ban on the use of DDT, the population slowly began to increase, and the bald eagle was reclassified as threatened in 1995 and delisted in 2007

Northern diamond-backed terrapin (*Malaclemys terrapin terrapin*) – Collection Concern
The diamondback terrapin is the only North American turtle that lives exclusively in brackish water. Diamondbacks feed mostly on mollusks, especially snails, clams, and mussels. Diamondbacks spend their entire lives in local creeks, salt marshes, and coves. Whitelaw and Zajac (2002) demonstrated that resource availability may not be the primary driver of terrapin distribution. Distribution may be driven more by the physical structure, plant density, and tidal amplitude of the creeks in which they reside. Diamondbacks and, particularly, their nests are susceptible to predation by raccoons, crabs, crows, gulls, rats, muskrats, foxes, skunks, and mink.

Because of the appeal of terrapin as a gourmet delicacy, harvest pressure decimated terrapin populations throughout the Bay by the early 1900s. To aid in conserving the population, the State of Maryland passed legislation in 2007 banning the commercial harvest of terrapins in Maryland waters.

Appendix B

SECTION 404 (b) (1) EVALUATION

SECTION 404 (b) (1) EVALUATION
CHESAPEAKE BAY NATIVE OYSTER RESTORATION PROJECT
PIANKATANK RIVER, VIRGINIA

I. INTRODUCTION

This report concerns measures proposed as part of the Chesapeake Bay Native Oyster Restoration Project, Piankatank River and is submitted in accordance with Section 404 of the Clean Water Act of 1977 (Public Law 95-217).

The 404(b)(1) guidelines in 40 CFR 230 contain the substantive criteria for evaluation of proposed discharges of dredged or fill material under Section 404. The principle behind the criteria is that no discharge of dredged or fill material is permitted that would result in unacceptable adverse effects to the aquatic ecosystem. Compliance with the guidelines is evaluated by reviewing the proposed discharge with respect to the four restrictions in 40 CFR 230.10. These restrictions state that:

a) No discharge shall be permitted if there is a practicable alternative which would have less adverse impacts on the aquatic ecosystem;
b) No discharge shall be permitted if it violates state water quality standards, violates toxic effluent standards or prohibitions under Section 307 of Act, or jeopardizes the continued existence of threatened or endangered species as identified under the Endangered Species Act of 1973.
c) No discharge shall be permitted which will cause or contribute to the significant degradation of waters of the United States.
d) No discharge shall be permitted unless appropriate and practicable steps have been taken to minimize potential adverse impacts to the aquatic ecosystem.

II. PROJECT DESCRIPTION

A. Location

The project is located in the Piankatank River, which is a medium-sized tributary on the western shore of the Virginia portion of the Chesapeake Bay. It is immediately south of the Rappahannock River and North of the York River in the Middle Peninsula region of the state. It is one of the most pristine rivers remaining in Virginia, with little development within the watershed. The Piankatank River's total watershed covers 887.5 square miles (142,000 acres or 2,298.6 km²) with most of the watershed being forests, wetlands, or farms. Overall, the watershed is the least modified of all in Virginia, even less than the mostly undeveloped Great Wicomico River watershed.

Project activities will occur at the mouth of the Piankatank River (see the attached map).

Refer to the Draft Environmental Assessment (DEA) dated February 2015, for specific information regarding this project, environmental data, and maps and photographs of the project area.

B. Description of Proposed Work

The recommended plan includes the construction of sanctuary reefs

These sanctuary areas contribute to the goal of long-term self-sustaining populations of native oysters in various tributaries within the Chesapeake Bay. A map of proposed and existing reefs can be found at the end of this document. The sanctuary reefs will be constructed primarily of artificial substrate materials or a combination of shell and artificial substrate. If shaped concrete structures are used, they must be placed on hard bottom to avoid subsidence, and may perform better if placed on bottom hardened by placement of concrete rubble or small amounts of new shell. Alternative materials can be used to create reef bases with shells placed on top, or, depending on the material's size and source, be used to construct the entire reef. Considering post construction settling of material, the reef base minimum recommended is one foot of elevation above existing bottom, assuming hard bottom is available to construct the reefs. If more marginal areas with higher percentages of silt are utilized, settling is expected to be greater and higher reefs would be needed. A layer of shell may be added to the surface of the reefs to encourage the colonization of oysters.

C. Authority and Purpose

This project was originally authorized by Section 704(b) of the Water Resources Development Act (WRDA) of 1986. Section 704(b) of the WRDA 1986 has since been amended by the following legislation:

- Section 505 of WRDA 1996
- Section 342 of WRDA 2000
- Section 113 of the Energy and Water Development Act of 2002
- Section 126 of the Energy and Water Development Act of 2006
- Section 5021 of WRDA 2007
- Section 4010 of WRRDA 2014

D. Description of Material

1. General Characteristics of Proposed Fill Material - Alternative

substrate materials that could be used include (but is not limited to) concrete rubble (recycled concrete) and related "materials of opportunity" generated by demolition of concrete structures, granite, limestone marl, and shaped concrete structures (reef ball® type structures, pyramids, modules, and "castles," for example).

2. **Quantities of Fill Material** -The goal of the project is to construct reefs that are more than 12 inches high. The amount of fill used to create the new sanctuary reefs will depend on the material that is used. For example, if formed concrete structures are use, depending on the size and shape of the structures, the density of structures could be anywhere from 500 to 2000 per acre. If crushed material (concrete, granite, fossil shell, etc.) is used to construction the new oyster reefs, then approximately 1600 cubic yards of material per acre will be required.

3. **Source of Material –** The material required to construct the new sanctuary reefs will either be purchased from commercial sources or will be recycled material. All material that is uses for this project will be free of contaminants.

E. Description of Proposed Discharge Sites

1. Location of the Sites

New Sanctuary Reefs – Approximately 219 acres of oyster reef will be constructed at the mouth of the Piankatank River (labeled "3D reefs", Figure 1).

2. Size of Wetland Sites -

The project will have no impact on emergent wetlands. Construction of subtidal oyster reefs will result in the conversion of unconsolidated bottom wetlands, as identified by the NWI, to reef wetlands. The creation of new reefs may indirectly benefit adjacent subtidal wetlands, through improvements to water quality and increases to benthic and overall secondary production.

3. Type of Aquatic Resources

The Piankatank River is a Virginia tributary of the Chesapeake Bay. It is a relatively shallow estuary, with an average water depth of about 20 feet, although there are deeper areas up to 174 feet in depth. It is one of the most pristine rivers remaining in Virginia, with little development within the watershed. Currently, the Piankatank River contains a number of highly degraded reefs, which were once the basis of a vibrant commercial fishery in the region.

4. Timing and Duration of Discharge

New Sanctuary Reefs - The timing of placement of material in the river will depend on the biological windows, as defined by the resource agencies , so that protected species will not be adversely impacted by this project. Construction of the new sanctuary reefs will be phased over 5 years due to funding constraints.

F. Description of Disposal Method

New Sanctuary Reefs - A crane and/or a clam shell, on a barge, will be used to place the alternative substrate on the river floor.

III. FACTUAL DETERMINATIONS

A. Physical Substrate Determination

1. Substrate Elevation and Slope

Less than one percent slope, with a three foot tidal range.

The placement of shell at the existing sanctuary reefs and seed reefs will not significantly change the elevation or slope present at those sites. The new constructed sanctuary reefs will be at least 12 inches high.

1. Comparison of Fill Material and Substrates at Discharge Sites

The construction of new sanctuary reefs will not substantially change the substrate types found in the Piankatank River. Material used to construct the sanctuary reefs will be placed on top of the substrate and is too large to mix with bottom substrates.

3. Dredged/Fill Material Movement

The material used to construct the new sanctuary reefs will be large and heavy. It will be difficult to move the material once it has been placed on the ocean bottom.

4. Physical Effects on Benthos

The short term negative impacts to benthic communities would be minor. Benthic invertebrates would be buried or injured during the placement of alternative material during the construction of new reefs and oyster shell. It is anticipated that losses to benthic populations will be replaced. Benthic populations in areas adjoining project areas may be adversely affected by a temporary decrease in water quality that will occur during construction; however these impacts will only last during the construction phase and normal conditions will return once construction has been completed. Long term impacts are

expected to be positive because the amount and quality of reef habitat will increase.

5. Erosion and Accretion Patterns

No expected changes to erosion or accretion patterns will result from this project.

6. Actions Taken to Minimize Impacts.

Best management practices would be used to minimize negative impacts during construction.

B. Water Circulation, Fluctuation, and Salinity Determinations.

1. Water

a. Salinity – No effect

b. Water Chemistry – Minor and temporary effect on DO and biological oxygen demand during construction; temporary turbidity increase.

c. Clarity – Minor and temporary increase in turbidity will be generated during the construction phase.

d. **Color** – Minor and temporary change due to increase in turbidity.

e. **Odor –** Implementation of this project is not expected to alter odor levels.

f. **Taste–** Implementation of this project is not expected to alter water taste.

g. **Dissolved Gas Levels –** Minor and temporary decrease in DO during the construction phase.

h. **Nutrients** – Nutrient levels in the water column may increase during construction due to the disturbance of sediment. Effects would be minor and temporary and levels would return to normal post-construction.

i. **Eutrophication –** The Piankatank River and surrounding wetlands would not become more eutrophic as a result of this project.

2. Current Patterns and Circulation.

a. **Current Patterns and Flow** – Construction of new oyster reefs will cause small scale changes in currents around reef structures and may alter existing flow patterns.

b. **Velocity** – No change.

c. **Stratification** – No change.

d. **Hydrologic Regime** – Estuarine, no change.

e. **Aquifer Recharge** – No change.

3. Normal Water Level Fluctuations – No change.

4. Salinity Gradients – No Change.

5. Actions that will be taken to minimize impacts – None.

C. <u>Suspended Particulate/Turbidity Determinations.</u>

1. Suspended particulates and turbidity level

Levels of suspended particulates and turbidity are expected to increase temporarily during construction. However, best management practices would minimize these effects. Turbidity is expected to return to normal levels once construction is completed.

2. Effects on chemical and physical properties of the water column

a. Light Penetration – Minor increases in suspended solid particulate and turbidity levels would reduce light penetration in the project area during construction. Impacts will be temporary and short in duration. Best management practices would be employed during construction to minimize turbidity levels.

b. Dissolved Oxygen – Oxygen levels in the project area would be expected to decrease slightly during construction due to increased suspended solids and turbidity, which would lower the photosynthesis rate of aquatic vegetation. Levels would return to normal upon completion of project construction.

c. Toxic Metals and Organics – The project will have no impact on current levels of toxic metals and organics present in the Piankatank system.

d. Pathogens – Fill materials will be clean and free of pathogens.

e. Aesthetics – The project will have no impact on current aesthetics.

3. Effects on Biota

a. Primary Production, Photosynthesis – Temporary increase in suspended solids during construction may reduce light transmission and photosynthesis. There will be no significant long term effects.

b. Suspension/Filter Feeders – Temporary increase in suspended solids during construction may impact suspension and filter feeders. Long term effects of the project would be extremely positive to some of these organisms. Newly constructed oyster reefs will provide new habitats.

c. Sight Feeders - Temporary increase in suspended solids and water clarity may impact hunting and foraging behaviors of sight feeders. Also, the use of heavy equipment during construction may disrupt normal behaviors, by scare sight feeders out of the immediate project site. These impacts would end once the construction phase has been completed. Long term effects of the project would be positive to sight feeders associated with reef habitat. Construction of new oyster reefs would provide habitats that support sight feeder communities.

4. Action to Minimize Impacts.

Best management practices would be used to reduce negative impacts of project construction.

D. <u>Contaminant Determination</u>

1. Evaluation of the Biological Availability of Possible Contaminants in the Fill Material

c. a. Physical Characteristics of the Fill Material – The fossil shell will be obtained from either a permitted shell mining area; house shell will be purchased from a shell house.

Alternative substrate materials that could be used to construct new sanctuary reefs include (but is not limited to) concrete rubble (recycled concrete) and related "materials of opportunity" generated by demolition of concrete structures, granite, limestone marl, and shaped concrete structures (reef ball® type structures, pyramids, modules, and "castles,").

b. **Hydrography in Relation to Known or Suspected Sources of Contamination** – There are no suspected sources of contamination.

c. **Results from Previous Testing of the Material or Similar Material in the Vicinity of the Project** – No testing has been completed in the vicinity of the project.

d. **Known, Substantive Sources of Persistent Pesticides from Land Runoff or Percolation** – No substantive sources of pesticide contamination have been identified.

e. **Spill Records for Petroleum Products or Designated Hazardous Substances** – The DEQ VEGIS database was searched for records of petroleum releases. There were no records of spill that occurred within the project site; however, there are approximately eight records of spills that have occurred on terrestrial sites in areas within a mile of the project area. There were no records of toxic releases in either Middlesex or Mathews Counties in the 2012 Toxic Release Inventory

f. **Other Public Records of Significant Introduction of Contaminants from Industries, Municipalities or Other Sources** – The DEQ VEGIS database was searched and no records have been found that indicated that significant introduction of contaminants from industries, municipalities or other sources. There are no solid waste facilities in the project area or in areas adjacent to the project site. One petroleum facility, the Fishing Bay Harbor Marina Club is located on the shores of the Fishing Bay which is located next to a reef site, but there are no records of spills occurring at that site. There are no VPDES, VRP sties or RCRA corrective Actions in or around the project area as well.

g. **Known Existence of Substantial Deposits of Substances Which Could Be Released in Harmful Quantities by Man-Induced Discharges** – No records have been found.

2. Contaminant Determination

The fill (oyster shell and alternative substrate) material that will be used in this project will be clean and not be a carrier of contaminants. There is no evidence that suggests that bottom sediments in the project area are contaminated and project construction will not require significant disturbance of bottom sediments.

E. Aquatic Ecosystem and Organism Determinations

1. Effects on Plankton

Turbidity levels may temporarily affect plankton populations through abrasions by suspended material and light transmission reduction. However, these impacts would be minor and temporary.

2. Effects on Benthos

There will be a loss of benthos during the construction on new sanctuary reefs. Relative to the entire system, losses resulting from the project will be small in nature. It is anticipated that benthic populations will rebound. Additionally, the new reefs will provide additional habitat benthic species that are associated with structure.

3. Effects on Nekton

Effects would be minor and temporary since it is anticipated that these species would move out of the work areas when construction begins and would return once the project is complete. Fish species associated with structure would derive long-term benefits from the creation of new oyster reefs.

4. Effects on Aquatic Food Web

Minor losses of aquatic organisms will result from the implementation of the project at the construction sites and the aquatic community at the site of newly constructed reefs will change. It is not expected that these losses would result in significant changes to the overall populations in the Piankatank River. Once construction has been completed, the aquatic food web of the Piankatank River would return pre-construction level. The long term effects on the aquatic food web would be positive, with the construction of new reef habitat.

5. Effects on Special Aquatic Sites

a. Sanctuaries and Refuges –No impact

b. Wetlands – The project will result in no impacts to emergent wetlands The project will convert subtidal wetlands from unconsolidated bottom type to reef habitat. The creation of new reefs may indirectly benefit adjacent subtibal wetlands, through improvements in water quality and increases benthic and overall secondary production.

a. Mudflats – No impact

b. Vegetated Shallows – The 2012 SAV survey completed by VIMS indicates that there are a number of small SAV beds in and around the project area. New reefs will not be located on

existing SAV beds. The construction of the project may have temporary impacts on the existing SAV habitat due to increases in water turbidity only if the SAV beds were located adjacent to the construction sites.

c. Riffle and Pool Complexes - N/A

6. Effects on Threatened and Endangered Species

Federally listed species that maybe found in and around the project area include shortnose and Atlantic Sturgeon, Kemp's Ridley, loggerhead, green, and leatherback sea turtle, Northeastern beach tiger beetle and piping plover. The Piankatank Project will have no significant negative impacts on the populations of federally threatened or endangered species. The proposed project will affect shallow subtidal areas within the river basin and is projected to have no impact on terrestrial and intertidal species. Individuals animals of aquatic species within the project area may be slightly negatively affected by the construction of the project (reduction of water quality, physical impacts with construction equipment and materials and disruption of normal behavior), but these species are highly mobile and will be able to move out of the construction zone. These impacts will halt once the construction has been completed.

7. Effects on Other Wildlife

Potential short term impacts associated with the Piankatank Project would occur during the construction phase and could include injury/mortality due to direct encounters with construction equipment, burial under the shell or alternative substrate, disruption of normal behaviors during the construction phase and increased turbidity and suspended solids. These impacts would be minor and temporary and site conditions would quickly return to pre-construction levels once construction has been completed.

8. Actions to Minimize Impacts

The placement of material would be accomplished under conditions that would minimize, to the extent practicable, adverse effects on the aquatic ecosystem. Best management practices would be employed during the construction. Specific actions include:

- Fills would be limited to the amount necessary to achieve project objectives.
- Fill material would be clean and free of contaminants

F. Proposed Disposal Site Determinations

1. Mixing Zone Determination

a. **Depth of Water at the Disposal Site –** Depth of water varies from six to 12 feet at the reef sites.

b. **Current Velocity –** Variable, the velocity within the Piankatank System is dependent on the tides.

c. **Degree of Turbulence –** Negligible

d. **Water Column Stratification –** Negligible

e. **Discharge Vessel Speed and Direction –** N/A

f. **Rate of Discharge –** N/A

g. **Dredged Material Characteristics –** N/A, No material will be dredged in the project area.

h. **Number of Discharges Per Unit of Time –** Discharges would occur at intervals throughout the construction period.

2. Disposal Site and Size

An evaluation of the appropriate factors indicates that the disposal site and/or sizes of the mixing zone are acceptable.

3. Actions to Minimize Adverse Discharge Effects

The placement of material would be accomplished under conditions that would minimize, to the extent practicable, adverse effects on the aquatic ecosystem. Best management practices would be employed during the construction. Specific actions include:

- Fills would be limited to the amount necessary to achieve project objectives.
- Fill material would be clean and free of contaminants

4. Determination of Compliance with Applicable Water Quality Standards

The project will comply with all applicable water quality standards.

5. Potential Effects on Human Use Characteristics

a. **Municipal and Private Water Supply –** The proposed project would not affect municipal or private water supplies.

b. **Recreational and Commercial Fisheries –** The construction of

the project may temporarily have a negative effect on the fisheries of the Piankatank Basin. These include short-term and minor turbidity increases, minor impacts to benthos, movement of nekton out of the area, and restriction of recreational and commercial activities at the project sites when construction equipment is in use to ensure public safety. These impacts will last through the construction phase. Long term impacts will be beneficial and are anticipated to improve environmental conditions and benefit the finfish and shellfish populations within the Piankatank River.

c. Water-Related Recreation – Water-related recreation, such as boating and fishing, would be restricted in project areas during the construction phase to ensure public safety. Minor benefits to recreational fishing for reef-oriented fish and waterfowl hunting where oyster density increase. Construction will result in shallower depths over the new reefs, which may require that vessels with deeper drafts navigate around the project sites. Signs will be placed to warn boaters of the location of the new reefs.

d. Aesthetics of the Aquatic Ecosystem – The project would have no impact on the aesthetic quality of the Piankatank Basin.

e. Parks, National and Historical Monuments, National Seashores Wilderness Areas Research Sites, and similar Preserves – No Impact.

G. <u>Determination of Secondary Effects on Aquatic Ecosystems</u>

None anticipated.

IV. FINDINGS OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. Adoption of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

B. Evaluation of the Availability of Practicable Alternatives to the Proposed Discharge Sites Which Would Have Less Adverse Impacts on the Aquatic Environment

A series of alternative environmental restoration actions and features were developed and evaluated for feasibility. However, no other alternatives were found that would produce reduced adverse impacts on the aquatic environment.

C. Compliance with Applicable State Water Quality Standards

Fill activities have been coordinated with and are in conformance with the Commonwealth of Virginia standards. A 401 Water Quality Certification will be obtained from the Division of Water prior to construction as required.

D. Compliance with Applicable Toxic Effluent Standards or Prohibitions under Section 307 of the Clean Water Act

Section 307 of the Clean Water Act establishes limitation or prohibitions on the discharge materials containing certain toxic pollutants. The discharges associated with the proposed work would not contain these toxins, and therefore the project complies with Section 307.

E. Compliance with the Endangered Species Act of 1973

No threatened or endangered species or their critical habitat would be affected by the proposed project. This project complies with the stipulations of the Endangered Species Act.

F. Compliance with Specific Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

Not applicable; the project does not involve the transportation or placement of dredged material in ocean waters pursuant to Sections 102 and 103 of the Act, respectively.

G. Evaluation of the Extent of Degradation of Waters of the United States

1. Significant Adverse Effects on Human Health and Welfare

a. Municipal and Private Water Supplies – The project would not affect municipal or private water supplies.

b. Recreational or Commercial Fisheries - Negative impacts to recreation and commercial fisheries will be minimal and temporary in nature.

c. Plankton – Adverse impacts will be minor and limited to the construction period.

d. Fish – Adverse impacts will be minor and limited to the construction period.

e. Shellfish – Adverse impacts will be minor and limited to the construction period.

f. Wildlife - Adverse impacts will be minor and limited to the construction period.

g. Special Aquatic Sites –Temporary adverse impacts to existing special aquatic sites in the Piankatank Basin are offset by predicted long-term benefits of environmental restoration.

2. Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystem

Direct and indirect negative impact to aquatic ecosystems would not be significant due to the project design and scope and measures taken to minimize impacts.

3. Significant Adverse Effect on Aquatic Ecosystem Diversity, Productivity, and Stability

The temporary and minor impacts which may occur during the construction phase of the project will be minimal compared to the long term benefits that will be realized once the project has been completed. Implementation of the proposed project is expected to result in increases to diversity, productivity and stability of the aquatic ecosystems.

4. Significant Adverse Effect on Recreational, Aesthetic, and Economic Values

Minor and temporary adverse effects to recreation and economic values are expected during the construction phase. These impacts will be eliminated once the construction phase has been completed. Long term impacts to recreation and economic values are expected to be overwhelmingly positive. This project would have no adverse impacts to aesthetics.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

Appropriate steps to minimize potential adverse impacts from any discharges on aquatic systems have been incorporated.

I. Finding

The proposed discharges of fill material are specified as complying with the requirements of the 404(b)(1) Guidelines, with the inclusion of appropriate and practicable conditions as identified herein to minimize pollution or adverse effects on the aquatic ecosystem. These conditions will be attached and made part of the project record.

Approved by: _____

Date: _____

Appendix C

ESSENTIAL FISH HABITAT ASSESSMENT

ESSENTIAL FISH HABITAT ASSESSMENT

PIANKATANK RIVER OYSTER RESTORATION

MIDDLESEX AND MATHEWS COUNTIES, VIRGINIA

December 2014

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ESSENTIAL FISH HABITAT ASSESSMENT
PIANKATANK OYSTER RESTORATION PROJECT
MIDDLESEX AND MATHEWS COUNTIES, VIRGINIA

1.0 INTRODUCTION

The Piankatank Oyster Restoration project is located at the mouth of the Piankatank River in eastern Virginia where the river flows into the southern Chesapeake Bay. Parts of the project are located in both Middlesex and Mathews counties (Figure 1).

The purpose of the Chesapeake Bay Native Oyster Restoration Project in the Piankatank River is to restore oyster habitat and populations in order to establish a self-sustaining population of native oysters to the river. This population must be sufficient to form oyster reefs that persist and grow in size and height over time, similar to oyster reefs during the time prior to commercial exploitation. This goal will be achieved through the construction of new sanctuary reefs.

2.0 ESSENTIAL FISH HABITAT ASSESSMENT PURPOSE

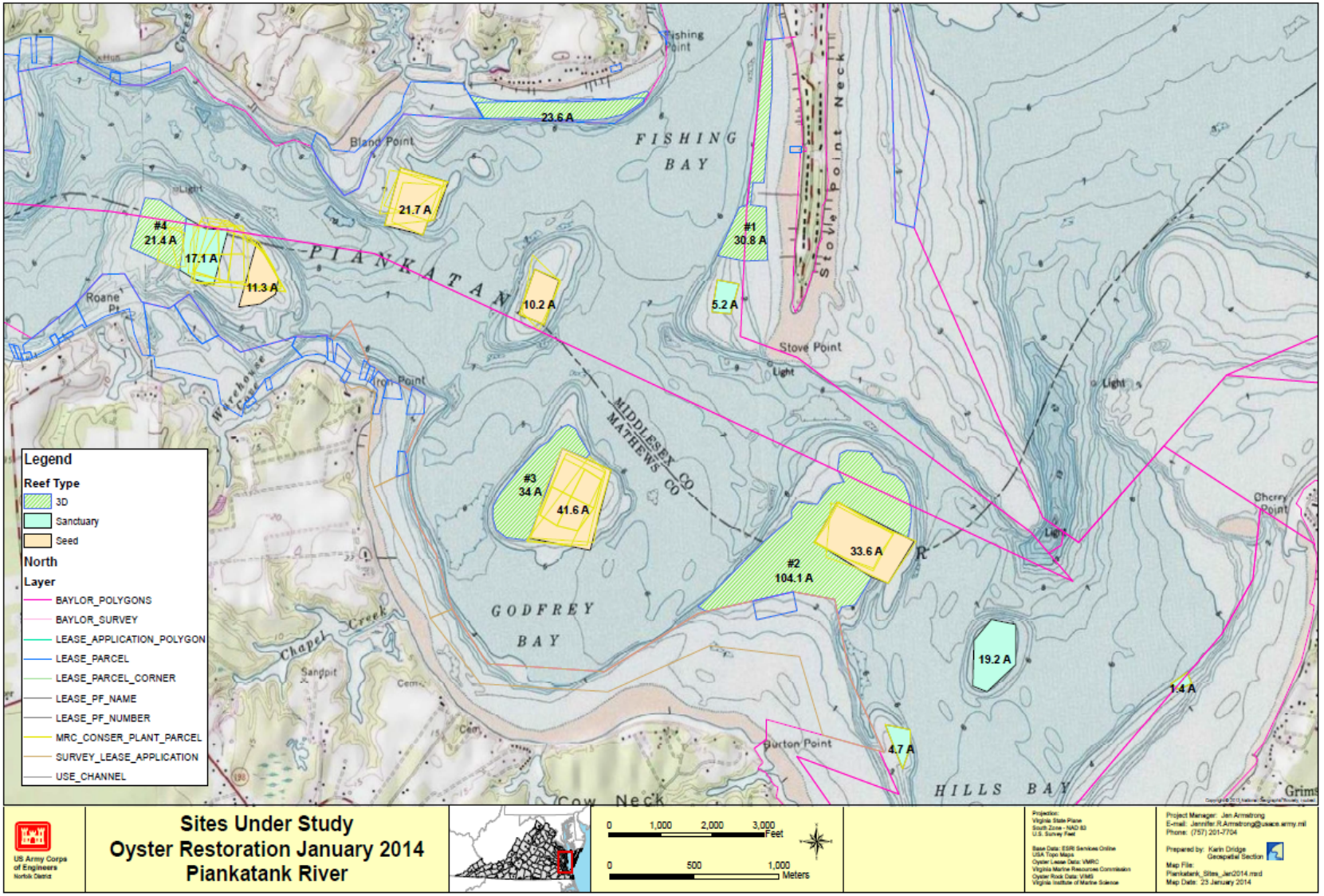
Provisions of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801) require that Essential Fish Habitat (EFH) areas be identified for each species managed under a fishery management plan, and that all Federal agencies consult with the National Marine Fisheries Service (NMFS) on all Federal actions that may adversely affect EFH. Essential Fish Habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." This EFH assessment is being prepared pursuant to Section 305(b)(2) of the Magnuson-Stevens Act, and includes the following required parts: 1) identification of species of concern; 2) a description of the proposed action; 3) an analysis of the effects of the proposed action; 4) proposed mitigation; and 5) the Federal agency's views regarding the effects of the proposed action. The purpose of this consultation process is to address specific federal actions that may adversely affect EFH, but do not have the potential to cause substantial adverse impact.

3.0 PROPOSED PROJECT

3.1 PROJECT DESIGN

Sanctuary Reefs. Sanctuary reefs will be constructed at sites, totaling up to 219 acres of new reef habitat, in the mouth of the Piankatank River. Figure 1 illustrates the sites where new oyster reefs, labeled “3D” in the image, are proposed to be constructed. The sanctuary reefs will be constructed primarily of artificial substrate materials or a combination of shell and artificial substrate. Alternative substrate materials that could be used include (but is not limited to) concrete rubble (recycled concrete) and related “materials of opportunity” generated by demolition of concrete structures, granite, limestone marl, and shaped concrete structures

Figure 1. PROJECT LOCATION MAP



(reef ball® type structures, pyramids, modules, and "castles," for example). If shaped concrete structures are used, they will need to be placed on hard bottom to avoid subsidence, and may perform better if placed on bottom hardened by placement of concrete rubble or small amounts of new shell. Considering post construction settling of material, all reefs will be build to a minimum height of one foot elevation above existing bottom, assuming hard bottom is available If more marginal areas with higher percentages of silt are utilized, settling is expected to be greater and taller reefs would be needed. A layer of shell may be added to the surface of the reefs to encourage the colonization of oysters.

These sanctuary areas will be closed to commercial and private harvest. The purpose of the project is to contribute to the goal of long-term self-sustaining populations of native oysters in various tributaries within the Chesapeake Bay. It is predicted that the sanctuary reefs will contribute to improved water quality of the Piankatank River and will increase spat sets within the river. The spat will move throughout the area, improving oyster harvests.

3.2 PROJECT CONSTRUCTION

The new reefs will be built using alternative substrate. The goal of the project is to construct reefs that are more than 12 inches high. The amount of fill needed to create the new reefs will depend on the material that is used. For example, if formed concrete structures are used, depending on the size and shape of the structures, the density of structures could be anywhere from 500 to 2000 per acre. If crushed material (concrete, granite, fossil shell, etc.) is used to construction the new oyster reefs, then approximately 1600 cubic yards of material per acre will be required. The material required to construct the new sanctuary reefs will either be purchased from commercial sources or will be recycled material. All material that is uses for this project will be free of contaminants.

The construction of this project will be phased over a number of years due to funding constraints and availability of materials. To correspond to annual oyster spat set, construction will not take place later than September 30th of each year.

4.0 IDENTIFICATION OF MANAGED SPECIES

Essential Fish Habitat has been identified for seventeen fish species (Table 2), including three skate species, in the project area, which falls within three separate 10 minute square grids (Table 1) (NOAA/NMFS, 2014). This document includes a summary a discussion of the life cycle, the status of the fishery, and the designated EFH and a summary of project impacts to each species.

Table 1. NOAA's ESSENTIAL FISH HABITAT 10 MINUTE SQUARE GRIDS THAT THE PROJECT AREA FALL WITHIN

North	East	South	West
37□ 40.0 N	76□ 10.0 W	37□ 30.0 N	76□ 20.0 W
37□ 40.0 N	76□ 20.0 W	37□ 30.0 N	76□ 30.0 W
37□ 30.0 N	76□ 10.0 W	37□ 20.0 N	76□ 20.0 W

Table 2. ESSENTIAL FISH HABITAT AS DESIGNATED BY NOAA FISHERIES FOR THE PIANKATANK PROJECT AREA.

Species	Eggs	Larvae	Juveniles	Adults
Red hake *(Urophycis chuss)*			X	X
Windowpane flounder (*Scopthalmus aquosus*)			X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Atlantic butterfish (*Peprilus triaccanthus*)	X	X	X	X
Summer flounder (*Paralicthys dentatus*)		X	X	X
Scup *(Stenotomus chrysops)*	X	X	X	X
Black sea bass (*Centrophristus striata*)			X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Red drum (*Sciaenops occelatus*)	X	X	X	X
Dusky shark (*Charcharinus obscurus*)		X	X	
Sandbar shark (*Charcharinus plumbeus*)		X	X	X
Sandbar shark (*Charcharinus plumbeus*)		HAPC	HAPC	HAPC
Clear nose skate (*Raja eglanteria*)			X	X
Little skate (*Raja erinacea*)			X	X
Winter skate (*Raja ocellata*)			X	X

* The "X" indicates the life stage for which this habitat is important.

4.1 RED HAKE

4.1.1 Life Cycle and Habitat. Red Hake can be found in the local area as juveniles and adults, but prefer oceanic waters. They can be found, especially as juveniles, in the Chesapeake Bay mainstem during the cooler months of the year. The species occurs from North Carolina to southern Newfoundland. They are primarily a demersal fish and are found on or near the bottom. They spawn offshore through the summer and fall primarily, although eggs can be found in the water column almost year round. Eggs are typically found floating mostly at the edge of the continental shelf. Larvae are planktonic and feed mostly on zooplankton. They metamorphose into bottom dwelling juveniles. Juveniles use structure as cover, including reefs, sea scallops, depressions in the sediments made by other fish, and other structures that provide any bottom relief. Adults are often found on or near the bottom, on reefs, or utilizing other structure, though they create their own depressions in the sea bottom for cover. They can also be found in the water column actively swimming at times. Adults prefer cooler waters of 2-22 °C.

4.1.2 Fishery. Red hake are managed as two U.S. stocks. The local stock is considered the southern stock, extending from southern Georges Bank to the Middle Atlantic Bight, the southern end of its range. The southern stock is currently considered overfished.

4.1.3 EFH. For juvenile red hake EFH is identified as bottom habitats with a substrate of shell fragments, including areas with an abundance of live scallops, in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where red hake juveniles are found: water temperatures below

For adult hake, EFH includes bottom habitats in depressions with a substrate of sand and mud in the Gulf of Maine, on Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Generally, the following conditions exist where red hake adults are found: water temperatures below

4.1.4 Project Impacts. Eggs and larvae are not found in the project area so no effect would be expected upon these two life stages. Juveniles and adults may be found in the project area and would be found near the bottom, associated with structure, including hard reef habitat. Individuals may be adversely affected during construction of the new reefs and improvements to existing reefs. The impacts could be direct, such as injury and death caused by direct contact with construction equipment or reef materials, or indirect, such as the affects of a temporary impairment to water quality and changes to behavior. These impacts are expected to be temporary, lasting only during the construction phase, and insignificant in nature, because they will only affect individual fish in the project area. These negative effects are not expected to impair the population. Long term, this project is expected to provide benefits to this fish species because the area of hard structure will increase.

4.2 WINDOWPANE FLOUNDER

4.2.1 Life Cycle and Habitat. In "The Guide to Essential Habitat Designations within the Northeastern United States," available online, NOAA describes habitat conditions for life stages of windowpane flounder. Two life stages (juveniles and adults) of this species are distributed in surface waters around the perimeter of the Gulf of Maine, on Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Juveniles occupy bottom habitats consisting of a mud or fine-grained sand substrate in the same regions where eggs are found. The juvenile fish prefer water temperatures below 25 °C, depths from 1-100 meters, and salinities between 5.5-36 ppt. Adults also dwell near the ocean floor, in habitats consisting of mud or fine-grained sand. Adults are found in waters with temperatures below 26.8 °C, depths from 1-75 meters, and salinities between 5.5 and 36 parts per thousand (ppt). Windowpane flounder are most often observed spawning during the months of February through December, with a peak in May in the middle Atlantic. Spawning occurs in depths from 1-75 meters when waters temperatures are below 21 °C and salinities between 5.5 to 36 ppt.

4.2.2 Fishery. Windowpane flounder are managed under a Multispecies Fishery Management Plan (FMP) developed by the New England Fishery Management Council's. The FMP includes 15 northeastern groundfish species and regulates the fishery, including time/area

closures, gear restrictions, and minimum size limits. "The goal of the management program is to reduce fishing mortality to allow stocks to rebuild above minimum biomass thresholds and to attain and remain at or near target biomass levels."

Directed commercial fisheries have only occurred sporadically and commercial landings of windowpane flounder, which are caught primarily in bottom trawls, are relatively low at present. Discards and bicatch windowpane flounder have never been quantified. However, it is likely that these practices are now an important source of mortality as recently there has been no directed fishery. Recreational catch is not considered significant to the windowpane flounder population.

Based on difference in growth rates, size of maturity and relative abundance, windowpane flounder are divided into two stocks; the Gulf of Maine/Georges Bank stock and the Southern New England/Middle Atlantic stock. During the 1950's, landings of Southern New England/Middle Atlantic windowpane flounder were as high as 924 million tons (mt) per year. From 1975 to 1981, landings ranged between 500 and 900 mt. The quantity of windowpane flounder harvested increased sharply to a record high of 2,100 mt in 1985 and then steadily declined to 100 mt in 1995. The fishery declined further, reached a record low of 25 mt in 2005 (Hendrickson, 2006).

4.2.3 EFH. Essential Fish Habitat has been identified in the project area for both juveniles and adult windowpane flounder. EFH for juvenile and adults include bottom habitats with a substrate of mud or fine-grained sand. Juveniles of the species are found in water between the depths of 1 and 100 meters, while adults have been observed in waters up to 75 in depth. Juveniles prefer water temperatures below 25 °C and adults prefer temperatures below 26.8 °C. Both life stages are found in waters where the salinity is between 5.5 – 3 ppt (NOAA/NMFS, 2014).

4.2.4 Project Impacts. Eggs and planktonic larvae are likely not to be found in the Piankatank River as the species spawns offshore therefore the implementation of the proposed project would not affect any eggs or larvae in the water column. Additionally, as they are buoyant and remain near the surface, the placement of subtidal reefs and shell should not impact them.

Juveniles and adults can both be found in the project area, and are benthic fish. This species does not prefer structured bottom provided by oyster reefs and is unlikely to be found on them, so the placement of artificial substrate is not expected to impact this species.

Adults prefer more open bottom areas, particularly sandy regions; while juveniles utilize sandy areas and SAV beds for shelter and foraging. The construction of new reefs may result in direct impacts, such as injury and death caused by direct contact with construction equipment or reef materials, but because of their great mobility, juveniles and adults should be able to avoid direct detrimental impacts. Indirect impacts, such as the affects of temporary impairment to water quality and changes to behaviors would affect fish within the project area. Other impacts to the species will result from the alteration of bottom habitat, from soft sediment to hard reef. Destruction of benthos and alteration of habitat type could impact the food web; however, the

amount of bottom that will be effects is relatively small in comparison to the amount of soft bottom habitat available in the Piankatank River. Detrimental impacts, both direct and indirect, to the windowpane flounder population is expected to be insignificant because there is no reason to expect that windowpane flounder will be concentrated at the site. Additionally, many of the impacts will last only during the construction phase.

4.3 BLUEFISH

4.3.1 General. Bluefish, *Pomatomus saltatrix*, is the sole representative of the family Pomatomidae and is closely related to the jacks, pompanos, and roosterfish. Commonly known as chopper, tailor, snapper, elf, skipjack, greenfish, and blue, the bluefish inhabits the continental shelf waters of temperate zones. Along the eastern seaboard, the species is found from Nova Scotia to Texas and visits the Chesapeake Bay region from spring to autumn. The bluefish is abundant in the lower Bay and common most years in the upper Chesapeake Bay, although it is rare north of Baltimore.

4.3.2 Life Cycle and Habitat. Bluefish have a worldwide distribution with occurrences recorded in the Atlantic Ocean, the Mediterranean Sea, the Black Sea, and the Indian Ocean. Adults overwinter off the southeastern coast of Florida and begin a northerly migration in the spring, following warmer water with local movements into and out of bays and sounds. Their movement patterns are complex and not well understood. Younger fish appear to follow different migratory routes than older fish. Schools of same-sized bluefish can cover tens of square miles and undertake extensive coastal migrations.

Adult bluefish are found in a variety of habitats, usually in response to food availability and spawning cues. Bluefish are voracious predators and will feed on virtually any food they can catch and swallow, including butterfish, menhaden, sand lances, silversides, mackerel, anchovies, sardines, weakfish, spotted seatrout, croaker, spot, white perch, shad, alewife, blueback herring, and striped bass. Due to their predacious nature, bluefish are in competition with adult striped bass, mackerel, and large weakfish. They have few predators and can live 12 years and weigh up to 20 pounds.

During the northward migration, a spring spawning takes place from Florida to southern North Carolina. A second spawning occurs off the Mid-Atlantic coast during the summer. In the Chesapeake Bay area, peak spawning is in July and occurs over the outer continental shelf. Most bluefish mature at age two and have high fecundity. Females can produce 900,000 to 4,500,000 eggs. The distribution of bluefish eggs is related to temperature and salinity and can vary from year to year.

Bluefish larvae can be found offshore between Cape Cod, MA, and Palm Beach, FL, throughout the year. Once spring spawn is complete, bluefish move shoreward. The smaller fish generally enter the Chesapeake Bay, while larger fish head farther north. Larval distribution is affected by the wind and currents. Larvae that originate from spawning off the Chesapeake Bay are carried south and offshore. As larvae grow and are able to swim, they leave the surface for deeper water and move in shore. Early juveniles (young fish whose fins have formed) enter the lower Chesapeake Bay and its tributaries in the late summer and fall where estuarine areas provide

food and shelter. In the early autumn, bluefish begin to migrate out of the Chesapeake Bay and move south along the coast. Peak abundance near the Chesapeake Bay mouth occurs from April to July and again in October and November.

4.3.3 The Fisheries. The bluefish commercial fishery in Chesapeake Bay accounts for about 20 percent of the total US landings of bluefish. Commercial landings from the Chesapeake Bay were generally high during the 1930's, modest to poor from the 1940's through the 1960's, and again high from the early 1970's through the mid-1980's. In recent years, overfishing has become a concern. Historically, the commercial bluefish harvest has been more important in Virginia, than in Maryland, with 10 times the landings of Maryland.

The predominant commercial gear used in harvesting bluefish from the Chesapeake Bay has been pound nets but other gear, including gill nets, otter trawls, haul seines, and hand lines, is used. Currently, all operators of commercial gear, except Virginia's hook and line fisheries, are required to have a license. The bluefish's aggressive feeding habits and spirited fight make it a popular and important sportfish. Landings from the recreational fishery are five to six times that of commercial landings. In the Chesapeake Bay, bluefish ranked highest in both number and weight among sportfish nearly every year from 1970 to 1990. Due to the high recreational value, the conservation effort by anglers has been strong (Chesapeake Bay Program, 1999).

4.3.4 EFH. Essential Fish Habitat has been designated for both juveniles and adult bluefish in the region that contains the current project. For both lifestages offshore pelagic waters found over the Continental Shelf is considered EFH. Bluefish typically are found in salinities > 25 ppt, which is normal for waters over the Continental Shelf. Inshore, EFH is all major estuaries. Generally, juvenile bluefish occur in Mid-Atlantic estuaries from May through October. Adults enter estuaries earlier in the season beginning in April (NOAA/NMFS, 2014).

4.3.5 Project Impacts. Juveniles and adult bluefish may be present during the construction of the project. However, because of their high mobility they are readily able to relocate from the project area to avoid direct detrimental impacts during the construction. It is expected that the fish species will return to the project site, once construction has been completed. Food web impacts caused by the destruction of benthos, alteration of bottom habitat from soft sediment to hard reef or change in water quality are unlikely to impact the bluefish, because of their open water orientation. Direct and indirect impacts are not expected to significantly affect the bluefish population. Post construction, bluefish may experience enhanced foraging opportunities on fish species that will inhabit the newly constructed reefs.

4.4 ATLANTIC BUTTERFISH

4.4.1 General. The Atlantic butterfish (*Peprilus triacanthus*) is a member of the family Stromateidae, of which two species are found within the Chesapeake Bay. Butterfish are characterized as being very deep-bodied and highly compressed, with adults lacking pelvic fins (Murdy et al., 1997). The Atlantic butterfish is a fast-growing, schooling, pelagic fish with a range that reaches from Newfoundland to the Gulf Coast of Florida. The species is most abundant in the region from the Gulf of Maine to Cape Hatteras. Butterfish rarely live beyond

three years of age and attain sexual maturity at 1 to 2 years of age. Butterfish are typically found in euryhaline (5-32 ppt) environments (Musick, 1972).

4.4.2 Life Cycle and Habitat. Butterfish occur in large schools in bays and over continental shelves. They are a pelagic species, typically found in shallow waters. The butterfish occurs in the Chesapeake Bay from March through November and is considered common to abundant in the lower bay. Within the bay, the butterfish move northward in the spring, first appearing in Virginia waters in March but not found above the Rappahannock River before May. Butterfish leave the bay by December, overwintering offshore in deeper water (590-690 ft) (Murdy et al., 1997).

Butterfish are broadcast spawners, and spawn offshore from May to July in the Atlantic Ocean. After hatching, juveniles move into near-coastal waters, including bays and estuaries. The young often hide from predators in mats of floating seaweed or among the tentacles of jellyfish. Juveniles feed primarily on phytoplankton, while the adult diet is comprised mainly of jellyfish, small fishes, crustaceans, and worms (Murdy et al., 1997).

4.4.3 The Fisheries. The butterfish fishery of the Chesapeake Bay, though once significant, is presently of minor commercial importance. In 1920, Chesapeake Bay landings were reported as 590,000 kilograms (kg) (1.3 million pounds), with almost all catch from pound-nets. In contrast, the reported catch for 1990 was 9,100 kg (20,000 pounds). Butterfish are caught primarily during two periods, the first occurring from April-May and the second occurring from September-October. Butterfish are of only minor interest to recreational fishermen, as they rarely take bait (Murdy et al., 1997). The butterfish stock is not overfished nor approaching an overfished condition (Cross et al., 1999; NMFS, 1997).

4.4.4 EFH. Essential Fish Habitat has been designated for all four lifestages (i.e. egg, larvae, juvenile and adult) of the Atlantic butterfish in the region where the proposed project is located. EFH for all lifestages of this species are located off shore in the pelagic waters found over the Continental Shelf. The depths vary in which each development stage of these fish are collected. Butter fish eggs are found from the shore to 600 ft, the larvae are collected in depths between 33 feet and 6000 feet, while both juveniles and adults are found between 33 and 1200 feet. Water temperature limits also vary by lifestage. Eggs have been found at water temperatures between 52 °F and 63 °F. The temperature range for larval fish is between 48 °F and 66 °F; while adults and juvenile fish are collected at temperatures between 37 °F and 82 °F (NOAA/NMFS, 2014).

4.4.5. Project Impacts. All life stages of butterfish may be present in the project site. Butterfish are a small pelagic fish that prefers open water habitat. Should butterfish be in the project areas, life stages with high mobility should be able to relocate away from the project site to avoid direct physical harm. Less mobile life stages may have more incidences of direct impacts since they will not be able to avoid the construction activities.

No indirect impacts to butterfish are expected as a consequence of alterations to bottom habitat since this species is largely pelagic, and not closely associated with the bottom. No indirect impacts resulting from food web impacts are expected because butterfish are planktivorous and

their food items are derived from a wide area. Any impacts to this species resulting from project construction will be minor and temporary in nature.

4.5 SUMMER FLOUNDER

4.5.1 General. Summer flounder or fluke (*Paralichthys dentatus*) live in estuarine and coastal waters from Nova Scotia to Southern Florida, with greatest abundance between Cape Cod, MA and Cape Hatteras, NC. Most summer flounder inhabit Chesapeake Bay in the summer and move offshore to depths of 120 to 600 ft during the fall and winter. However, some summer flounder over winter in the Chesapeake Bay. The flounder population extends as far north as the Gunpowder River, but are more common in the deep channels of the lower Chesapeake Bay than in the upper Bay.

Like other flounders, this species is a bottom-dwelling predator, relying on its flattened shape, agility, sharp teeth, and ability to change color and pattern on the upper (eyed) side of its body. Small fishes, squid, worms, shrimp, and other crustaceans make up the bulk of this species diet. Summer flounder can live to 20 years of age with females living longer and growing larger than males (up to 95 cm total length [3ft]).

4.5.2 Life Cycle and Habitat. Summer flounder spawn during their offshore migration, from late summer to mid-winter. Larvae and post-larvae drift and migrate in shore, aided by prevailing water currents, and enter the Chesapeake Bay from October through May. Larval flounder, which have body symmetry and eyes on both sides of their heads, more closely resemble the larvae of other fishes than adult flounder. Upon reaching the estuaries, larval flounder undergo a metamorphosis to the post-larval stage. During metamorphosis, the right eye of the larval flounder gradually migrates to the left side of the head–the feature distinguishing summer flounder from winter flounder, whose eyes are on the right side– and the body takes on the flattened appearance that it retains as an adult fish. Once the metamorphosis is complete, the post-larval flounder assumes the adults' bottom-dwelling lifestyle. Juvenile summer flounder often live among eelgrass beds in the Chesapeake Bay.

4.5.3 The Fisheries. Summer flounder are of major recreational and commercial importance north of Cape Hatteras. Anglers catch summer flounder from the shore, piers, and boats with hook and line. The recreational catch far exceeds the commercial catch in the Chesapeake Bay and nearshore coastal waters. The lower Chesapeake Bay and seaside inlets produce the bulk of the recreational landings. Between 1979 and 1985, the combined recreational harvest in Maryland and Virginia averaged 5.5 million pounds per year, with 90 percent taken originating from Virginia waters.

Commercial landings in Virginia have historically been greater than those in Maryland. Between 1981 and 1986, Virginia averaged 5.7 million pounds per year and Maryland averaged 583,000 pounds. However, more than 90 percent of the landings recorded for both states have come from outside state waters. The great bulk of the catch is produced by the winter trawl fishery that operates in mid-continental shelf waters. In the Chesapeake Bay, summer flounder are commercially-caught by haul seines, pound nets, and gill nets, but the species does not form a significant commercial fishery. In 1990, only 48,000 pounds of summer flounder were taken in

Virginia's Chesapeake Bay and ocean waters. Since the mid-1980's, commercial and recreational catches have declined precipitously because of overfishing and year-class failure. The Chesapeake Bay record for summer flounder is a fish weighing 15 pounds, which was taken in Maryland waters (Chesapeake Bay Program, 1999).

4.5.4 EFH. Essential Fish Habitat has been designated for three lifestages (larvae, juvenile and adult) of the summer flounder in the region where the project is located. Offshore, EFH for larvae, juvenile and adult flounder has been identified as the pelagic waters found over the Continental Shelf. EFH for this species has also been identified in nearshore waters. All the estuaries where summer flounder were identified as being present in the ELMR database, with waters with salinities from 0.5 to greater than 25.0 ppt, has been designated as EFH for all three developmental stages of summer flounder (NOAA/NMFS, 2014).

In general, summer flounder larvae are most abundant nearshore (12-50 miles from shore) at depths between 30 and 230 ft. They are most frequently found in the southern part of the Mid-Atlantic Bight from November to May. Juveniles inhabit estuarine habitats, including salt marsh creeks, seagrass beds, mudflats, and open bay areas, which is used as nursery areas. Juveniles prefer water temperatures greater than 37 °F and salinities from 10 to 30 ppt. Adult flounder are found in shallow coastal and estuarine waters during warmer months and move offshore to the outer Continental Shelf at depths of 500 ft during the colder months (NOAA/NMFS, 2014).

4.5.5 Project Impacts. The Piankatank River is not considered EFH for eggs of the summer flounder; however larvae, juveniles and adults can be found in the project area.

Direct impacts include mortality or injury cause by contact with construction equipment or material that is being placed in the river. Because of their mobility, juvenile and adult summer flounder should be able to relocate elsewhere and avoid any detrimental impacts. If juvenile fish are in the project area during construction, they would be more vulnerable than adults because of their slower swimming speed. Larval fish are even less mobile than juveniles and may be unable to move out of the project area during construction. Although individual fish may be injured or killed during the construction of this project, no adverse impacts to the summer flounder population would be expected from destruction of individuals because summer flounder are not concentrated in the project area.

Indirect impacts, such as the affects of temporary impairment to water quality, alteration of bottom habitat and behavioral changes would affect fish within the project area. Because of their demersal nature, destruction of benthos and alterations in bottom habitat impacting the food web may have detrimental impacts to summer flounder in the project area (Diaz et al., 2006). These impacts are expected to be minor since it is expected that the fish will move to areas outside of the project boundaries in order to find adequate prey. Although acres of soft bottom habitat will be converted to hard reef habitat, it is predicted that impacts to the food web will be minor, because the amount of sea floor that will be affected is minor relative to the amount of soft habitat that will remain unchanged in the Piankatank River.

Detrimental impacts, both direct and indirect, to the summer flounder population are expected to be insignificant. Additionally, many of the impacts will temporary, lasting only during the construction phase

4.6 SCUP

4.6.1 Life Cycle and Habitat. The eggs and larvae of the scup are pelagic, with eggs hatching within two to three days. Larval fish move out of the water column to become demersal after reaching lengths between 15-30 mm. Young of the year juveniles begin to arrive in estuaries in June. Scup are considered mature at two years of age. Adult fihs are found in the Middle Atlantic Bight from the spring until the fall. This fish are usually found in schools in and around a variety of habitat, including open sandy bottom to mussel beds and reefs.

Juvenile scup feed mainly on polychaetes, amphipods and other small crustaceans, and mollusks. Adult scup are benthic feeders and rely on a wide variety of prey, including small crustaceans, polycheates, mollusks, small squid, and small fish.

Scup migrate from inshore waters as water temperatures decrease in the winter. These fish will overwinter in warmer waters on the outer continental shelf south off of New Jersey and along the coast from Long Island to North Carolina. Individuals of this species will return to inshore areas as water temperatures rise in the spring (Steimle et al 1999).

4.6.2 Fishery. The fishery is considered overfished in the Middle Altantic Bight, with record low abundance levels.

4.6.3 EFH. Estuaries are considered EFH for all lifestages of scup, in "mixing" and "seawater" salinity zones. In general scup eggs are found from May through August in southern New England to coastal Virginia, in waters between 55 and 73 ^{o}F and in salinities greater than 15 ppt. Juvenile scup, in general during the summer and spring are found in estuaries and bays between Virginia and Massachusetts, in association with various sands, mud, mussel and eelgrass bed type substrates and in water temperatures greater than 45 ^{o}F and salinities greater than 15 ppt. While, wintering adults (November through April) are usually offshore, south of New York to North Carolina, in waters above 45 ^{o}F (NOAA/NMFS, 2014).

4.6.4 Project Impacts. All life stages of this species may be found within the project area. Impacts to eggs and larval stages are not anticipated due to the pelagic nature of these live stages. Adult and juvenile fish are most likely to inhabit inshore areas, such as the project site and are therefore more likely to be affected by this project.

Direct impacts include mortality or injury cause by contact with construction equipment or material that is being placed in the river. Because of their mobility, juvenile and adult scup should be able to relocate elsewhere and avoid any detrimental impacts. If juvenile fish are in the project area during construction, they would be more vulnerable than adults because of their slower swimming speed. Although individual fish may be injured or killed during the construction of this project, no significant impacts to the scup population would be expected from destruction of individuals because scup are not concentrated in the project area.

Scup juveniles and adults may suffer minor indirect impacts from food web disturbance caused by destruction of benthos and altered habitat conditions within the project area. However, because of the temporary and localized nature of the impacts, and relatively small area of bottom to be disturbed, impacts are expected to be very minor.

This species is found on both open bottom habitat and on structure so it is expected that post-construction, local scup will inhabit the new and restored oyster reefs and forage on the new reefs and on open sand/clay bottom outside of the project area. Negative impacts will be minor and temporary; while long term benefits to this species will be positive and significant.

4.7 BLACK SEA BASS

4.7.1 General. The black sea bass (*Centropristis striata*) is a member of the family Serranidae, or true sea basses. In the Chesapeake Bay area, this fish alsoused to be known as "black will," "chub," or simply sea bass. Black sea bass are year-round inhabitants of the Mid-Atlantic region. These fish are bluish-black as adults and brownish as juveniles.

4.7.2 Life Cycle and Habitat. The black sea bass population extends from Maine to the Florida Keys and into the Gulf of Mexico. Black sea bass found north of Cape Hatteras are seasonally migratory and are considered a stock distinct from fish living south of the Cape. In the Chesapeake Bay, adults migrate offshore and south to overwinter in waters more than 100-meter deep off of the Virginia and Maryland coasts. During the spring, the fish return to the mid and lower Chesapeake Bay, as far north as Solomon's Island, and remain there until late fall. Adult black sea bass have been captured as far north as the Chester River, but most fish encountered near the shore are juveniles (1 to 2 years old).

Adult black sea bass are considered a temperate reef fish and are most often found associated with rocky bottoms near pilings, wrecks, and jetties. Visual feeders during daylight hours, black sea bass rely on swift currents and their large mouths to capture their prey, which include other fish, crabs, mussels, and razor clams. Although they do not travel in schools, they can be found in large groups around structures or during in shore-offshore migrations.

Black sea bass are protogynous hermaphrodites, meaning individuals change sex during their lifetime. Initially, black sea bass are female, but once they reach between nine and 13 inches in length some individuals reverse sex to become males. Thirty-eight percent of females in the Mid-Atlantic demonstrate sex reversal, usually between August and April.

In the Mid-Atlantic continental shelf waters (59-148 ft deep), spawning begins in June, peaks in August, and continues through October. Fish between ages two to five years produce approximately 280,000 eggs, which are buoyant and contain a single oil globule. Larvae develop in coastal waters, two to 50 miles offshore, at depths of up to 108 feet, preferring salinities of 30-35 ppt and temperatures of 58-82 °F. When they are about 13 millimeter (mm) (0.5 inches [in]) in length, young black sea bass move into estuaries, bays, and sounds, where they find shelter in beds of SAV, oyster reefs, and among wharves, pilings, and other structures. Young black sea bass feed primarily on crustaceans, such as shrimp, amphipods, and isopods.

Juveniles migrate offshore in December, although some young-of-the-year may remain in the Chesapeake Bay throughout the winter. Black sea bass are reported to live as long as 20 years and reach a maximum adult size of two feet. However, individuals longer than 15 inches (approximately the size of an 8-year-old fish) are uncommon. Large fish are more common offshore than in the Chesapeake Bay.

4.7.3 The Fisheries. The black sea bass forms the base of an important recreational fishery. An estimated 1.5 million black sea bass were taken by anglers in the lower Chesapeake Bay in 1991. Anglers bottom fish using squid and other natural baits to catch this highly esteemed and flavorful fish. The commercial interest in the Chesapeake Bay is modest, with commercial landings averaging less than 2,275 kg (5,000 pounds) per year. Gear types used to catch this species include trawls, pots, and hook and line.

In 1996, the Chesapeake Bay Program developed the "Chesapeake Bay and Atlantic Coast Black Sea Bass Fishery Management Plan" to enhance and perpetuate black sea bass stocks in the Chesapeake Bay and its tributaries. Stock assessments completed prior to 1996 indicated that the species was being over-harvested in the Chesapeake Bay, which led the Mid-Atlantic Fishery Management Council/Atlantic States Marine Fisheries Commission to take several measures: implementing a 9-inch total length minimum size limit for 1996-97, with ensuing limits to be revised on an annual basis; requiring a 4-inch minimum mesh size for trawlers that harvest more than 100 pounds; and requiring all black sea bass pots to have escape vents and biodegradable hinges and fasteners. The goal of these efforts was to reduce exploitation and to improve protection of the black sea bass spawning stock in the Chesapeake Bay and the Atlantic.

4.7.4 EFH. Essential Fish Habitat has been designated for both juvenile and adult black sea bass in the region that corresponds with the current project. Offshore, the demersal waters over the Continental Shelf have been designated as EFH for both phases of this species. Juveniles are usually associated "with rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas", while adults can be found in "structured habitats (natural and man-made), sand and shell are usually the substrate preference".

Inshore, EFH is defined as "estuaries where black sea bass are identified as being common, abundant, or highly abundant in the ELMR database for the "mixing" and "seawater" salinity zones". Juveniles are found in estuaries during the summer and spring, when waters temperatures are >43 °F and salinities are > 18 ppt. Adults Black sea bass inhabit estuaries between May and October. Both adults and juveniles move offshore during the winter months. Clam beds and shell patches may be used by juvenile black sea bass when they overwinter offshore (NOAA/NMFS, 2014).

4.7.5 Project Impacts. Juvenile and adult black sea bass may be present in the project area while construction is taking place. This species is a structure preferring fish that feeds on benthic invertebrates as well as other marine life. Direct impacts include mortality or injury caused by contact with construction equipment or material being placed into the river. Similar to other species addressed in this document, local black sea bass are expected to avoid the area during construction due to the noise and disturbance.

Black sea bass juveniles and adults may suffer minor indirect impacts from food web disturbance caused by destruction of benthos and altered habitat conditions within the project area. However, because of the temporary and localized nature of the impacts, and relatively small area of bottom to be disturbed, impacts are expected to be very minor.

Due to their preference for structure, it is expected that post-construction, local black sea bass will inhabit the new and restored oyster reefs and forage there preferentially compared to the open sand/clay bottom found there now. Negative impacts will be minor and temporary; while long term benefits to this species will be positive and significant.

4.8. KING AND SPANISH MACKEREL

4.8.1 General. The king mackerel, *Scomberomorus cavalla*, and Spanish mackerel, *Scomberomorus maculatus*, are members of the mackerel family, Scombridae. Both species support major commercial and sport fisheries along the Atlantic Ocean and Gulf of Mexico. The ranges of these species are generally limited to the middle and lower Chesapeake Bay.

4.8.2 Life Cycle and Habitat. King mackerel inhabit coastal waters from the Gulf of Maine to Rio de Janeiro, Brazil, and the Gulf of Mexico. They are most commonly found from the Chesapeake Bay southward and occasionally in the upper Bay. King mackerel are solitary surface dwellers that tend to be found nearshore, often among reefs, wrecks, or other underwater structures. Immature fish school and sometimes mix with schools of Spanish mackerel of similar sizes. King mackerel are migratory in response to water temperature; preferring temperatures no lower than 68 °F.

King mackerel spawn over a protracted period, with several peaks in activity. On the Atlantic coast, larvae have been collected from May through October. Larval distribution indicates that spawning occurs in the western Atlantic off the Carolinas, Cape Canaveral, and Miami. King mackerel prefer to consume fish but also have been known to eat shrimp and squid. Female king mackerel can live for up to 14 years.

Spanish mackerel live in the coastal waters of the western Atlantic Ocean, from the Gulf of Maine to the Yucatan Peninsula. They are a schooling fish, preferring neritic, or shallow, ocean coastal waters, but they freely enter tidal estuaries. These mackerel are found most frequently in water temperatures between 70 and 88 °F and rarely in waters below 64 °F. Spanish mackerel are a common visitor to the middle and lower Chesapeake Bay from spring to autumn, sometimes swimming as far north as the mouth of the Patuxent River. Like the king mackerel, Spanish mackerel is a surface-dwelling, nearshore species that will migrate over long distances in large schools along the shore. As water temperatures in the south increase, it moves north, entering the Chesapeake Bay when temperatures exceed 63 °F. They spawn off Virginia between late spring and late summer. Spanish mackerel consume small fishes, shrimp, and squid and reach a maximum age of 8 years.

4.8.3 The Fisheries. King mackerel support an important commercial fishery along the Gulf of Mexico and South Atlantic coasts. In recent years, they have primarily been caught

commercially in south Florida and increasingly off North Carolina and Louisiana. Historically, there was a small commercial fishery for king mackerel in the Chesapeake Bay, when pound nets and gill nets were introduced in the 1880's. During the 1920's and 1930's, the total commercial catch averaged at 4 million pounds annually. Commercial landings fell to 2.5 million pounds by the 1950's and increased to 8 million pounds in the mid-1970's. Since 1985, the coastal fishery has been quota managed, with average annual catches equaling 3.5 million pounds. Commercial landings of king mackerel in both Maryland and Virginia are insignificant, although in some years Virginia supports a small directed hook-and-line fishery.

The Spanish mackerel commercial fishery was initiated around 1850 along the Long Island and New Jersey coasts. By the 1870s, the fishery was well-established in the Mid-Atlantic and Chesapeake Bay area. In 1880, the Chesapeake Bay area produced 86 percent of the total coastal catch of 1.9 million pounds. By 1887, this number had dropped to 64 percent, after areas of major production had changed. This trend continued, and from 1950 through 1985, Florida accounted for more than 92 percent of the Spanish mackerel commercial landings. Since 1986, Florida's contribution to the commercial harvest has decreased due to increased landings along the south and Mid-Atlantic. Total commercial landings ranged between 5 million pounds and 18 million pounds, and between 1950 and 1983 averaged around 8 million pounds. The coastal landings have been quota-managed since 1986 (Chesapeake Bay Program, 1999).

4.8.4 EFH. Essential Fish Habitat for coastal migratory pelagic species, such as Spanish and King mackerel, include "sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward." EFH also includes coastal inlets and state-designated nursery habitats because they are of particular importance to coastal migratory pelagic species (NOAA/NMFS, 2014).

4.8.5 Project Impacts. Neither mackerel species' eggs nor larvae are likely to be found in the project area as they appear to prefer to spawn in coastal oceanic waters. Juvenile and adult fish of these two species may occur within the project area.

Direct impacts include mortality or injury caused by contact with construction equipment or material being placed into the river. Similar to other species addressed in this document, local king and Spanish mackerels are expected to avoid the area during construction due to the noise and disturbance.

Juveniles and adults may suffer minor indirect impacts from food web disturbance caused by destruction of benthos and altered habitat conditions within the project area. However, because of the temporary and localized nature of the impacts, and relatively small area of bottom to be disturbed, impacts are expected to be very minor.

King mackerels are structure preferring fish, and may increase in numbers locally upon construction of the proposed reef habitat so juveniles and adults may benefit. Spanish mackerel are surface dwelling schooling fish and unlikely to be effected by any aspects of the proposed project. No negative impacts are expected to these species; limited benefits to king mackerel are expected.

4.9 COBIA

4.9.1 General. Cobia is the only species of the family Rachycentridae and is a migratory, pelagic fish that is found in tropical, subtropical, and warm temperate waters throughout most of the world. However, they are not known to occur in the eastern Pacific. In the western Atlantic, they occur from Massachusetts and Bermuda to the Rio de la Plata of Argentina. They are seasonally common along the US coast from Virginia to Texas. Recent research has indicated that cobia frequenting US coastal waters maybe of a single genetic stock.

4.9.2 Life Cycle and Habitat. Cobia migrate north along the Atlantic coast from northern Florida to the Carolinas and then into the Chesapeake Bay by late May. Most fish depart Virginia coastal waters by late September/early October. However, it is not known where cobia from the Mid-Atlantic United States overwinter. Some findings suggest that after a southerly coastal migration, they may spend the winter on the outer half of the continental shelf. The migration of this species is greatly affected by water temperature, with cobia entering the Chesapeake Bay after water temperatures exceed 67 °F. Adult cobia prefer coastal and continental shelf waters, but occasionally they do enter estuaries. This species may occur throughout the water column and over a variety of bottom habits including mud, rock, sand, and gravel; over coral reefs; in shore around pilings and buoys; and offshore around drifting and stationary objects.

Researchers believe the lower Chesapeake Bay is an important spawning area. In Virginia, cobia are reported to spawn from late June through mid-August, possibly spawning multiple times during that period. Eggs hatch within 36 hours of fertilization. Highest hatching rates occurred during tank tests in water salinities of 33-35 ppt and a water temperature of approximately 79 °F. Female cobia appear to grow more rapidly and to greater sizes than males. Males average 42.5 inches and 33 pounds and females average 54 inches and 69 pounds. Females may reach maturity as early as 3 years of age, when the fish is approximately 8 pounds and 28 inches in length. Although some studies indicate that this species may live to up to 10 years, more data show 8 years is a more accurate life span (Olney, 1998).

To a large extent, cobia feed near the bottom, but they also take prey near the surface. They feed extensively on crabs and other crustaceans but also prey on other invertebrates and fish (Snider, 1996).

4.9.3 The Fisheries. Commercially, cobia have been an incidental catch in both hook-and-line and net fisheries, with the majority of fish taken from Gulf of Mexico waters. Research has also revealed there is a significant bycatch of cobia that occurs incidental to the bottom shrimp trawl fishery in the Gulf of Mexico. In the United States, recreational landings of cobia have not been historically well documented, although they have far exceeded commercial landings.

Recreational fishermen landed an estimated 216,000 cobia in U.S. waters in 1965, while 119,000 were landed in 1970. During the period from 1984 through 1993, the number of fish caught along the Atlantic coast ranged from 29,199 in 1993 to 55,741 in 1992, with a yearly average of

37,521. The yearly average for this period in the Gulf of Mexico was 56,686. During the same period, the commercial catch in the Atlantic region ranged from 1,328 in 1985 to 6,078 in 1992, with a yearly average of 4,231. The yearly commercial average for the Gulf was 10,606.

There is only a small amount of data describing cobia landings in Virginia. Figures from the VMRC show that state commercial catch in pounds range from 545 lbs. in 1987 to 16,959 lbs. in 1990. Since 1993, any person desiring to catch and sell cobia in Virginia must possess a harvester registration card and a hook and line gear license. This requirement legally eliminates previous recreational fishermen who might have sold much of their catch.

In Virginia, as in most other states, the cobia is viewed primarily as a recreational fish. Fish receiving recognition in the state's Saltwater Fishing Tournament provide a barometer of the recreational catch in that they only reflect those fish over 45 lbs. (catch citation) and those over 48 inches (release citation implemented in 1991). Three hundred citations were given during 1962 and 1963 representing the largest numbers of citations awarded prior to 1995. Between 1984 and 1995, the numbers of citations awarded annually ranged from 11 in 1984 to 603 in 1995 (Snider, 1996), with the number only slightly diminished in 1996 (Olney, 1998). Estimates of recreational catches are based on the NMFS Marine Fish Recreational Statistics Survey, which has not provided a consistently reliable reading of the Virginia catch (Snider, 1996).

In the US, the cobia is currently managed by the South Atlantic and Gulf of Mexico Fishery Management Councils. Although there is not a specific Cobia FMP, the species has been included within the FMP for Coastal Migratory Pelagic Resources. While most of the plan is dedicated to measures specifically for king and Spanish mackerel, and dolphin, cobia are addressed (Snider, 1996).

4.9.4 EFH. Essential Fish Habitat has been designated for all four life stages of cobia in the region that includes the project site. It is identical to EFH identified for Spanish and King mackerel as described in Section 4.7.4, with the inclusion of high salinity bays, estuaries, and seagrass habitat (NOAA/NMFS, 2014).

4.9.5 Project Impacts. All life stages may be present at the project site. Cobia are a generalist forager and feeder, and they can and will forage off of benthic habitats and structures such as oyster reefs.

Individual eggs and larvae may be destroyed during material placement. However, any cobia eggs or larvae present in the Piankatank River would be widely distributed and there is no reason to believe they would be concentrated in the project area; therefore no significant impacts to the cobia population are expected. Because cobia feed on bottom-dwelling prey, individuals could be present on the bottom. Any cobia juveniles or adults that are present in the project area during construction will be capable to swim away and relocate to adjacent areas to avoid detrimental impacts. Any individuals venturing too close to the construction equipment could be injured or destroyed. Juveniles would probably be more vulnerable than adults because of their slower swimming speed.

Destruction of benthos and alterations of soft bottom habitat may reduce the suitability of the areas as a foraging area temporarily. These disturbances are unlikely to impact cobia because abundant undisturbed, soft bottom will remain elsewhere in the river, and food web impacts will be temporary in nature. Foraging opportunities may be enhances for juveniles and adults in the Piankatank River with the restoration and construction of oyster reefs.

Local cobia may avoid the project area during construction, but overall benefits to cobia as a result of the proposed oyster reef construction should be positive. No significant negative impacts to local cobia are expected

4.10 RED DRUM

4.10.1 General. Red drum (*Sciaenops ocellatus*) is one of thirteen species in the family Sciaenidae found in the Chesapeake Bay area. The family includes the commercially and recreationally important seatrouts, spot, croaker, kingfishes, silver perch, and black drum. This species is also known as channel bass, redfish, bull redfish, drum, puppy drum, and spottail. The largest recorded red drum was 59 inches and 98 pounds, and the fish can live as long as 35 years.

4.10.2 Life Cycle and Habitat. Red drum are found from the Gulf of Maine to the northern coast of Mexico but are most commonly found south of the Chesapeake Bay. Adult red drum occur in the Chesapeake Bay from May through November and are abundant in the spring and fall near the Chesapeake Bay mouth. The red drum population extends as far north in the Chesapeake Bay as the Patuxent River. During mild winters, red drum may overwinter in the Chesapeake Bay, but they usually migrate seasonally, moving in schools offshore and southward in the winter and in shore to the north in the spring. Juvenile red drum also move from bays and estuaries to deeper waters of the ocean in response to dropping water temperatures in the fall and winter.

Male red drum begin maturing at age one, while females mature at ages four to five in North Carolina and two to three farther south. Red drum are prolific spawners; large females are capable of producing nearly two million eggs in a single season. Spawning occurs throughout the late summer and into the fall in nearshore coastal waters along beaches and near inlets. Eggs spawned in the ocean are carried by currents into estuaries where they hatch.

Each year the young appear in the estuary between August and September. Newly hatched larval red drum are carried further by water currents toward fresher, shallower water. Juvenile drum feed on zooplankton and invertebrates such as small crabs and shrimp, while adults primarily feed on fish, crab, and shrimp.

4.10.3 The Fisheries. Commercial landings of red drum baywide have been reported since the 1880s. Landings in the Mid-Atlantic have declined since the 1930s, so presently the commercial red drum fishery in the Chesapeake Bay area is not significant. Virginia's commercial catch, once as high as 180,000 pounds per year, has been insignificant since 1965, while Maryland's annual catch has not exceeded 2,000 pounds since 1954. The fishery is generally nondirected, using pound-nets, shrimp trawls, hand lines, haul seines, and gill nets.

Runaround gill nets were a dominant gear in Florida, taking 65 percent to 84 percent of the total catch, but that fishery has been closed due to concern that overfishing could cause stock collapse.

A modest recreational fishery exists. Most fish are taken by surf casting from seaside beaches and some by bait fishing along the Chesapeake Bay side of the lower Eastern Shore. The recreational fishery for red drum targets small "puppy drum" and large trophy fish. Trophy-size fish are caught along the mid and south Atlantic barrier islands, while smaller red drum are taken in shallow estuarine waters. The Chesapeake Bay size record is unknown, but the Virginia record is a fish weighing 85.3 pounds, which was taken from the seaside of Wreck Island in 1981. Recreational catch peaked in 1984 at 9.96 million pounds. Since the 1980's, the amount of fish caught for a given unit of effort has declined.

Red drum on the Atlantic coast are managed jointly by the Atlantic States Marine Fisheries Commission (ASMFC) and the South Atlantic Fisheries Management Council (SAFMC). An Fishery Management Plan for Red Drum were completed by the ASMFC in 1984 and by the SAMFC in 1990. The Chesapeake Bay Program also wrote a Fishery Management Plan for red drum in 1993. Intense fishing pressure on juvenile red drum in state waters, which results in significantly reduced recruitment to the spawning stock, is a significant concern of the regulatory agencies. Additionally, managers are concerned about the potential for a directed fishery outside state waters, which could directly reduce the spawning stock. The goal for both the ASMFC and the SAMFC is to manage sustainable harvest of red drum by US fishermen, while maintaining the spawning stock biomass at 30 percent of the level that would occur with no fishing (Chesapeake Bay Program, 1999).

4.10.4 EFH. Essential Fish Habitat has been designated for all four life stages of red drum in the region that includes the current project. Habitats to a depth of 50 meters offshore, including "tidal freshwater; estuarine emergent vegetated wetlands (flooded saltmarshes, brackish marsh, tidal creeks); estuarine scrub/shrub (mangrove fringe); submerged rooted vascular plants (sea grasses); oyster reefs and shell banks; unconsolidated bottom (soft sediments); ocean high salinity surf zones; and artificial reefs" are identified as EFH for this species (NOAA/NMFS, 2014).

4.10.5 Project Impacts. The red drum is a benthic feeding fish and is known to forage on oyster reef habitat. The Piankatank River is identified as EFH for all life stages of the red drum. Red drum eggs and larvae may be in the project areas during the late summer through early fall, after spawning has occur. Although eggs or larvae may be destroyed during construction, no significant impacts to the red drum population are expected. Additionally, larvae and eggs near the Piankatank River area would be widely distributed and there is no reason to believe they would be concentrated in the project area.

Direct and indirect impacts to the juvenile and adult red drum population are expected to be minor. The construction of new reefs may result in direct impacts, such as injury and death caused by direct contact with construction equipment or reef materials. Due to their great mobility, juveniles and adults should be able to avoid direct detrimental impacts. Indirect impacts, such as the affects of temporary impairment to water quality and changes to behaviors would affect fish within the project area. Other impacts to the species will result from the

alteration of bottom habitat, from soft sediment to hard reef. Destruction of benthos and alteration of habitat type could impact the food web; however, the amount of bottom that will be effected is relatively small in comparison to the amount of soft bottom habitat available in the Piankatank River.

The project will not have significant negative impacts on any life stage of red drum. Instead, long term impacts are expected to be positive. Juveniles and adults in the project area will experience increased foraging opportunities as a result of the oyster reef restoration. Overall, the red drum will benefit significantly from the proposed oyster reef restoration project, as they are a mostly benthic feeding fish.

4.11 DUSKY SHARK

4.11.1 Life Cycle and Habitat. The dusky shark (*Charcharinus obscurus*) grows up to 4 meters in length. Similar to many elasmobranchs, female dusky sharks give birth to live young, typically a litter of six - 14 pups. They usually reproduce every three years. This species typically eats fish, including smaller elasmobranchs such as other sharks, skates, and rays, though other prey, such as squid and sea turtles, are taken on occasion. In the North Atlantic, they range from George's Bank through the Gulf of Mexico, preferring warm temperature waters. The species prefers oceanic salinities and is not commonly found in estuaries. Due to this temperature preference, more northern populations migrate seasonally. The dusky inhabits waters from the coast to the outer continental shelf and adjacent pelagic waters. It is not a common shark, and its slow reproductive rate makes it vulnerable to over exploitation.

4.11.2 The Fisheries. Due to the fact that the Dusky Shark is a slow growing species and does not mate until individual are around 20 years old and low reproductive rates, this species is a Species of Concern and is considered overfished. There was a commercial fishery for this species, and its large fins make it very valuable in the sharkfin trade. The commercial fishery closed due to population declines. Currently, the principal threat to the recovery of the population is recreational fishing.

4.11.3 EFH. Essential Fish Habitat has been designated for early and late juveniles of the dusky shark in the region that includes the current project. EFH for early juveniles, fish up to 115 cm in length, is shallow coastal waters, inlets and estuaries to the 25 m isobaths. Coastal and pelagic waters between 25 to 200 m isobaths and shallow coastal waters, inlets and estuaries to the 200 m isobath is the EFH identified for late juvenile dusky sharks (NOAA/NMFS, 2014).

4.11.4 Project Impacts. The Piankatank River is considered EFH for early and late juvenile dusky sharks. This species is an oceanic shark species, and is unlikely to be found in the Piankatank River. If present, neonates and juveniles, because of their mobility, could avoid any direct impacts during project construction. Only short term indirect impacts to individual dusky sharks are expected to result from the construction of the project. These impacts would include disruption of the food web and change of behavior. No significant negative project effects are expected. Instead, transient sharks may find more foraging opportunities than before, due to the presence of the reef habitat.

4.12 SANDBAR SHARK

4.12.1 Life Cycle and Habitat. The sandbar shark (*Charcharinus plumbeus*) has designated HAPC (habitat area of particular concern) in the local area. This species is the principal species caught in the commercial shark fishery of the U.S. Atlantic coast and is also important recreationally. The species is a large fish, with females growing up to 2.5 m and males to 1.8 m total length. They typically roam in small groups or schools, which are segregated by sex in coastal waters. The sandbar shark migrates seasonally to avoid overwintering in cold, northern waters. Although they range from Cape Cod to the western Gulf of Mexico, individuals are not found north of the Carolinas in the winter months.

Sandbar sharks, like many elasmobranch fishes, are viviparous, giving birth to live young. They typically give birth to less than 10 young, once every two years. The primary reason that the local waters are considered HAPC is because the lower Chesapeake Bay is one of the most important nursery grounds for this species on the U.S. East Coast. Large numbers of female sharks give birth in the area and the lower Chesapeake Bay and lower Eastern Shore are important nursery grounds for the juveniles (Grubbs, 1995).

4.12.2 The Fisheries. The fishery is considered severely depleted. Restrictions on the take of sandbar sharks have been put in place with the intention of allowing recovery of the species. The status of the sandbar shark along much of the east coast is "protected," meaning that there is no permitted commercial harvest of the species in Federal waters; however incidental takes still occur. The harvest of sandbar shark is still allowed in state waters, but a quota is set and managed by NMFS.

4.12.3 EFH. Essential Fish Habitat for early juvenile, late juvenile and larval sandbar sharks has been designated in the region that includes the current project. All shallow coastal waters to the 25 m isobath are designated EFH for early juveniles, fish up to 90 cm. This area is also EFH for late juvenile, individuals between 91 and 179 cm. Additionally, benthic areas at the shelf break between the 100 and 200 m isobaths during the winter months is also considered EFH for late juveniles. EFH for adult sandbar sharks includes all shallow coastal areas to the 50 m isobaths.

The lower Chesapeake Bay, including the project site, has been identified as a HAPC, which is described in regulations as a subset of EFH that is rare; particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally-stressed area. This area is has been given this designation because it is an important nursery and pupping area (NOAA/NMFS, 2014).

4.12.4 Project Impacts. The waters near, and perhaps within, the mouth of the Piankatank River are likely a pupping ground for female sandbar sharks. As a result, sandbar sharks may be present during construction of the project. Neonates, juveniles, and adults, because of their mobility, should easily be able to avoid any direct negative impacts. However, since they are bottom dwelling, individuals remaining on the bottom and would be destroyed during the placement of reef material. Neonates and juveniles would probably be more vulnerable than adults because of their slower swimming speed.

Because the sandbar shark is a bottom-dwelling species, indirect impacts to the food web caused by destruction of benthos and alterations in bottom habitat conditions could be more detrimental. Any food web impacts are expected be temporary and local in nature. Another indirect impact may include the disruption to shark movement patterns within the Piankatank River caused by the noise/disruption of the construction activity, though it is expected that fish will return to the area once construction has been completed.

Long term, the project may provide additional benefits to this fish species, including increased habitat complexity and secondary production. Young sharks would find shelter and food on the reefs. Adults may also find additional foraging opportunities on the reefs.

4.13 CLEAR NOSE SKATE

4.13.1 Life History and Habitat. The clear nose skate (*Raja eglanteria*) is small elasmobranch that occurs in the North Atlantic, ranging from Nova Scotia to the Gulf of Mexico; though it is rarely found in the northern portion of its range. This species migrates from cooler northern waters as winter approaches. The local population is also migratory, typically appearing in the Chesapeake Bay in April to November-December. In the Chesapeake Bay, the only recorded sightings of the clear nose skate have been from the bay mainstem.

The maximum size this species can achieve is approximately 80 cm total length at an age of 5-6 years. They feed on small benthic organisms as well as on small fishes. The skate is typically found in areas with soft substrate along the continental shelf, though they are also found in rockier habitat.

The clear nose skate is an egg layer, typically laying up to 30 pairs of eggs in a season. Both juveniles and adults can be found in the Chesapeake Bay. The species prefers higher salinity waters of > 22 ppt, with the majority of the population found in waters with salinities of at least 31 ppt.

4.13.2 The Fisheries. There is a commercial fishery for the clear nose skate. The primary means to capture them is via otter trawling, though they are also taken as bycatch in groundfish trawling and scallop dredging fisheries. This small species is typically used for bait, not human consumption. The current status is not overfished.

4.13.3 EFH. Those bottom habitats with mud, gravel, and sand substrate that occur within the project area are designated as EFH for the clearnose skate. The maps below represent the designation of juvenile and adult EFH for this life history stage based on the areas of highest relative abundance of this species. Only bottom habitats with mud, gravel, soft bottom, rocky or gravelly substrates and sand substrates that occur within the blue shaded (Figures 2 and 3) areas in U.S. waters are designated as EFH (NOAA/NMFS, 2014).

Figure 2: EFH DESIGNATED FOR JUVENILE CLEARNOSE SKATE.

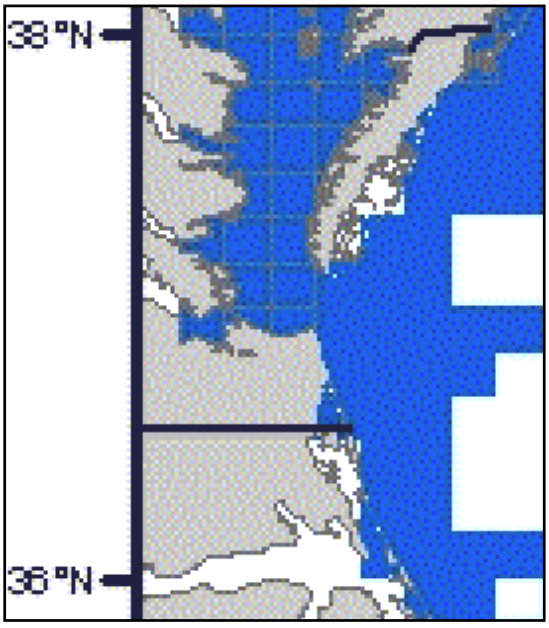
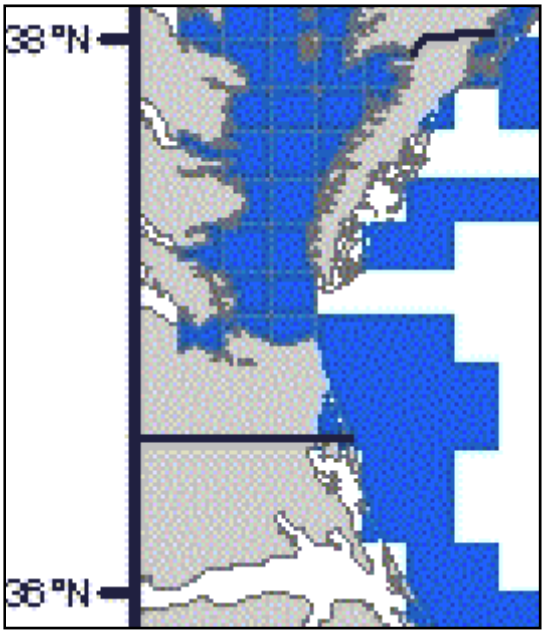


Figure 3: EFH DESIGNATED FOR ADULT CLEARNOSE SKATE.



4.13.4 Project Impacts**.** Adult and juvenile skates may be found within the project area. If present, the clearnose skate could be affected by project construction directly, e.g. injury or mortality due to impact with construction equipment or reef materials, or indirectly due to changes in water quality and alteration of habitat types. It is expected that skates will leave the immediate area while construction takes place and then return to the area after the reefs have been completed. Water quality changes during construction of the proposed project would be minimal and temporary, limited to the immediate area of the activity. Turbidity may impact

sight feeding but it is predicted that skates will flee the area to feed in neighboring waters. The clearnose skate prefers soft substrate and the reduction of that habitat type may reduce foraging opportunities. However, the amount of river bottom that will be converted to reef habitat is small relative to the amount of soft substrate habitat available in the Piankatank River. It is predicted that no more than minimal negative impacts should occur to clearnose skate as a result of the implementation of the project.

4.14 WINTER SKATE

4.14.1 Life History and Habitat. The winter skate *(Raja ocellata)* is a small elasmobranch that occurs from the coast of Newfoundland to Cape Hatteras. It prefers colder waters than many fish species found in the Chesapeake Bay area and can be found in the local area from December to April.

The maximum size of this species is approximately 1.5 m in total length. The winter skate typically feeds on a wide variety of invertebrate benthic organisms but is also known to eat small fish and squid. It prefers sand and gravel bottoms but can sometimes be found on mud bottom habitat and typically buries itself in the sand during the day, feeding at night.

Similar to most skates, it is an egg layer; however, it is not known to lay eggs in the local area, preferring colder waters to spawn in. As a result, juveniles are not commonly found in the Chesapeake Bay area, only rarely being observed near the Bay mouth in the winter.

4.14.2 The Fisheries. Otter trawling is the main method used to catch most skate species, including the winter skate. This species is also caught as bycatch during groundfish trawling and during sea scallop dredging. The skate fishery is mainly a bait fishery, though this species does have a commercial market for its wing meat for human consumption. As a result of these uses, fishing pressure has grown and the winter skate was overfished. However, it has since recovered and although its biomass is still well below its original level (about 25 percent of the observed peak) and it is not currently considered to be overfished.

4.14.3 EFH. For the winter skate, those bottom habitats with a substrate of sand and gravel or mud that occur within the project area are designated as EFH. The map below represents the designation of EFH for the juvenile life history stage based on the areas of highest relative abundance of this species. Only habitats with soft bottom, rocky or gravelly substrates that occur within the blue shaded (Figures 4 and 5) areas are designated as EFH (NOAA/NMFS, 2014).

Figure 4: EFH DESIGNATED FOR JUVENILE WINTER SKATE.

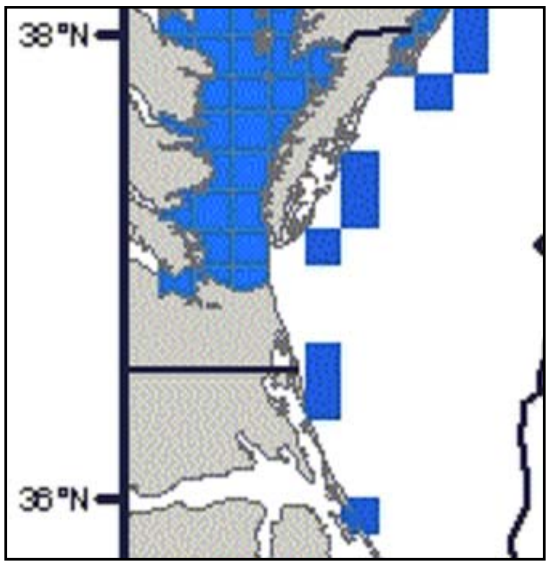
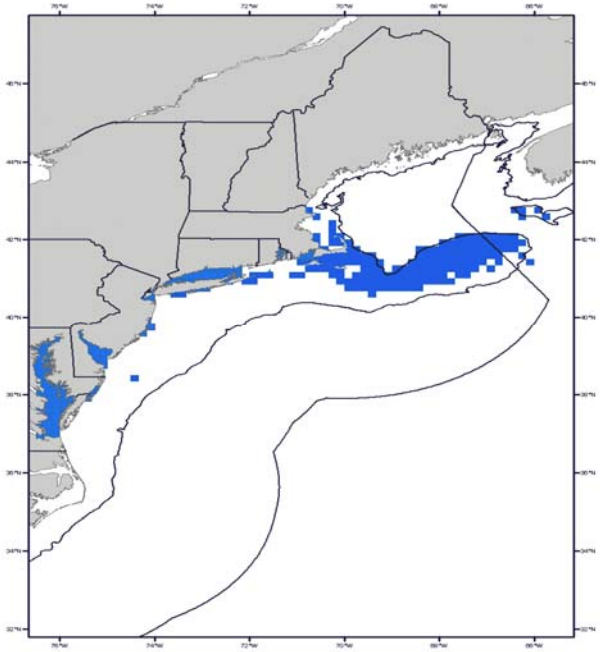


Figure 5: EFH DESIGNATED FOR ADULT WINTER SKATE.



4.13.4 Project Impacts. Adult and juvenile skates may be found within the project area during the winter months. Construction typically does not occur during the winter, so the impact of construction on this species is predicted to be low. If present, the winter skate could be affected by project construction directly, e.g. injury or mortality due to impact with construction equipment or reef materials, or indirectly due to changes in water quality and alteration of habitat types. It is expected that skates will leave that immediate area while construction takes place and

then return to the area after the reefs have been completed. The winter skate prefers soft substrate and the reduction of that habitat type may reduce foraging opportunities. However, the amount of river bottom that will be converted to reef habitat is small relative compared to the amount of soft substrate habitat available in the Piankatank River. It is predicted that no more than minor adverse affects should occur to winter skate as a result of the implementation of the project.

4.14 LITTLE SKATE

4.14.1 Life History and Habitat. The little skate (*Raja erinacea*) is a small elasmobranch species, with adults reaching a maximum size of approximately 60 cm. This species is very abundant in its range that extends from Nova Scotia to Cape Hatteras. Like most skates, the little skate is an egg layer and has been known to lay eggs throughout the year. This skate typically consumes small invertebrates, primarily crustaceans, squid, and polychates, though this skate is also known to prey upon fish and other organisms. Little skates prefer sand or gravel bottoms, though they can also be found on mud bottom habitat and they often bury themselves in the sand during the day and feed at night.

4.14.2 The Fisheries. There is a commercial fishery for the little skate, which is typically used for bait, not human consumption. The fish is primary caught using an otter trawling, although they are also taken as bycatch in groundfish trawling and scallop dredging fisheries. The current status is not overfished, and the population biomass is estimated to be a medium level.

4.14.3 EFH. Those bottom habitats with soft bottom, rocky, or gravelly substrates that occur within the project area are designated as EFH for the little skate (NOAA/NMFS, 2014).

4.14.4 Project Impacts. Adult and juvenile skates may be found within the project area. If present, the little skate could be affected by project construction directly, e.g. injury or mortality due to impact with construction equipment or reef materials, or indirectly due to changes in water quality and alteration of habitat types. It is expected that skates will leave that immediate area while construction takes place and then return to the area after the reefs have been completed. Water quality changes during construction of the proposed project would be minimal and temporary, limited to the immediate area of the activity. Turbidity may impact sight feeding but it is predicted that skates will flee the area to feed in neighboring waters. The little skate prefers soft substrate and the reduction of that habitat type may reduce foraging opportunities. However, the amount of sea floor that will be converted to reef habitat is small relative compared to the amount of soft substrate habitat available in the Piankatank River. It is predicted that no more than minimal negative impacts should occur to little skate as a result of the implementation of the project.

Figure 6: EFH DESIGNATED FOR JUVENILE LITTLE SKATE.

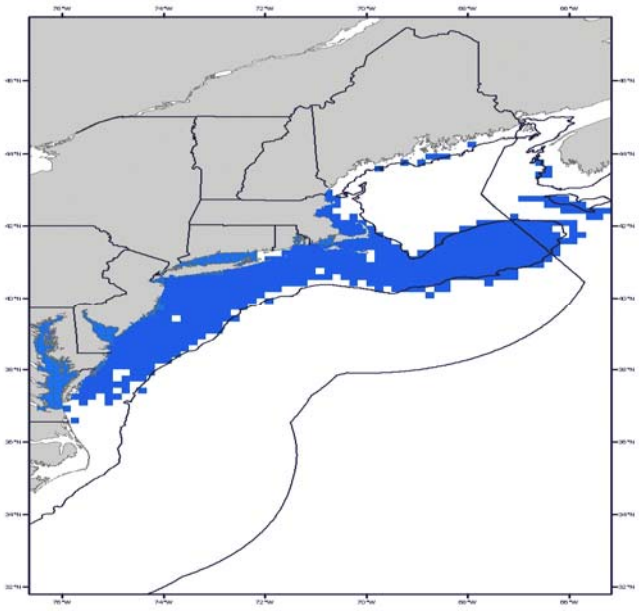
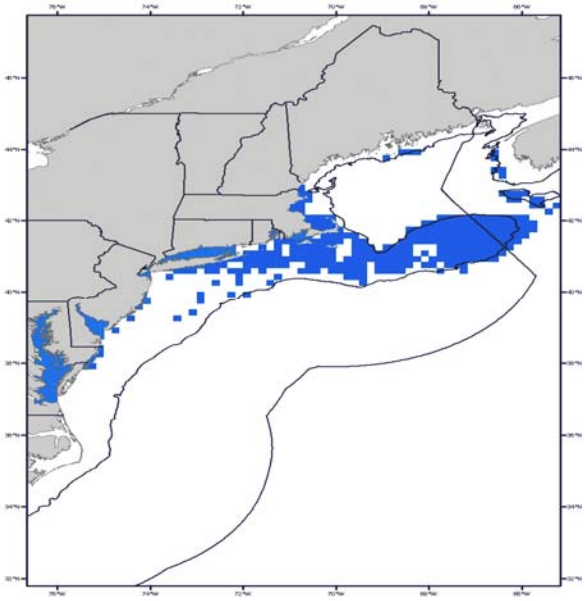


Figure 7: EFH DESIGNATED FOR ADULT LITTLE SKATE.



5.0 EVALUATION OF IMPACTS ON EFH SPECIES

Impacts of the proposed project to EFH fish species can be divided into two categories, direct and indirect. Direct impacts are defined as those "which are caused by the action and occur at

the same time and place." While indirect impacts are those that may be caused by the project, but would occur in the future or outside of the project area.

5.1 DIRECT EFFECTS

Finfish could be directly affected by construction operations by being struck by the vessels, being hit by reef materials during placement or by passing through the prop of a construction vessel. Injuries would be more likely for early life stages, such as eggs and larval fish, which have little to no swimming ability. Adult and juvenile fish, however, are more motile and are more able to move out of the area during construction.

Construction of the project will, also, result in temporary, minor changes to water quality which may adversely affect EFH species. The disturbance of sediment is expected to result in increased turbidity and decreased dissolved oxygen content. Increased turbidity could cause gill clogging and reduce the foraging success of sight hunters. Reduced dissolved oxygen levels within the water column can stress aquatic organisms if the levels are low enough. The materials that will be placed on the existing reefs or used to create new reefs will consist of a very small portion of fine material (shell and concrete dust). As a result, impairment of water quality is only expected to occur only during construction and is predicted to dissipate quickly.

The creation of reefs at the project site will result in the conversion of shallow soft bottom habitat to hard reef habitat. Although fish species that depend on soft bottom will lose foraging habitat, the relative amount of this habitat type present in the mouth of the Piankatank River makes the conversion of habitat types insignificant. It is expected that species that prefer soft bottom habitat will move to areas adjacent to the project site where open sea floor continues to be available.

5.2 INDIRECT EFFECTS

A number of indirect effects may result from the construction of the proposed project. The neckton may suffer minor indirect impacts from food web disturbance caused by destruction of benthos and altered habitat conditions within the proposed project areas. Benthic invertebrates will be buried or destroyed during the placement of reef material. Mobile prey species will move out of the construction zone. Additionally, organisms inhabiting areas adjacent to project sites may be adversely affected from decreases in water quality that will occur during construction.

The construction of oyster reefs will change the aquatic community and the prey items available at those sites. The new reef habitat will be colonized by species that are different from those that would normally inhabit soft bottom. This change in the benthic community will be beneficial for those fish species that forage on reefs, but will reduce foraging opportunities for fish that prefer to forage on soft bottom habitat and require them to move to another location.

A final indirect impact to finfish that inhabit the project area is that construction activities may result in changes to fish behavior. The presence of large equipment may temporarily cause animals to stop normal behaviors, such as hunting and foraging, and cause these animals to leave

the project area. It is expected that once construction has been completed, fish will return to the project area and their behaviors will return to normal.

6.0 CONSERVATION MEASURES

Every measure that is technically and economically viable will be pursued to avoid and minimize effects on EFH. Minimization of impacts will include implementation of best management practices, and extensive consultation with Federal and state agencies. The Corps will consider all mitigation and recommendations that NMFS proposes through this consultation.

7.0 CONCLUSION AND AGENCY VIEW

The significance of direct impacts resulting from this project on EFH species will depend on life stage and the usage of the project area. For example, it is more likely that eggs and larval fish will be affected to a greater extent than adults and juveniles, because the older life stages have greater swimming abilities and will be able to move away from construction activities. However, eggs and larvae are widely distributed over the continental shelf, so the destruction of these life stages is not expected to cause significant impacts to fish populations. Adult pelagic species, such as bluefish and Atlantic butterfish, will be less affected by project construction, because they are less likely to be in the project area. Demersal species, such as the windowpane flounder and the summer flounder, are mobile and should be able to avoid project construction as well; however, because of their demersal nature, individuals that remain on the seafloor during the placement of materials, and could be buried and destroyed.

Direct impacts to water quality are predicted to be minor and temporary in nature. Due to the relatively small amount of fine material that will make up the alternative substrate and shell, increases in turbidity and decreases in dissolved oxygen are expected to be small and localized to the construction area. Once construction has been completed, water quality is expected to return to pre-project conditions almost immediately.

The transition of shallow soft bottom habitat to hard reef habitat will not be temporary in nature. However, the area that will be converted is relatively small compared to the amount of soft bottom habitat that will remain undisturbed. The benthic and fish community that utilize soft bottom habitat will be able to move to sites adjacent to the project area to access the preferred habitat type.

Most indirect impacts of the project are also expected to be minor, temporary and localized to the footprint of the project area. It is expected that the benthic community in the project will recover and fish usage will return to pre-project conditions once construction has been completed.

Habitat Area of Particular Concern for the sandbar shark is not anticipated to be significantly impacted by the project in any of the following ways: 1) the importance of its ecological function, 2) by human-induced or long-term degradation, 3) by stressing the habitat type, or 4) by compromising or jeopardizing the habitat, fully considering the rarity of habitat type. The project is not anticipated to significantly impact EFH species or habitat (including HAPC) that may be in the project area.

It is also the opinion of USACE that the proposed project will provide numerous long-term benefits to the Piankatank River and these benefits will far outweigh the negative impacts that will result from construction of the project. These benefits include restoration and creation of hard reef habitat in the river system. The new reefs will increase productivity of the system and provide habitat for prey species, such as crustaceans, mollusks, worms and fish. The hard reef structures will also provides attachment surfaces for sessile organisms, cover and shelter for many species of fish and other motile invertebrates and attachment surfaces for benthic egg masses. Additionally, it is predicted that the reefs will be utilized by oysters, mussels, and other filter feeding organisms, resulting in improved water quality. The benefits gained through the implementation of the proposed project will be realized by EFH fish species, through increased prey populations, increased community diversity, and improved water quality. The amount of EFH for certain species, such as red drum, black sea bass, summer flounder and scup will increase with the construction of reef habitat.

In conclusion, the project is not anticipated to cause more than minor adverse effects to EFH species or habitat (including HAPC) that may be in the project area. As discussed and evaluated in this EFH assessment and in the accompanying EA, the reshelling of existing oyster reefs and the construction of new reefs are not expected to impact "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" to any appreciable extent over a significantly large area or over any significant period of time. Although the construction of the project may impact individual fish, no significant impacts to the populations of EFH species that inhabit the Chesapeake Bay are expected. Inversely, the anticipated long term impacts of the project will be positive for the fauna of the mouth of the Piankatank River, through the restoration of existing reefs and construction of new reef habitat.

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Appendix D

COASTAL ZONE MANAGEMENT ACT FEDERAL CONSISTENCY DETERMINATION

COASTAL ZONE MANAGEMENT ACT
FEDERAL CONSISTENCY DETERMINATION FOR THE

PIANKATANK RIVER NATIVE OYSTER RESTORATION PROJECT
MIDDLESEX AND MATHEWS, VIRGINIA

FEDERAL CONSISTENCY DETERMINATION

CONSISTENCY REVIEW: Information to support this Federal consistency determination (including maps and additional supporting information) can be found in the accompanying Draft Environmental Assessment (EA), dated February, 2015.

PROJECT DESCRIPTION: The goal of the project is the restoration of native oysters to the Piankatank River. The project will consist of constructing up to 219 acres of new oyster sanctuary reefs. The new reefs will be constructed using alternative substrate or a mixture of alternative substrate and oyster shell. Alternative materials that may be used include concrete rubble (recycled concrete) and related "materials of opportunity" generated by demolition of concrete structures, granite, limestone marl, and shaped concrete structures (reef ball® type structures, pyramids, modules, and "castles," for example). The new reefs will be constructed as high relief reefs, being more the 12 inches high to avoid sedimentation.

PROPERTY CLASSIFICATION: The project area is located in Middlesex and Mathews counties in the Commonwealth of Virginia. The Piankatank River is a tributary of the Chesapeake Bay, located on the western shore of the Virginia. It is immediately south of the Rappahannock River and North of the York River in the Middle Peninsula region of the state. It is one of the most pristine rivers remaining in Virginia, with little development within the watershed. The entire project occurs on subaqueous land, which is owned by the Commonwealth of Virginia. The Virginia Marine Resources Commission manages all subaqueous lands in Virginia.

IMPACTS TO RESOURCES/USES OF THE COASTAL ZONE: See summaries below.

DETERMINATION: Based upon evaluation of impacts analyzed in the Environmental Assessment and in accordance with Section 307 of the Coastal Zone Management Act (CZMA) and the CZMA Federal Consistency Regulation – 15 C.F.R. Part 930, the Norfolk District, U.S. Army Corps of Engineers determined that the proposed project would be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the Commonwealth of Virginia's Coastal Zone Management Program.

Enforceable Policies

The Virginia Coastal Zone Management Program (VCP) contains the below enforceable policies (A-I). More information can be found in the Final EA for this project.

A. Fisheries Management

This program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities.

The proposed project will result in positive, negative and neutral impacts on Essential Fish Habitat (EFH). The negative impacts to Essential Fish Habitat (EFH) include temporary negative effects on water quality, including decreases in dissolved oxygen, increased turbidity and total suspended sediment in the water column. Additionally, organisms living in the project area have to potential of being injured or killed during the construction process. These impacts are expected to be temporary and short-term. Motile species will move out of the area and return once construction has been completed. The number of organisms that may be killed during project will not impact the population as a whole. The project will also result in the alteration of soft-bottom habitat to reef habitat. The change of habitat type will be positive for those species that depend on hard reef habitat, while the project will reduce the amount of habitat for species that prefer soft bottom.

The majority of the long-term impacts resulting from the project can be considered positive. Water quality will improve due to the filtration of the increase oyster population. Spat sets should increase with the increased oyster population. Additionally, oyster harvests will benefit from the creation of a seed reef, where spat can be taken in order to supplement other areas within the river where oysters are cultivated.

The project area falls within an area that has been designated as Habitat Area of Particular Concern (HAPC) for the sandbar shark (*Charcharinus plumbeus*). Shallow bays and estuaries from Delaware to North Carolina are used by this species as pupping and nursery areas from June through August. The Corps of Engineers will consult with NOAA and will incorporate practices and measures into the project design to ensure that construction will not adversely affect the sandbar shark.

For more detailed information on the short term impacts to EFH and HAPC please refer to Appendix C: The Essential Fish Habitat Assessment of the Draft Environmental Assessment.

B. Subaqueous Lands Management

This management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ), Water Division.

The project will obtain a permit from the Virginia Marine Resources Commission (VMRC) for encroachment upon state-owned bottomlands. Activities required to complete the proposed project include the placement of alternative substrate within the Piankatank River to create new reef habitat. State water quality certification/Virginia Water Protection Permit (VWPP) will be obtained from DEQ as required.

C. Wetlands Management

The purpose of the wetlands management program is to preserve tidal and non-tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

No emergent wetlands will be affected by the project. The project will convert subtidal wetlands from one category (unconsolidated bottom) to another (reef habitat). The creation of new reefs may indirectly benefit adjacent subtibal wetlands, through improvements in water quality and increases benthic and overall secondary production.

D. Dunes Management

Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes.

This project will not impact sand dunes.

E. Non-point Source Pollution Control

Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth.

The potential for soil erosion and non-point source pollution is low for the proposed project. Erosion and sediment control (ESC) and stormwater management (SWM) best management practices will be incorporated into the project design to ensure compliance with state programs as appropriate. On-site inspections will ensure compliance with government contract plans and specifications and the applicable state program to the maximum extent practicable.

F. Point Source Pollution Control

Point source pollution control is accomplished through the implementation of the National Pollutant Discharge Elimination System permit program established pursuant to Section 402 of the Federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System permit program.

A Virginia Pollutant Discharge Elimination System (VPDES) permit is not required for this project. State Water Quality Certification under Section 401 of the Clean Water Act administered under the VWPP program will be obtained as required from DEQ.

G. Shoreline Sanitation

The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth.

This project involves no septic tanks; therefore, adherence to this program is not applicable to the proposed project.

H. Air Pollution Control

The program implements the Federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS).

The Clean Air Act prohibits Federal entities from taking actions which do not conform to the State implementation plan (SIP) for attainment and maintenance of the national ambient air quality standards (NAAQS).

Although there will be minor, temporary air pollution increases from construction equipment, these increases will be short-term and below *de minimis* levels. Clean Air Act conformity determination was completed as part of the EA.

I. Coastal Lands Management

This is a state-local cooperative program administered by the Virginia Department of Conservation and Recreation's Division of Stormwater Management – Local Implementation (previously the Division of Chesapeake Bay Local Assistance) and 88 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §§ 10.1-2100 through 10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative code 9 VAC10-20- 10 et seq.

The project consists of the construction of new sanctuary oyster reefs. The proposed project will result in net benefits to Chesapeake Bay Preservation Act Resource Protection Areas through increasing the amount of reef habitat and improving existing reefs.

<u>Advisory Policies for Geographic Area of Particular Concern</u>

a. Coastal Natural Resource Areas

Coastal Natural Resource Areas are areas that have been designated as vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the

shoreline. These areas include the following resources: wetlands, aquatic spawning, nursing, and feeding grounds, coastal primary sand dunes, barrier islands, significant wildlife habitat areas, public recreation areas, sand gravel resources, and underwater historic sites.

No submerged archaeological sites are recorded in the Virginia Department of Historic Resources' Virginia Cultural Resource Information System (VCRIS) database for the lower Piankatank River. No shipwrecks or obstructions are recorded for this area in the NOAA Automated Wreck and Obstruction Information System, the closest are two miles east of Stingray Point, or about five miles from the project area.

The project area falls within an area that has been designated as Habitat Area of Particular Concern (HAPC) for the sandbar shark (*Charcharinus plumbeus*). Shallow bays and estuaries from Delaware to North Carolina are used by this species as pupping and nursery areas from June through August. The Corps of Engineers will consult with NOAA and will incorporate practices and measures into the project design to ensure that construction will not impact the sandbar shark.

b. Coastal Natural Hazard Areas

This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are highly erodible areas and coastal high hazard areas, including flood plains.

There are no buildings or structures that will be constructed in association with this project. The project is in compliance with this policy.

c. Waterfront Development Areas

These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are commercial ports, commercial fishing piers, and community waterfronts.

The project area is located entirely in subaqueous land and does not include commercial ports, commercial fishing piers or community waterfronts.

<u>Advisory Policies for Shorefront Access Planning and Protection</u>

a. Virginia Public Beaches

These public shoreline areas will be maintained to allow public access to recreational resources.

The Piankatank Project will not impact any Virginia public beaches.

Virginia Outdoors Plan (VOP)

The VOP, which is published by Virginia's Department of Conservation and Recreation (DCR), identifies recreational facilities in the Commonwealth that provide recreational access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.

This project is consistent with the VOP for Region 18, Middle Peninsula. The project will provide environmental benefits which support recreational activities such as wildlife and fishing.

b. Parks, Natural Areas, and Wildlife Management Areas

The recreational values of these areas should be protected and maintained.

There are no parks, natural areas or wildlife management areas located in the project area.

c. Waterfront Recreational Land Acquisition

It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.

This project does not limit the ability of the Commonwealth in any way to acquire, preserve, or maintain waterfront recreational lands.

d. Waterfront Recreational Facilities

Boat ramps, public landings, and bridges shall be designed, constructed, and maintained to provide points of water access when and where practicable.

This project does not involve the design, construction, or maintenance of any boat ramps, public landings, or bridges.

e. Waterfront Historic Properties

The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Virginia Department of Historic Resources.

Because the project area is located entirely in subaqueous land, no water front historic properties will be affected. The Virginia Department of Historic Resources was consulted, and concurred that no above-ground resources would be adversely affected by the proposed project.

Determination

Based upon the following information, data, and analysis, the U.S. Army Corps of Engineers, Norfolk District, finds that the construction of the Piankatank River Native Oyster Restoration Project is consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program.

Pursuant to 15 CFR Section 930.41, the Virginia Coastal Resources Management Program has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR section 930.41(b). Virginia's concurrence will be presumed if its response is not received by the U.S. Army Corps of Engineers on the 60th day from receipt of this determination.

_____ _____

Date

Mr. Gregory C. Steele, P.E.
Chief, Planning and Policy
Norfolk District, USACE

APPENDIX E

US FISH AND WILDLIFE PROJECT REVIEW PACKAGE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-1897 May 07, 2014
Project Name: Piankatank River Native Oyster Restoration Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Piankatank River Native Oyster Restoration Project

Official Species List

Provided by:

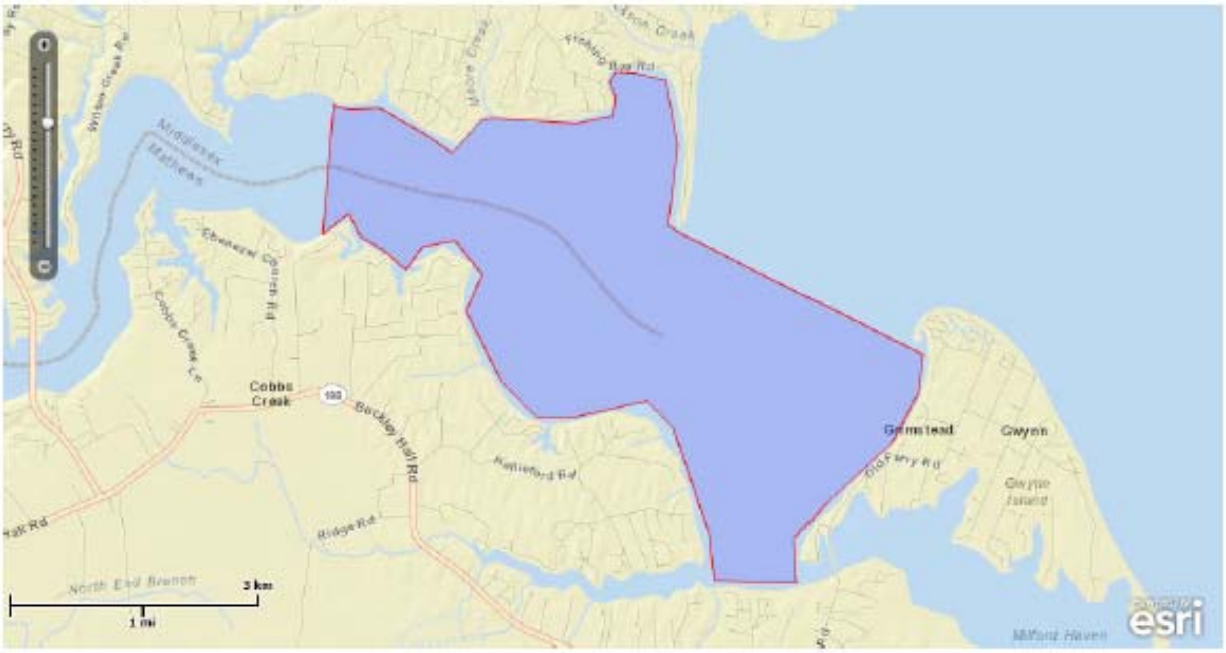
Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-1897
Project Type: ** Other **
Project Description: Construction of 219 acres of new oyster reefs using alternative substrate and restoration of existing sanctuary reefs (48 acres) and seed reefs (118 acres) via re-shelling.

United States Department of Interior
Fish and Wildlife Service

Project name: Piankatank River Native Oyster Restoration Project

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-76.3783979 37.5387537, -76.3780662 37.5383407, -76.3774257 37.5382841, -76.3769381 37.538168, -76.3761673 37.5380754, -76.3720474 37.5382115, -76.3651809 37.5350808, -76.362091 37.5333111, -76.3579712 37.5369865, -76.3562545 37.5371226, -76.3449249 37.5365781, -76.3399467 37.5373948, -76.3396034 37.5394366, -76.3404617 37.54107, -76.3396034 37.5421589, -76.3368568 37.5420228, -76.3327369 37.5412061, -76.3310203 37.5341211, -76.3323936 37.5255447, -76.330677 37.5245917, -76.2975463 37.5113846, -76.298233 37.5071633, -76.3018379 37.5017161, -76.3107643 37.4951789, -76.3150558 37.4912291, -76.3147125 37.4864618, -76.3260421 37.4867342, -76.3267288 37.4917739, -76.331707 37.5033503, -76.3353119 37.5063462, -76.3449249 37.5045759, -76.3505897 37.5045759, -76.3553962 37.508525, -76.3602028 37.5161503, -76.3579712 37.5200988, -76.3617477 37.5237748, -76.3662109 37.5230941, -76.3684425 37.5206434, -76.3715315 37.5226901, -76.37463 37.5241809, -76.3763466 37.5267676, -76.3799429 37.52446, -76.3783979 37.5387537)))

United States Department of Interior
Fish and Wildlife Service

Project name: Piankatank River Native Oyster Restoration Project

Project Counties: Mathews, VA | Middlesex, VA

United States Department of Interior
Fish and Wildlife Service

Project name: Piankatank River Native Oyster Restoration Project

Endangered Species Act Species List

There are a total of 1 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Northeastern beach tiger beetle *(Cicindela dorsalis dorsalis)*

Population: Entire

Listing Status: Threatened

United States Department of Interior
Fish and Wildlife Service

Project name: Piankatank River Native Oyster Restoration Project

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

June 6, 2014

Janet Cote
US Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, VA 23510-1096

Re: Chesapeake Bay Native Oyster Restoration, Piankatank River

Dear Ms. Cote:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Coordination Email
Virginia Department of Game and Inland Fisheries
30 May 2014

We have reviewed the subject project that proposes to install oyster reefs within the lower Piankatank River.

According to our records, federal Endangered Kemp's Ridley sea turtles and federal Endangered leatherback sea turtles have been documented from the project area. Although we do not anticipate this project to result in adverse impacts upon sea turtles, we recommend coordination with NOAA Fisheries regarding the protection of sea turtles associated with this project.

Federal Threatened northeaster beach tiger beetles have been documented from the project area. We recommend coordination with the USFWS and DCR-NH regarding possible impacts upon this listed insect.

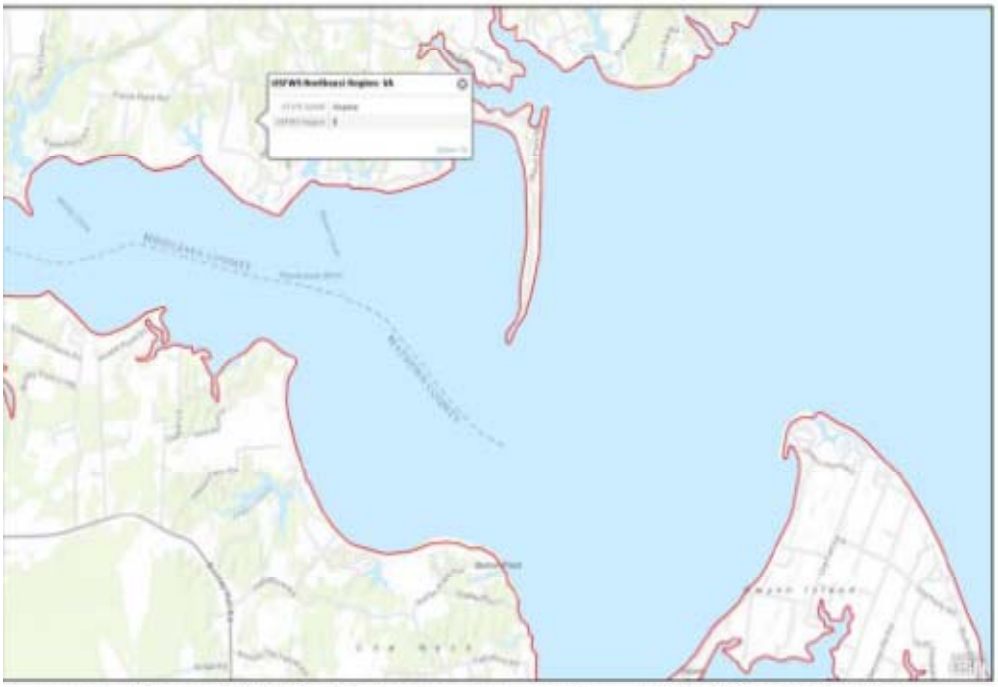
We also document bald eagles from the project area. Although we do not anticipate this project to result in adverse impacts upon bald eagles, we recommend coordination with the USFWS regarding possible impacts upon them.

The Piankatank River has been designated a Confirmed Anadromous Fish Use Area. Therefore, we recommend that all instream work in the Piankatank River adhere to a time of year restriction from February 15 through June 15 of any year. We recommend conducting any in-stream activities during low or no-flow conditions, using non-erodible cofferdams or turbidity curtains to isolate the construction area, blocking no more than 50% of the streamflow at any given time, stockpiling excavated material in a manner that prevents reentry into the stream, restoring original streambed and streambank contours, revegetating barren areas with native vegetation, and implementing strict erosion and sediment control measures. To minimize harm to the aquatic environment and its residents resulting from use of the Tremie method to install concrete, installation of grout bags, and traditional pouring of concrete, we recommend that such activities occur only in the dry, allowing all concrete to harden and cure prior to contact with open water.

Thanks, Amy

Amy Ewing [Environmental Services Biologist/FWIS Manager [VA Dept. of Game and Inland Fisheries [4010 West Broad St. Richmond, VA 23230 [804-367-2211 [www.dgif.virginia.gov <http://www.dgif.virginia.gov/>

USFWS Bald Eagle Concentration Areas - Virginia



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Species Conclusions Table

Project Name: Chesapeake Bay Native Oyster Restoration Project, Piankatank River VA

Date: 14 May 2014

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Northeastern Beach Tiger beetle	No suitable habitat present	No Effect	All activities will occur in submerged sites. The project will have no impact on beach habitat.
Critical Habitat	No critical habitat present	No Effect	
Bald Eagle	Unlikely to disturb nesting bald eagles	No Eagle Act permit required	No nests within 660' and not within a concentration area.
Bald Eagle	Does not intersect with an eagle concentration area	No Eagle Act permit required	
Kemp's Ridley sea turtle	Species Present (from VAFWIS Initial Project Assessment Report)	Not likely to adversely affect	Coordinating with VADGIF and NOAA/NMFS to develop measures to avoid impacts
Loggerhead sea turtle	Species Present (from VAFWIS Initial Project Assessment Report)	Not likely to adversely affect	Coordinating with VADGIF and NOAA/NMFS to develop measures to avoid impacts

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Date: 14 May 2014

Online Project Review Certification Letter

Project Name: Chesapeake Bay Native Oyster Restoration Project, Piankatank River, Virginia

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in "no effect" and/or "not likely to adversely affect" determinations for listed species and critical habitat and/or "no Eagle Act permit required" determinations for eagles regarding potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the "no effect" and "not likely to adversely affect" determinations for listed species and critical habitat and "no Eagle Act permit required" determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species, critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for one year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Kimberly Smith of this office at (804) 693-6694, extension 124.

Sincerely,

/s/ Cynthia A. Schulz

Cindy Schulz
Supervisor
Virginia Field Office

Enclosures - project review package

APPENDIX F

PERTINENT CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Date: 11 Feb 2014

Online Project Review Certification Letter

Project Name: Piankatank River Native Oyster Restoration Project

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

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Sincerely,

/s/ Cynthia A. Schulz

Cindy Schulz
Supervisor
Virginia Field Office

Enclosures - project review package

INFORMATION SERVICES ORDER FORM
Updated 11/10

Mail or Email to:
Project Review Coordinator
Department of Conservation and Recreation
Natural Heritage Program
600 E. Main St., 24th Floor
Richmond, VA 23219
Voice: (804) 371-2708 Fax:
(804) 371-2674
nhreview@dcr.virginia.gov

ENVIRONMENTAL REVIEW SERVICES:

X **Project Review** (30 calendar day turnaround); Natural heritage occurrences (rare plants, rare animals, significant communities and karst).

Project Review with Accompanying Map; for projects including alternative energy projects with potential impact to Natural Heritage Resources, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.

Details: Describe project in the space below, please include detailed project description, project location information including **latitude, longitude,** acreage, and existing site conditions (photographs if available). Attach additional information as necessary. In order to ensure an accurate assessement, please submit **an electronic copy of a site map.** (preferably from a USGS topo map with identified project boundaries) and all other information to **nhreview@dcr.virginia.gov** or fax a map to: **Environmental Review Coordinator @(804) 371-2674**. Please include the project title on all correspondence. **Incomplete submittal of information will delay the review process.**

Project Title: Chesapeake Bay Native Oyster Restoration Project, Piankatank River

Project Description:

These sanctuary areas contribute to the goal of long-term self-sustaining populations of native oysters in various tributaries within the Chesapeake Bay. New oyster reefs will be constructed using alternate substrate. Alternative materials that may be used include concrete rubble (recycled concrete) and related "materials of opportunity" generated by demolition of concrete structures, granite, limestone marl, and

shaped concrete structures (reef ball® type structures, pyramids, modules, and “castles,” for example). The new reefs will be constructed as high relief reefs, being more the 12 inches high to avoid sedimentation. Only small amounts of house or fossil shell will be used during the construction of the reefs. A thin layer of shells, if necessary, will be spread over the reefs to encourage spat settlement. If spat will settle on the alternative material without a shell layer, the alternative material will be left bare.

For existing sanctuary and seed reefs, a layer of fossil or house oyster shell will be distributed over the structures to encourage continued spat settlement. It is estimated that approximately 1000 bushels of oyster shell per acre will be required for these two project elements.

Shell would be obtained from sites in the James River that are currently permitted mining. These sites are mined by VMRC as part of the oyster restoration program in the Commonwealth and have already undergone an environmental review as a part of the permit process. The material required to construct the new sanctuary reefs will either be purchased from commercial sources or will be recycled material.All material that is uses for this project will be free of contaminants.

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

June 6, 2014

Janet Cote
US Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, VA 23510-1096

Re: Chesapeake Bay Native Oyster Restoration, Piankatank River

Dear Ms. Cote:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please re-submit project information and map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov).

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Coordination Email
Virginia Department of Game and Inland Fisheries
30 May 2014

We have reviewed the subject project that proposes to install oyster reefs within the lower Piankatank River.

According to our records, federal Endangered Kemp's Ridley sea turtles and federal Endangered leatherback sea turtles have been documented from the project area. Although we do not anticipate this project to result in adverse impacts upon sea turtles, we recommend coordination with NOAA Fisheries regarding the protection of sea turtles associated with this project.

Federal Threatened northeaster beach tiger beetles have been documented from the project area. We recommend coordination with the USFWS and DCR-NH regarding possible impacts upon this listed insect.

We also document bald eagles from the project area. Although we do not anticipate this project to result in adverse impacts upon bald eagles, we recommend coordination with the USFWS regarding possible impacts upon them.

The Piankatank River has been designated a Confirmed Anadromous Fish Use Area. Therefore, we recommend that all instream work in the Piankatank River adhere to a time of year restriction from February 15 through June 15 of any year. We recommend conducting any in-stream activities during low or no-flow conditions, using non-erodible cofferdams or turbidity curtains to isolate the construction area, blocking no more than 50% of the streamflow at any given time, stockpiling excavated material in a manner that prevents reentry into the stream, restoring original streambed and streambank contours, revegetating barren areas with native vegetation, and implementing strict erosion and sediment control measures. To minimize harm to the aquatic environment and its residents resulting from use of the Tremie method to install concrete, installation of grout bags, and traditional pouring of concrete, we recommend that such activities occur only in the dry, allowing all concrete to harden and cure prior to contact with open water.

Thanks, Amy

Amy Ewing [Environmental Services Biologist/FWIS Manager [VA Dept. of Game and Inland Fisheries [4010 West Broad St. Richmond, VA 23230 [804-367-2211 [www.dgif.virginia.gov <http://www.dgif.virginia.gov/>

Coordination Email
Email from Christine Vaccaro
NOAA
14 May 2014

Hi Janet,
Thanks for getting in touch early. For the Piankatank River you are right that sea turtles and Atlantic sturgeon may meander in there to opportunistically feed. You likely would not need to worry about shortnose sturgeon, in our opinion.

That being said, even though building oyster reefs is typically an overall beneficial activity for the marine/estuarine environment, I do recommend you prepare a short analysis of potential effects to listed species when the permitting time comes, so that you can complete a section 7 consultation with us. A "not likely to adversely affect" determination is appropriate here because any effects to Atlantic sturgeon and sea turtles will likely be insignificant and/or discountable, as well as temporary in nature.

Your analysis of potential effects and how any effects will be minimized should include the following in order to support your determination of "not likely to adversely affect":

1) analysis of possible effects of reef deployment--turbidity, interactions between listed species and reef materials as it is deployed, and/or interaction with vessels or machinery associated with deployment (including information about best management practices and minimization techniques is helpful here).

2) analysis of materials used for reef building--are the substrates clean? Are there concerns with chemicals from the artificial substrate leaching into the marine environment and affecting the food chain for Atlantic sturgeon and sea turtles? How has this been minimized or prevented?

3) Possibility of vessel interactions during transport from land site to in-water site--kinds of vessels, potential frequency of trips, etc. Please provide a brief analysis that addresses this.

This is the level of analysis we need in order to concur, so as much information you can provide as possible, up front, the easier the consultation process will be! Of course, estimates and ranges are fine if you don't have exact numbers, etc. We just need to evaluate the likelihood of effects from a number of different angles. As I said, the project will likely be minimally invasive to our species, and an NLAA determination seems very reasonable here based on location and the nature of the project.

I hope this helps!

-Chris
On Wed, May 14, 2014 at 9:41 AM, Cote, Janet NAO <Janet.Cote@usace.army.mil> wrote:

Classification: UNCLASSIFIED

Caveats: NONE

Good Morning Chris,

The USACE, Norfolk District is in the planning stages of the Chesapeake Bay Native Oyster Restoration Project in the Piankatank River. We are partnering with VMRC and the Nature Conservancy to restore existing oyster reefs and to construct new reefs in the mouth of the Piankatank River (Center of the project area 37,31,42.9 -76,20,24.01).

We are in the initial stages of the planning process and are beginning to coordinate with state and Federal organizations to determine if listed species would be present in the project area and how the project can be designed to reduce or eliminate adverse impacts to those species. I have completed a VaFWIS Initial Project Assessment and have attached it to this email, which lists a number of sea turtle species that have been confirmed as present in the project area. I have also include additional information regarding the project and a project map.

Once the planning stage has been completed, the Norfolk District will be submitting a CZMA and will provide a draft Environmental Assessment to allow the resource agencies a chance to comment on the project.

Please let me know your initial thoughts about the project.

Thanks,
Janet

Janet Cote
Acting Chief of Planning Resources/Ecologist
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APPENDIX G

PUBLIC COMMENTS RECEIVED AND RESPONSES