DRAFT ENVIRONMENTAL ASSESSMENT

JOINT BASE CHARLESTON
MAINTENANCE DREDGING 2020-2030

CHARLESTON AND BERKELEY COUNTIES, SOUTH CAROLINA

AUGUST 2019

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF APPENDICES

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AF	Air Force
AFB	Air Force Base
AICUZ	Air Installation Compatible Use Zone
ATON	Aids To Navigation
BAQ	Bureau of Air Quality
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSD	Cutter Suction Dredge
CY	Cubic Yard
DOPAA	Description of the Proposed Action and Alternatives
EA	Environmental Assessment
EFDC	Environmental Fluid Dynamics Model
EFH	Essential Fish Habitat
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ERL	Effects Range Low
ERM	Effects Range Medium
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
JBC	Joint Base Charleston
MAJCOM	Major Command
MLLW	Mean Low Low Water
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrous Oxide
NPTU	Nuclear Power Training Unit
NTU	Nephlometric Turbidity
O_3	Ozone
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POST 45	Charleston Harbor Deepening and Widening
PREIAP	Planning Requirements for the Environmental Impact Analysis Process
ROD	Record of Decision
SCDAH	South Carolina Department of Archives and History

SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCIAA	South Carolina Institute of Archaeology and Anthropology
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Oxides of Sulfur
TEL	Threshold Effects Level
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

Joint Base Charleston (JBC) in Berkeley County, South Carolina has performed routine dredging along approximately 4.8 miles of the Cooper River and along approximately 0.4 miles of Goose Creek from the confluence of the Cooper River since the 1940s (Figure 1-1). Dredging is performed to provide sufficient depth for navigation and berthing of Department of Navy, Military Sealift Command, Defense Fuels Supply Depot, Department of Army, Department of Air Force, and Department of Energy vessels that support JBC waterborne missions. The Naval Weapons Station Charleston (now known as Joint Base Charleston) currently holds a permit from the U.S. Army Corps of Engineers (USACE) and South Carolina Department of Health and Environmental Control (SCDHEC) to conduct maintenance dredging of the channels and several berthing areas (see Appendix A).

The USACE, Charleston District issued permit no. 2009-00175-2IR for the existing maintenance dredging in March 2010 pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). The project was Categorically Excluded in accordance with Navy regulations at the time, so an Environmental Assessment (EA) was not prepared. As part of the permit, a Certification in accordance with Section 401 of the Clean Water Act and a Certification in accordance with the Coastal Zone Management Act (15 CFR Part 923) were obtained from the SCDHEC. In 2011, the permits were modified to include dredging of a small area outside/riverside of Pier X to obtain the depths necessary for vessels to dock at this pier (see Figure 1-1, inset map). Additionally, in 2012, the Navy and Air Force completed an Environmental Assessment for Facilities Expansion at Navy Nuclear Power Training Unit Charleston, Joint Base Charleston. In 2018, a Supplemental EA was prepared and a Finding of No Significant Impact (FONSI) was signed for an approximate 2-acre area inside/shoreside of Pier X in need of dredging. This area will be included in the current 404 permit request for maintenance dredging.

The current permit will expire on 31 March 2020, and the action proponent, the U.S. Air Force on behalf of JBC, intends to apply for a new permit that will authorize maintenance dredging for another ten years. Additionally, a new area at Pier C will need to be dredged and maintained that was not in the previous permit, and the newly proposed inside/shoreside area of Pier X South that was not part of the previous permit but already assessed, will be included in the new permit request for future maintenance dredging. Since this is a Federal project, this draft Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts of the proposed action in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 CFR Parts 1500-1508), and the Air Force Environmental Impact Assessment Process Regulations at 32 CFR Part 989. The information presented in the Final EA will serve as the basis for deciding whether the proposed action would result in a significant impact to the environment, requiring the preparation of an Environmental Impact Statement (EIS), or whether no significant impacts would occur, in which case a Finding of No Significant Impact (FONSI) would be appropriate.

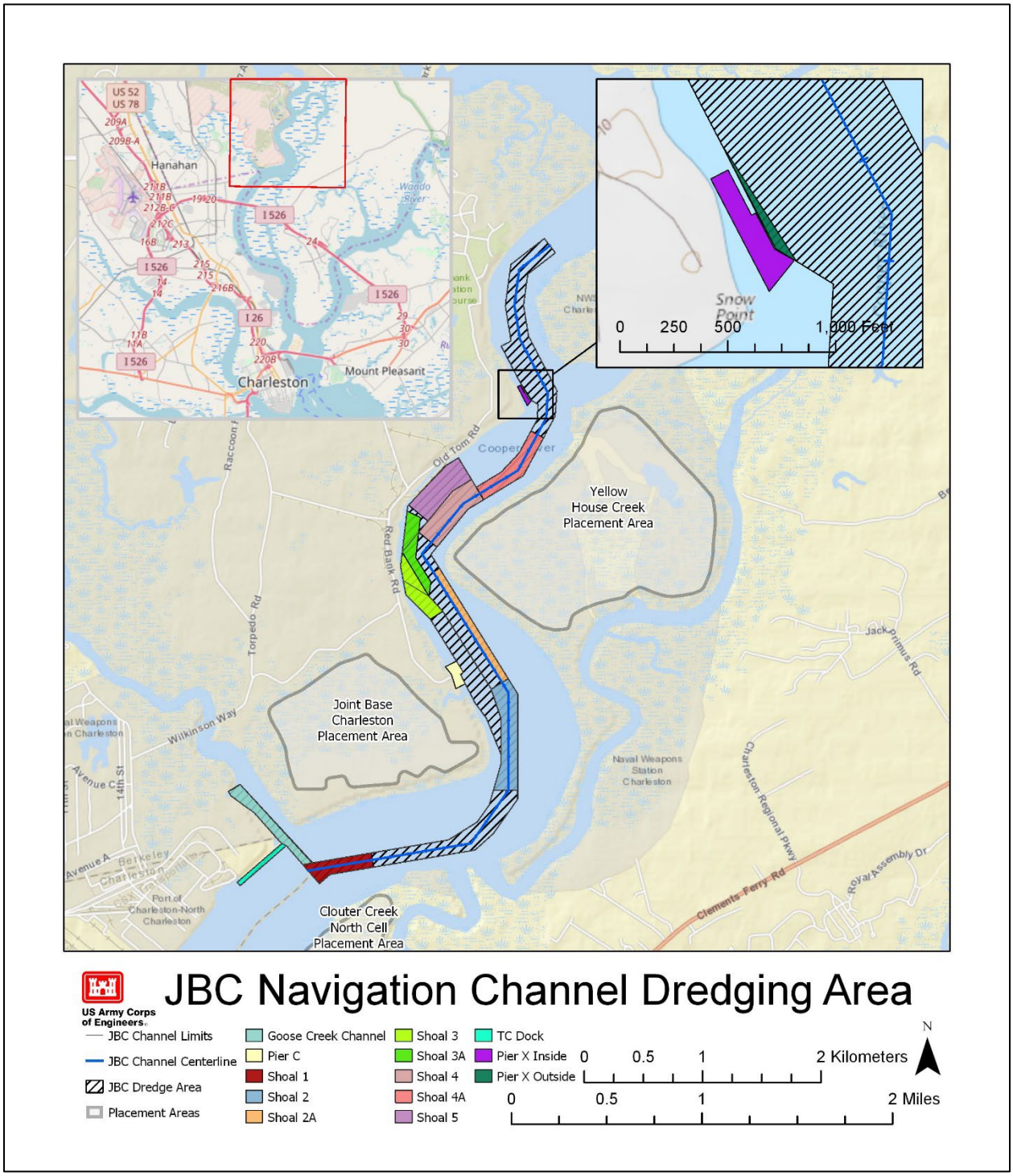

Figure 1-1. Location of Joint Base Charleston Dredging Area and Units.

1.2 PURPOSE OF AND NEED FOR THE ACTION

The purpose for the action is to provide and sustain sufficient depth for navigation and berthing of military vessels that support JBC waterborne missions. Dredging of the JBC navigation channels and associated berthing areas is needed to meet new dredging requirements and allow for the continuation of waterborne missions at JBC. The permits issued by the USACE and SCDHEC that currently authorize maintenance dredging of the vessel navigation/berthing areas will expire on 31 March 2020. The U.S. Air Force on behalf of JBC is seeking to obtain a new permit that will authorize maintenance dredging for another ten years. JBC will not be able to perform dredging and implement their waterborne missions without a new permit.

1.3 DECISION TO BE MADE

The decision to be made is the selection of an alternative by the U.S. Air Force to support future maintenance dredging of the JBC channels and associated vessel berthing areas. The decision options are to:

- Discontinue routine maintenance dredging when the current dredging permit expires (the No Action Alternative);
- Select an action alternative for maintenance and/or new dredging, and prepare a Finding of No Significant Impact (FONSI); or
- Prepare an Environmental Impact Statement (EIS) if the alternatives will result in significant environmental impacts.

1.4 INTERGOVERNMENTAL COORDINATION/CONSULTATIONS

1.4.1 Interagency and Intergovernmental Coordination and Consultations

Federal, state, and local agencies with jurisdiction that could be affected by the alternative actions were notified and consulted during the development of this EA.

Appendix B contains the list of agencies consulted during this analysis and copies of correspondence.

1.4.2 Government to Government Consultations

The National Historic Preservation Act requires Federal agencies to consult with Federally-recognized Native American tribes on proposed undertakings that have the potential to affect properties of cultural, historical, or religious significance to tribes historically affiliated with the JBC geographic area. The tribal coordination process is distinct from NEPA consultation or the Interagency and Intergovernmental Coordination processes in that it requires separate notification of all relevant tribes based on tribal preferences regarding the specific mode of contact. The timelines for tribal consultation are also distinct from those of intergovernmental consultations. Federal agency consultation with Indian tribes must start early in the planning process. The JBC USAF point-of-contact for Native American tribes is the Installation Commander. The JBC USAF point-of-contact for consultation with the Tribal Historic Preservation Officer (THPO) and the Advisory Council on Historic Preservation is the Cultural Resources Manager. The Native American tribal governments that will be coordinated with regarding this action are listed in Section 6.0.

1.5 PUBLIC AND AGENCY REVIEW OF EA

A Notice of Availability (NOA) of the draft EA and proposed FONSI will be published in the newspapers of record (listed below), announcing the availability of the draft EA for review on 1 September 2019. The NOA invites the public to review and comment on the draft EA and proposed FONSI. The public and agency review period will end on 2 October 2019. Public and agency comments that are received as part of the draft EA review process will be provided in Appendix B.

The NOA will be published in the following newspapers: Post and Courier (Charleston, SC).

Copies of the draft EA and proposed FONSI will also be made available for review at the following locations:

Otranto Rd Regional Library 2261 Otranto Road Charleston, SC 29406	Hanahan Library 1216 Old Murray Drive Hanahan, SC 29410	JBC-Weapons Station Library Bldg 732, 2316 Red Bank Rd Goose Creek, SC 29445

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is to maintain JBC vessel navigation/berthing areas through routine dredging of up to 2,000,000 cubic yards (CY) of material per year. Maintenance dredging of the JBC channels and berthing areas is managed by dredging units identified by shoals, piers and docks (see Figure 1-1). The dredging depth within the JBC Channel is 40' required depth, plus 2' allowable overdepth Mean Lower Low Water (MLLW). The depth within the Goose Creek Channel is 25' required depth, plus 2' allowable overdepth MLLW. Allowable overdepth is to assure the action is constructed to the authorized depth. The piers and docks have varying depth requirements (see Section 2.4) depending on their purpose. Advanced maintenance dredging of 4' is proposed for three of the dredging units – Shoal 4, Shoal 4A, and TC Dock – where accelerated shoaling has been experienced over the past ten years. Advanced maintenance is conducted to enable the action to maintain the authorized depth for a longer period of time, potentially reducing the need to dredge more often. The width of shoals within the JBC Channel and Goose Creek Channel vary; however, the required width for piers and docks is 125'.

To maintain current project depths, routine maintenance dredging is required on a 15-20 month rotating cycle, with the exception of the TC Dock area every nine months. To meet new dredging needs, a small area at Pier X South will be dredged and maintained that was not included in the previous permit but was assessed in a recent Supplemental EA (US Department of the Navy and US Department of the Air Force, 2018). A second new area at Pier C also needs to be dredged and maintained (see Section 2.4). The original fixed pier structure no longer exists at Pier C, but a floating dock is now present.

Dredging would be conducted using appropriate methodologies, and the dredged material would be placed into one or more existing upland placement areas. The existing, confined, upland placement areas that would be used include the Clouter Creek (the Clouter Creek Placement is divided into 4 cells: North Cell, Highway Cell, Middle Cell, and South Cell), Joint Base Charleston, and Yellow House Creek Placement Areas (Figure 2). The Clouter Creek Placement Area is currently used for material from the TC Dock dredging unit.

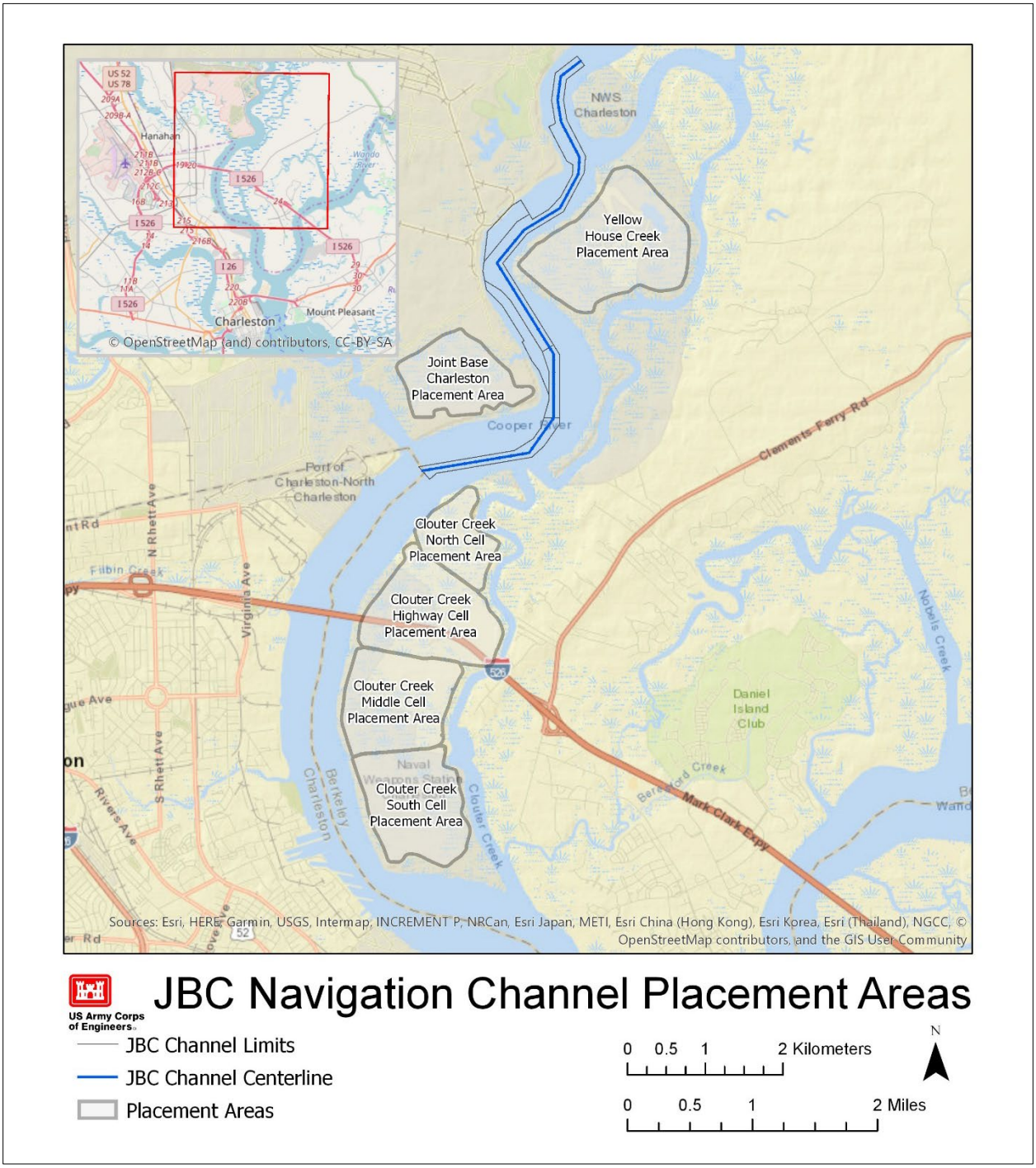

Figure 2-1. Locations of Placement Areas for Joint Base Charleston Maintenance Dredging.

2.2 SELECTION STANDARDS

The National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations mandate the consideration of reasonable alternatives for the proposed action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the proposed action. Per the requirements of 32 Code of Federal Regulations (CFR) Part 989, the USAF Environmental Impact Analysis Process (EIAP) regulations, selection standards are used to identify alternatives for meeting the purpose and need for the USAF action.

In addition to supporting the Purpose of and Need for the Action, the proposed action alternatives must meet the following dredging method selection standards:

- Maintain depth of 40' in the Cooper River navigation channel and major berths, 25' in the Goose Creek navigation channel and berths, and 10' to and at Pier C in order to maintain safe operations
- Establish dredge cycles (schedules) and depths for the dredging units that minimize frequency of dredging
- Utilize the most effective and efficient dredging methods and equipment based on cost, timing, availability and accessibility of placement areas, and environmental considerations
    - The decision to use one type of dredging method or another is based on a variety of factors, including environmental considerations, cost, timing, and the suitability of material placement areas. Flexibility is even more important for smaller dredging projects because the mobilization of dredging equipment is a greater percentage of the overall cost. Traditionally, both cutter suction and mechanical clamshell dredges have been used to maintain the Federal navigation channel in the Cooper River below the JBC channel limits. Hopper dredges do not need to be considered because the capacity provided by these dredges is not needed in this part of the Cooper River; likewise hopper dredges pose greater risks to fish and sea turtles and operate within restricted seasonal windows.
    - The three placement areas proposed are owned and/or managed by Joint Base Charleston or the US Army Corps of Engineers, specifically for the purpose of supporting the navigable waters that JBC or USACE has jurisdiction for. They are currently being used for material placement under the existing permit, and capacity in the placement areas is actively monitored. Using other placement areas is not considered practicable because it would result in additional costs and enhanced environmental risks associated with transporting the material greater distances through busy waterways.
- Minimize impacts to US waters, human health, habitat, and threatened and endangered species
- Do not impact cultural or historical resources.

2.3 DETAILED DESCRIPTION AND SCREENING OF THE ALTERNATIVES

Three alternatives, Alternative 1 (Preferred Alternative), Alternative 2, and "No-Action" are described and analyzed below. The selection standards described in Section 2.2 were applied to these alternatives to determine which could meet the purpose of and need for the action.

2.3.1 Alternative 1 (Preferred Alternative): New and Existing Maintenance Dredging

This is the preferred action alternative, and entails conducting routine maintenance dredging of the JBC navigation channel and berthing areas, including new and existing dredging units. The specifications for the dredging units (depth, slope, etc.) over a 10-year period are presented in Table 2-1. The locations of the dredging units are shown in Figure 1-1. Dredging would be conducted on a 15-20 month rotating cycle (or 9 months for TC Dock, as needed) as determined by routine depth soundings. Depths are measured at MLLW. The dredged material would be placed, as appropriate, into one or more of the designated upland confined placement areas which includes Yellow House Creek, Joint Base Charleston, and Clouter Creek. Dredging methods are largely influenced by site conditions and the dredging contractor and would include cutter suction dredge (CSD) or mechanical clamshell. For confined upland placement areas, a CSD is more efficient to operate than a mechanical dredge. This alternative meets all of the selection standards.

TABLE 2-1. Dredging Units for Joint Base Charleston Navigation Channels and Berthing Areas

Dredging Unit	Status	Proposed Depth and Slope	Change from Previous Permit
JBC Channel Shoal 1 JBC Channel Shoal 2 JBC Channel Shoal 2A JBC Channel Shoal 3 JBC Channel Shoal 3A JBC Channel Shoal 5 JBC Channel Shoal 6	Previously permitted and dredged to 42' MLLW (40' +2' overdepth; 1:4 side slopes)	40' MLLW required depth + 2' allowable overdepth; 1:4 side slopes	None
JBC Channel Shoal 4 JBC Channel Shoal 4A	Previously permitted and dredged to 42' MLLW (40' +2' overdepth; 1:4 side slopes)	40' MLLW required depth + 4' advanced maintenance + 2' allowable overdepth; 1:4 side slopes	+4' advanced maintenance
TC Dock	Previously permitted and dredged to 42' MLLW (40' +2' overdepth; 1:4 side slopes)	40' MLLW required depth + 4' advanced maintenance + 2' allowable overdepth; 1:4 side slopes	+4' advanced maintenance
Pier X South, 1.06 acre area riverside/outside berth	Previously permitted [existing permit modified in 2011] and dredged to 36' MLLW (34' +2' overdepth; 1:4 side slopes)	40' MLLW required depth + 2' allowable overdepth; 1:4 side slopes	+ 6' required depth

Pier X South, 2.2 acre area barge shoreside/inside berths	Partially dredged once in 1991 during pier construction; not part of current maintenance dredging permit	20’ MLLW required depth + 2’ allowable overdepth; 1:4 side slopes	+20” required and 2” overdepth
Pier C Security Boat Dock	Newly proposed	10’ MLLW required depth + 2’ allowable overdepth; 1:4 side slopes	+10’ required and 2’ overdepth
Goose Creek Channel	Previously permitted and dredged to 27’ MLLW (25’ + 2’ overdepth; 1:4 side slopes)	25’ MLLW required depth + 2’ allowable overdepth; 1:4 side slopes	No change

2.3.2 Alternative 2: Existing Maintenance Dredging

This alternative is the same as the preferred action alternative (Alternative 1), with the elimination of advance maintenance dredging and new dredging requirements for the Pier C access channel and berth to 10’ MLLW plus 2’ overdepth and 4:1 side slopes. With current depths at Pier C, JBC missions can still function but will be subject to operational constraints and navigation hazards at low tide. This alternative meets most of the selection standards, but only partially meets the first selection standard in Section 2.2 for minimum navigation depths needed for safe navigation.

2.3.3 No-Action Alternative

Under the No Action Alternative, routine maintenance dredging of the JBC channel would not occur and permits issued by the USACE and SCDHEC would not be sought. As a result, the purpose and need for the proposed action would not be met. This alternative entails not conducting routine maintenance dredging of the JBC vessel navigation/berthing areas and the dredging units presented in Table 2-1 over a 10-year period after the current permit expires. As a result of no action, sediments will accumulate along the sides and bottom of the channels and in berthing areas, resulting in shoaling that will limit clearance/access for vessels to reach JBC to execute their operational mission. A grounded vessel poses a risk to safe navigation, poses an environmental risk, results in vessel damage, and reduces mission capabilities.

The No Action Alternative cannot be considered reasonable, as it fails to address the purpose of and need for the action. However, it will be carried forward for further analysis, consistent with the CEQ regulations, and to provide a baseline against which the impacts of the other alternatives can be assessed.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Although Alternative 2 for Existing Maintenance Dredging, which excludes advance maintenance dredging and new 10’ (+2’ OD) dredging at Pier C, does not meet all of the selection standards, it is being carried forward for further consideration in the EA. No other alternatives were identified or considered for this project. The NEPA process is intended to

support flexible, informed decision-making. The environmental impact analysis that is being conducted for the draft EA, as well as feedback from the public and other agencies, will inform decisions to be made about whether, when, and how to execute the proposed action.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

NEPA requires focused analysis of the areas and resources potentially affected by an action or alternative, but does not require detailed analysis of those not potentially affected. The EA should provide enough detail and depth to allow decision makers and the public to understand the resource areas for which the potential impacts will be evaluated.

3.1 SCOPE OF THE ANALYSIS

This chapter describes the current conditions of the affected environment, or environmental resources, which could potentially be affected by implementing the Proposed Action and alternatives described in Chapter 2. This chapter also analyzes the potential impacts of implementing the Proposed Action and alternatives on these resources. These include Air Quality, Water Quality, Biological Resources, Coastal Zone Management, and Climate Change/Sea Level Rise. Potential impacts to the following resource areas were evaluated and are considered to be negligible or non-existent so they were not analyzed in detail for this EA: Land Use, Noise, Wetlands, Floodplains, Safety and Occupational Health, Explosive Safety, Hazardous Materials and Waste, Geologic Resources, Cultural Resources, Navigation, Environmental Justice, and Socioeconomics. Justification for eliminating these resources from further analysis is provided under 3.1.1.

The affected area for the Proposed Action is the aquatic environment within the JBC navigation channel limits, but also the upland environment of the Yellow House Creek Placement Area, Joint Base Charleston Placement Area, and Clouter Creek Placement Area. No other terrestrial environments will be affected, nor freshwater habitats. With the exception of JBC facilities, there is limited development along the approximate 4.8 miles of the JBC channel in the Cooper River and the approximate 0.4 miles in Goose Creek. The Yellow House Creek contained placement area is located on the east side of the Cooper River near river mile (RM) 13; the Clouter Creek contained placement site is located on the east side of the Cooper River between RM 7 and 10.5; and the Joint Base Charleston disposal site is located on the west side of the Cooper River at RM 11 between the Yellow House Creek and Clouter Creek placement sites. Clouter Creek is the largest of the three disposal sites. The site has four cells and is currently used on a rotating basis to receive material from the Charleston Harbor deepening project (a.k.a., Post 45) and maintenance dredging of the JBC navigation channel and berthing areas. The Charleston District Navigation Branch establishes a plan to manage the capacity of each cell based on the previous amount of material that is placed into the cells on an annual basis. The current combined capacity of the three disposal sites is approximately 13.9 million cubic yards.

3.1.1 Resources Removed from Further Analysis

Based on the scope of the Proposed Action, issues with minimal or no impacts were identified through a preliminary screening process. The following describes those resource areas not carried forward for a detailed analysis, along with the rationale for their elimination.

Land Use. Land use typically refers to human alteration of the natural environment for the purpose of development, agriculture, or recreational enjoyment and is typically regulated by local ordinances, management plans and government regulations. The proposed action area lies within jurisdictional waters and military lands. The immediate areas surrounding the JBC navigation channels include natural or undeveloped areas (such as shoreline habitats and marshes) and military infrastructure (upland placement areas, roads, buildings, docks, etc.

owned and operated by JBC).The action is intended to support military operations and will not result in land use changes.

Noise. Noise is often defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. The Noise Pollution Act of 1972, as amended, is a national statute intended to protect the public from noise that could adversely affect their health and welfare. The Proposed Action would generally occur within jurisdictional waters situated adjacent to natural or undeveloped areas (such as shoreline habitats and marshes) or military infrastructure (upland placement areas, roads, buildings, docks, etc.) owned and operated by JBC. Noise generated from the proposed activities would be temporary and typically occur during daytime hours. There is one public elementary school and one public middle school located on JBC property, approximately 5 miles from the proposed action area, and noise generated from the dredging activities would be short-term. In addition, noise producing construction activities that create sound pressure energy waves in water and shoreline areas have the potential to rupture swim bladders in fish and result in fish kills. However, the proposed dredging operations will not create sound pressure energy waves that could be harmful to aquatic species. Therefore, impacts associated with noise would be negligible.

Wetlands. Wetlands are ecosystems that are inundated or flooded by water at a frequency and duration that results in anaerobic soil conditions and supports hydrophytic vegetation. Wetlands provide many ecological functions such as flood storage, nutrient transformation, and clean water and are provided protection under federal and state regulations. According to Executive Order 11990 Protection of Wetlands, federal agencies must consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The proposed action is intended to increase depths to navigational waterways and will not involve impacts to the shoreline habitats or marshes located adjacent to the channels. Therefore, wetlands will not be directly or indirectly affected by the Proposed Action.

Floodplains. Floodplains are lowlands and relatively flat areas bordering inland and coastal waters. Executive Order 11988, Floodplain Management, requires that federal agencies take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and to preserve natural and beneficial floodplain values served by floodplains in executing agency responsibilities. The Proposed Action would involve dredging within 4.8 miles of the Cooper River navigational channel extending to the mouth of the Goose Creek navigational channel, and placement of the dredged material in established upland placement areas. Therefore, floodplains will not be directly or indirectly affected by the Proposed Action.

Safety and Occupational Health. Safety and Occupational Health concerns the health, safety, and protection of people in the workplace. The project includes maintenance dredging of navigational channels and placement of dredged material in uplands, and would not involve human exposure to asbestos, radiation, or chemicals. Work will be conducted on dredging vessels and barges where all applicable safety regulations and policies will be implemented to avoid endangerment or unusual risk to personnel. While a Solid Waste Management Unit (SWMU) has been identified within Goose Creek, Unexploded Ordinance (UXO) contractors have surveyed and cleared this area within the limits of their survey equipment as part of a Remedial Investigation/Feasibility Study (RI/FS) for SWMU 25. SWMU 25 is a Military Munitions Response Program (MMRP) site which includes a portion of Goose Creek. JBC inspects the

CDF for any evidence of UXO after each dredging event. To date, no UXO have been identified in this area during prior maintenance dredging events and no changes to dredging depths or locations are proposed for this area. In addition, as a controlled JBC security zone, the public is not allowed to stop, anchor, or fish in the area and no activities are allowed in this area without prior approval by JBC. Therefore, the Proposed Action is not expected to have an adverse effect on safety or occupational health.

Explosive Safety. To ensure the safety of dredgers and equipment, JBC will maintain the minimum safe separation distance during explosive operations (1M-lbs of explosives/T-AKE Ops) on Wharf Alpha. The explosive safety quantity-distance (ESQD) arc associated with unrelated personnel's safety is the Public Traffic Route Distance (PTRD). This is approximately 3,000-feet from the explosive site.

Hazardous Materials and Waste. The Affected Environment is located within the existing JBC navigation channel and berthing areas where maintenance dredging has generally occurred on an annual basis since the 1940s. Because of the frequent dredging activity, hazardous or toxic wastes are not expected to be encountered. In June 2018, sediment samples were collected at eleven locations in the JBC navigation channels for chemical evaluation. The analysis confirmed that hazardous and toxic materials are not present in the sediments above levels of concern (see Section 3.2 and Appendix D for sediment analysis). To prevent dredge material spilling or leaking during transport to deposit sites, dredge contractors will be required to provide a spill prevention, control, and containment response plan for all dredging activities including dredge material placement work. No hazardous waste sites are known to be present in the project area, and the likelihood of undiscovered hazardous waste sites in the project area is very low.

Geologic Resources. The Affected Environment is located within the Lower Coastal Plain of South Carolina on the northern boundary of the Sea Island Coastal Region of the South Atlantic Slope. River bottoms, swamps, marshes, and tidal flat features in this region were formed during the Holocene Period and contributed to the physiographic structure of the modern coastline. The Proposed Action would result in the removal of substrates within the JBC navigational channels and berthing areas. However, routine maintenance dredging along 4.8 miles of the Cooper River and along approximately 0.4 miles of Goose Creek has been ongoing since the 1940s. The existing 404 permit (SAC-2009-00175-2IR) currently authorizes maintenance dredging of these channels in addition to the TC Dock and a 1.06 acre area riverside/outside of Pier X South. The proposed dredging depths for the JBC navigational channels and berthing areas would not exceed previous dredging depths, with the exception of up to 4' of advanced dredging for Shoals 4 and 4A and TC dock and up to 6' for Pier X, so no impacts to deep well aquifers are anticipated and there would be no impacts to terrestrial soils. The Proposed Action will not result in adverse impacts to Geologic Resources.

Cultural Resources. The National Historic Preservation Act (NHPA) defines cultural resources as prehistoric and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Several federal laws and regulations protect these resources, including the NHPA of 1966, the Archaeological and Historic Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Section 106 of the NHPA and its implementing regulations, 36 CFR Part 800, requires Federal agencies to evaluate the effects of their activities on historic properties.

Maintenance dredging of the JBC and Goose Creek navigational channels, the TC dock, and the riverside and outside berthing areas of Pier X south were previously authorized under Corps permit number SAC-2009-00175-2IR. The shoreside/inside berth area of Pier X south was previously dredged in 1991 but has not been maintained under the existing permit. The only new area proposed for dredging includes approximately 4.6 acres, at a depth of 10' MLLW + 2' allowable overdepth at the Pier C Security Boat Dock and advanced dredging depths of up to 4' in two shoal areas and the TC dock. In response to agency coordination for this proposal, the underwater archaeologist with the South Carolina Institute of Archaeology and Anthropology's Maritime Research Division (SCIAA) determined that no submerged cultural resource surveys would be required for the proposed dredging sites identified in this EA. In a letter dated February 6, 2019, the State Historic Preservation Office (SHPO) concurred with the SCIAA recommendation that no additional submerged cultural resources survey is needed in the project area. However, in the event that project activities expose potential submerged cultural material, dredging activities would cease operation in the immediate vicinity and contact would be made with the SHPO and SCIAA concerning the content and nature of the site. Consultation is ongoing with federally-recognized American Indian Tribal representatives.

Navigation. The Cooper River originates at the confluence of its East and West Branches about 32 miles north of Charleston. The West Branch originates at the Pinopolis Dam, which impounds Lake Moultrie (a freshwater reservoir). The Cooper River is classified "navigable waters of the U. S." from its mouth at Charleston Harbor and the Atlantic Ocean, to the Pinopolis Lock and Dam via the Tailrace Canal. JBC has performed routine dredging along approximately 4.8 miles of the Cooper River, and along approximately 0.4 miles of Goose Creek from the confluence of the Cooper River since the 1940s. The existing 404 permit (SAC-2009-00175-2IR) currently authorizes maintenance dredging of these channels in addition to the TC Dock and a 1.06 acre area riverside/outside of Pier X South, through March 31, 2020. The Proposed Action would also allow advanced dredging of up to 4' for Shoals 4 and 4A and the TC dock, add a small 2-acre area of dredging inside/shoreside of Pier X and an approximately 4 acre area around the Pier C Security Dock. Dredging would be conducted using a mechanical clamshell, or cutter suction dredge (CSD) with a suction pipe anchored to the channel bottom. During dredging/placement of material, the CSD would utilize only a small portion of the overall channel width, and appropriate warning and marking devices would be installed to alert the boating public of potential dangers (such as cables, anchors, buoys, or other appurtenances), thereby allowing safe navigation through the area of work. In the past, maintenance dredging of the JBC navigational channels has not required relocation of any Aids to Navigation (ATONs). However, future dredging activities for Shoal 1 (see Table 2-1) may require temporary relocation of ATON R62 for dredging in this location. Should relocation of any ATONs be required, the Coast Guard has requested notification at least 4 weeks prior to commencement of dredging activities in order to allow sufficient time to notify the public. The dredging contractor would be required to coordinate with the Coast Guard if relocation of ATONs is necessary. Temporary relocation of ATON R62 would not result in adverse effects to navigation since the ATON would be returned to its original location once dredging of this area is complete. Based on the above information, the Proposed Action would not impede navigation in the JBC waterways.

Environmental Justice. According to Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and low-Income Populations, each Federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying

persons (including populations) the benefits of, or subjecting person(including populations) to discrimination under such programs, policies, and activities, because of their race, color, national origin, or income level. Agencies must assess whether disproportionally high and adverse effects would be imposed on minority or low income areas by Federal actions. In addition, Executive Order 13045 Protection of Children from Environmental Health Risks and Safety Risk requires Federal agencies to assess the environmental health and safety risk of their actions on children.

The proposed action area lies within jurisdictional waters and land of the US Military. The immediate area surrounding the JBC navigation channels includes natural or undeveloped areas (such as shoreline habitats and marshes) or military infrastructure (upland placement areas, roads, buildings, docks, etc. owned and operated by JBC). The Preferred Alternative is not expected to adversely impact any human populations; low income, minority, or otherwise. Standard site safety procedures would be followed to minimize any environmental health or safety risks to children. Any potential impacts under Alternative 2 would be similar to that of the Preferred Alternative. Under the No Action Alternative, dredging would not occur and there would be no change to conditions in the area. Therefore, Environmental Justice is not carried forward for detailed analysis in this EA.

Socioeconomics. Socioeconomics comprises the basic attributes and resources associated with the human environment, particularly population and economic activity. Socioeconomic impacts would be considered significant if the Proposed Action would result in a substantial shift in population trends or notably affect regional employment, earnings, or community resources. There is limited residential or commercial development near the proposed action area. The land along the eastern shoreline of the JBC navigation channel on the Cooper River is undeveloped/unmanaged, with the exception of the Yellow House Creek upland placement area. This area is owned by the US Military. It falls within in census block group 450150204041 which extends from the shoreline to the east and to the north and south of the JBC navigation channel, with a population of approximately 1,700 (USEPA 2018). Comparatively, 177,843 people live in Berkeley County (US Census Bureau 2010).

The land along the western shoreline of the JBC navigation channel of the Cooper River and on the north side of Goose Creek is also owned by the US Military. Military infrastructure in the area primarily includes some roads and buildings, a recreational golf course, docks/piers, and the JBC upland placement area. There is one public elementary school and one public middle school located on JBC property, approximately 5 miles from the proposed action area. This land area falls within two census block groups: 450159801001 with no population data recorded, and 450150207241 which extends to the west and north of the shoreline and registers a population of approximately 2,200 (USEPA 2018).

The southern shoreline along the JBC navigation channel in Goose Creek is also undeveloped, with the exception of TC Dock and other infrastructure owned by the South Carolina State Ports Authority at the mouth of Goose Creek. This small stretch of channel aligns census block group 450150210001 to the south, which extends farther up Goose Creek and to the west with a total population of approximately 2,100 (USEPA 2018). A private golf course is located approximately one mile upstream from the JBC navigation channel on Goose Creek.

The Preferred Alternative would result in minor, temporary, beneficial impacts to the local economy when dredging occurs by providing employment to local dredge and equipment operators; and the use of associated vessels, fuel, and heavy equipment. Since dredging has historically been occurring at and near the Preferred Alternative sites site, any increased

benefits to socioeconomics as a result of the additional proposed work under the Preferred Alternative would be negligible. Any benefits to socioeconomics under Alternative 2 would be similar to those under the Preferred Alternative. Under the No Action Alternative, dredging would not occur and any minor, short term benefits to socioeconomic resources which would occur during dredging would not occur. Therefore, Socioeconomics is not carried forward for detailed analysis in this EA.

3.2 AIR QUALITY

3.2.1 Affected Environment

The region of influence for air quality for the proposed action is defined by the administrative/regulatory boundary of Berkeley County, within the Berkeley-Charleston-Dorchester (BCD) Air Quality Coalition Region, one of seven regional groups in South Carolina dedicated to improving the state's air quality.

Air quality in a given location is described by the concentration of various pollutants in the atmosphere. A region's air quality is influenced by many factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards. The Clean Air Act (CAA) and its subsequent amendments (CAAA) established the National Ambient Air Quality Standards (NAAQS) for six principal air pollutants, also known as "criteria air pollutants." Those air pollutants considered for the proposed action are sulfur dioxide ($SO_{2)}$ and other compounds (i.e., oxides of sulfur or SOx); volatile organic compounds (VOCs), which are precursors to ozone (O_3); nitrogen oxides (NOx), which are also precursors to O_3 and other compounds; carbon monoxide (CO); and particulate matter (PM2.5 and PM10). These criteria pollutants are generated by the activities (e.g., construction and mobile source operations) associated with the proposed action.

A locality's air quality status and the stringency of air pollution standards and regulations depend on whether monitored pollutant concentrations attain the levels defined in the NAAQS. To ensure the NAAQS are achieved and/or maintained, the CAAA requires each state to develop a State Implementation Plan (SIP). The SCDHEC's air program, oversees the state's air agendas, including the SIP. The state and national ambient air quality standards that have been set are presented in Table 3-1 below. They represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. Short-term standards (1, 8, and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects.

Table 3-1. South Carolina Ambient Air Quality Standards

Pollutant	Reference	Measuring Interval	Standard Level			
			mg/m^3	$\mu g/m^3$	ppm	ppb
Sulfur Dioxide	40 CFR 50.4 40 CFR 50.5	3 hour (secondary)	-	1300	0.5	-

	40 CFR 50.17	1-hour (primary)	-	-	-	75
PM_{10}	40 CFR 50.6	24 hour	-	150	-	-
$PM_{2.5}$	40 CFR 50.18	24 hour (primary)	-	35	-	-
	40 CFR 50.18	Annual (primary)	-	12	-	-
	40 CFR 50.13	24 hour (secondary)	-	35	-	-
	40 CFR 50.13	Annual (secondary)	-	15	-	-
Carbon Monoxide	40 CFR 50.8	1 hour (no secondary)	40	-	35	-
		8 hour (no secondary)	10	-	9	-
Ozone	40 CFR 50.15	8 hour (2008)	-	-	0.075	-
	40 CFR 50.19	8 hour (2015)	-	-	0.07	-
Nitrogen Dioxide	40 CFR 50.11	Annual	-	100	0.053	53
		1-hour				100
Lead	40 CFR 50.16	Rolling 3-month average	-	0.15	-	-

South Carolina Department of Health and Environmental Control Air Pollution Control Regulations and Standards, Regulation 61-62.5 Air Pollution Control Standards, Standard No. 2, Ambient Air Quality Standards.

The EPA published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* in the 30 November 1993, Federal Register (40 CFR Parts 6, 51, and 93). This publication provides implementing guidance to document the CAA Conformity Determination requirements. Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan before the action is taken (40 CFR Part 1 51.850[a]). The general conformity rule applies to federal actions proposed within areas which are designated as either nonattainment or maintenance areas for the NAAQS for any of the criteria pollutants. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Bureau of Air Quality (BAQ), under SCDHEC, maintains a network of air quality monitoring stations located throughout the state. Three monitoring stations (Naval Base, Jenkins Ave., and FAA) are located in close proximity of the Proposed Action Area. These stations monitor for ozone and NO_2.

Currently, Berkeley County and all the counties in the airshed are considered by EPA to be in attainment for all principal air quality pollutants in the CAA and its amendments. Included are the standards for emissions of CO, SO_2, NO_2, $PM_{2.5}$, PM_{10}, Pb and the 8-hr standard for ozone.

Since the air quality within the project airshed is in attainment for all criteria air quality contaminants, the BCD coalition is exempt from CAA Conformity Determination requirements. However, emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC), which are precursors to ozone formation and are caused primarily by motor vehicle traffic and other mobile sources such as aircrafts, are of continuing interest in Berkeley County, as well as the state of South Carolina.

According to the American Lung Association's 2017 Air Quality Report, the Charleston-North Charleston area is one of eight cities in the Southeast that reached the lowest level-in-year for recorded ozone and long-term particle pollution in the air. Charleston's prevailing sea breezes contribute to sweeping the coastal air, keeping it cleaner than inland areas.

More information and details on the types and sources of air quality pollutants, regulatory requirements and air quality standards relevant to the proposed action and action area can be found in the Air Quality Analysis found in Appendix C.

3.2.2 Environmental Consequences

To determine potential impacts to air quality from the proposed action, an emission inventory and forecast was generated. The EPA's "Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, Final Report" dated April 2009 provided the framework to determine air emissions for the proposed action.

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

The Proposed Action under Alternative 1 would not change the project's ability to meet air quality standards. There would be a temporary and localized reduction in air quality during placement due to emissions from the dredge during dredging and upland placement of materials. These impacts would be minor and temporary in nature, and would cease once dredging and placement is completed. Therefore, no significant impacts would occur to air quality under Alternative 1.

Alternative 2 – Existing Maintenance Dredging.

No new impacts to Air Quality are expected than are experienced with current dredging. Under Alternative 2, elimination of advanced dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments in these areas that has reduced the navigable capacity of the waterway. The frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. However, this would not change the project's ability to meet air quality standards. There would be a temporary and localized reduction in air quality during placement due to emissions from the dredge equipment and upland placement of materials. These impacts would be minor and temporary in nature, and would cease once dredging and placement is completed. Therefore, no significant impacts would occur to air quality under Alternative 2.

No Action Alternative.

Under the No Action Alternative, maintenance dredging and placement of upland dredge material would not occur. Under this alternative, impacts to air quality would not occur.

3.3 WATER QUALITY

3.3.1 Affected Environment

The Proposed Action Area lies within the Cooper River Watershed and includes portions of the Cooper River and Goose Greek. Fosters Creek is also in the watershed and empties into the Back River. Goose Creek and the Back River drain into the Cooper River, which ultimately joins with the Ashley River and Wando River to form the Charleston Harbor. The State of South Carolina classifies the Cooper River from the juncture of the east and west branches of the river to the confluence with the Ashley River as a "Class Saltwater B" water body. Class Saltwater B water bodies are tidal saltwaters suitable for primary and secondary contact recreation, crabbing, and fishing, except for harvesting of clams, mussels or oysters for market purposes or human consumption. They are considered suitable for the survival and proposition of balanced indigenous aquatic community of marine fauna and flora (SCDHEC 2014). Although the JBC navigation channels in the Cooper River and Goose Creek have not been identified as impaired waterways under Section 303(d) of the Clean Water Act, the State has set a total maximum daily load (TMDL) for the Cooper River, Wando River, Ashley River and Charleston Harbor combined, known as the "Charleston Harbor TMDL." A TMDL allocates the amount of oxygen demanding substances that an industry can discharge into a water body or system.

As part of the current Section 404 dredging permit, the South Carolina Department of Health and Environmental Control certified on 24 February 2010 that the project met requirements of Sections 401 and 303 of the Federal Clean Water Act, and that there were no applicable effluent limitations under Section 301(b) and 302 and no applicable standards under Sections 306 and 307 (Appendix A).

Total Suspended Solids

Total suspended solids (TSS) are the suspended organic and inorganic particulate matter in water. Although increasing TSS can also be an indication of increased runoff from land, TSS differs from turbidity in that it is a measure of the mass of material in, rather than light transmittance through, a water sample. High TSS can adversely impact fish and fish food populations and damage invertebrate populations. There are no explicit state standards for TSS. The state standard for turbidity in the Charleston Harbor system is 25 nephlometric turbidity units (NTU).

Metals

Concentrations of cadmium, chromium, copper, lead, mercury, and nickel in water are routinely measured by SCDHEC to compare to state standards intended to protect aquatic life and human health. These metals occur naturally in the environment, and many are essential trace elements for plants and animals. Human activities, such as land use changes and industrial and agricultural processes also have resulted in an increased flux of metals from land to water. Atmospheric inputs are recognized as important sources of metals to aquatic systems. Some metals can be released to the atmosphere from the burning of fossil fuels (coal, oil), wastes (medical, industrial, municipal), and organic materials. The metals are then deposited on land and in waterways from the atmosphere via rainfall and particulates (dry deposition). Water

quality impacts from dredging, accidental spills, and bilge wastes have the potential to occur on occasion from recreational traffic, military operations, and maintenance dredging operations.

Dissolved Oxygen

Dissolved Oxygen (DO) is important to the survival of aquatic organisms. DO concentrations are dependent on a number of factors such as temperature, salinity, wind, turbulence, atmospheric pressure, and pollutants. The diversion of freshwater flow into the Cooper River from Lake Moultrie starting in the 1940s has caused the river to shift from vertically well-mixed, to a more stratified condition. Additionally, deepening and widening of the Federal navigation channel in the Cooper River has already lowered river-bottom DO concentrations over the past century. For the current Charleston Harbor Deepening and Widening (Post 45) Project that proposes to deepen the Cooper River portion of the Federal navigation channel from 45 feet to 48 feet, the USACE modeled impacts to DO using the Environmental Fluid Dynamics Code (EFDC) hydrodynamic and water quality model. The model suggested the harbor deepening project would cause a minor (average 0.03 mg/L) reduction in DO and would not have a significant effect on the TMDL waste load allocation. The USACE is monitoring the potential impacts of their project to the allowable DO deficit for the Charleston Harbor (USACE IFR/EIS 2015).

Salinity

Salinity in the Cooper River watershed can affect estuarine habitat and the distribution of marine species. Along with tidal inundation/water elevation, salinity generally determines the marsh vegetation species and influences fish, crustacean, and bivalve populations. Salinity concentrations in the Cooper River where the JBC navigation channel is can range from 5 to 18 ppt, and nearby wetlands are dominated by estuarine emergent marshes with cordgrasses and black needlerush. Salinity also influences DO concentrations. Event-driven salinity intrusion into freshwater in the Cooper River and Bushy Park reservoir is also a concern for water usage. As a result, there are several monitoring stations around the Charleston Harbor to help inform management of freshwater flow from Lake Moultrie into the Cooper River. These include a gage at the Cooper River near Goose Creek and a gage on the West Branch Cooper River at Pimlico near Moncks Corner. The USACE also used the EFDC model to predict salinity changes due to deepening of the Charleston Harbor under the Post 45 Project. Salinity changes and potential impacts were modeled on the Cooper River all the way to the Bushy Park Reservoir. Results showed a slight alteration in salinity distribution in the Charleston Harbor system with deepening scenarios to 48 feet and to 52 feet. Impacts to estuarine emergent marshes such as those along the Cooper River are expected to have negligible impacts since this habitat is already tolerant to slight increases in salinity or brief exposures to salinity. The USACE is monitoring the potential impacts of their deepening project on wetland vegetation farther up the Cooper River in areas where salinity is regularly less than 5 ppt to tidal freshwater areas (USACE IFR/EIS 2015).

Sediment Analysis

Sediments provide important benthic (bottom) habitat for aquatic organisms, and can create environmental problems if harmful contaminants are present and released when disturbed. In 2016, 2 sediment composites (composed of 4 to 5 samples each) were collected at the Naval Nuclear Power Training Unit Pier X-Ray South Inboard Berthing Area. In June 2018, seven sediment composites (composed of 2 to 7 samples each) were collected at the TC Dock, Goose Creek channel, Pier C, and Shoals 1, 2, 2A, 3, 3A, 4, 4A, and 5. (See Sediment Sample Chemical Analysis Reports in Appendix D.)

Results of laboratory analyses of sediment samples are compared to published sediment screening values as appropriate. These levels are the threshold effects level (TEL) and the effects range low (ERL). The TEL represents the concentration below which adverse effects are expected to occur only rarely. The ERL and effects range medium (ERM) are concentrations associated with biological effects from a large collection of biological experiments and field assessments. The ERL and ERM values are defined as the concentrations at which 10% and 50% of the studies showed a biological effect at specific concentrations, respectively. Values below the ERL would rarely be expected to be associated with measurable biological effects. Values between the ERL and ERM represent a range in which there are possible biological effects for a wide range of organisms. Values above the ERM represent a range above which there are probable biological effects for a wide range of organisms.

Table 3-2 provides a summary of the 2016 and 2018 sediment composite results. The 2016 results demonstrate that 21 PCB congeners, 6 PAH analytes, and 6 metals were detected in composite samples. Copper was detected in concentrations greater than the TEL. Arsenic and zinc exceeded the TEL and ERL.

The 2018 results demonstrate that 24 PCB congeners, 6 PAH analytes, and 8 metals were detected in composite samples. However, only arsenic (metal) was detected in concentrations above the TEL and/or ERL.

The arsenic concentrations were: 13.7 mg/kg at TC Dock, 8.23 mg/kg at Goose Creek, 7.27 mg/kg at Shoal 1, 10.7 mg/kg at Shoal 2, 13.0 mg/kg at Shoal 3, and 8.58 mg/kg at Shoal 4. The average concentration was 10.3 mg/kg. Five of the seven sites exceeded the ERL of 8.2 mg/kg and six of the seven sites exceeded the EPA screening value of 7.24 mg/kg, but all are well below the ERM of 70.0 mg/kg.

Arsenic samples are naturally occurring in S.C. and according to the NOAA report entitled “Chemical Contaminant Levels in Estuarine Sediment of the Ashepoo-Combahee-Edisto River Basin National Estuarine Research Reserve and Sanctuary Site”, (Scott et al. 1998) found the level of sediment trace metal contamination in the ACE Basin National Estuarine Research Reserve (NERR) to be low. NERR encompasses approximately 350,000 acres of undeveloped land and water areas consisting of marshes, maritime forests, upland pines, and bottomland hardwoods. Fifteen federally endangered or threatened species and over half of the bird species that occur in North America can be found in the ACE Basin. While the overall level of sediment contamination in the ACE Basin study area was found to be low with very little potential for adverse biological effects, sediment testing at NERR has detected arsenic levels that exceed the ERL. However, arsenic concentrations are naturally high in the southeastern United States based on several studies conducted in pristine systems (Scott et al. 1994, Long et al. 1998, Sanger 1998). These naturally high levels are due to the high arsenic concentrations in the basement rock within the region. Therefore, these findings generally indicate that trace metal concentrations in the ACE Basin are indicative of that which one would expect from the natural weathering of basement rock within the region (Scott et al. 1998). This study found that approximately 30% of the sediment samples in the ACE Basin exceeded the ERL value for arsenic with a maximum concentration of 21.22 mg/kg. JBC sediments, with an average concentration of 10.3 mg/kg of arsenic, are actually lower in concentration than those samples from the ACE Basin and no adverse impacts associated with exposure to elevated arsenic levels have been documented in aquatic, mammalian, or avian wildlife of the ACE Basin. Based on studies of the ACE Basin, an acceptable arsenic level for water quality and biological resources would be anything below 21.22 mg/kg.

Table 3-2. Summary of 2016 and 2018 Sediment Testing Results

PARAMETER	2016 Pier X South	2018 TC DOCK	2018 GOOSE CR CHANNEL	2018 SHOAL 1	2018 SHOALS 2/2A	2018 SHOALS 3/3a	2018 SHOALS 4/4A/5	2018 PIER C	Marine Sediment Screening Criteria		
									TEL+	ERL+	ERM
Tri-n-butyltin (ug/kg)	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	x	x	x
PESTICIDES (ug/kg)											
All pesticides	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	varies		
METALS											
Arsenic	14.0	13.7	8.23	7.27	10.7	13	8.58	5.54	7.24	8.2	70
Zinc	685.0	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	124.0	150.0	x
Copper	19.7	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	18.7	34.0	x
All other metals	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	varies		
DIOXINS /FURANS											
Total TEQs*	< TEL/ERL	1.43	1.45	0.856	3.15	1.28	0.698	1.73	0.85	3.6	x
PCB AROCLORS (ug/kg)											
All PCB Aroclors	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	varies		
PCB CONGENERS (ug/kg)											
All PCB congeners	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	varies		
PAH ANALYTES											
Acenaphthene	< TEL/ERL	14.5	< TEL/ERL	< TEL/ERL	< TEL/ERL	18.2	< TEL/ERL	< TEL/ERL	6.71	16	500
All other PAH	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	varies		
Total PAHs	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	< TEL/ERL	1684	4022	x

x = No TEL or ERL or ERM published Red values exceed the TEL and/or ERL

3.3.2 Environmental Consequences

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

Alternative 1 would lead to short-term increases in turbidity typical of dredging projects. Best management practices would be implemented as appropriate to minimize the migration of sediments. Any impacts to water chemistry, such as dissolved oxygen or salinity concentrations would be short-term and insignificant, as new advanced maintenance dredging requirements are minor and new dredging at Pier C is relatively small in size (~1 acre) and of limited depth (10 ft.). Modeling of dissolved oxygen and salinity changes in the Cooper River for other dredging projects of greater depths showed insignificant impacts (USACE 2015).

While sediment testing of the JBC channels and berthing areas indicate arsenic levels above the ERL/TEL, past studies have demonstrated that arsenic is naturally occurring in this region

due to high concentrations of arsenic found in basement rock. No impacts to wildlife have been documented in the ACE Basin where arsenic levels were detected at higher levels than the project site. In addition, in order to limit wildlife exposure to potential soil contaminants JBC will implement SCDNR recommendations regarding placement of a turbidity curtain around the dredge area to the maximum extent practicable, and mixing or covering of contaminated dredged material with clean dredged material prior to disposal. SCDNR expressed concerns with 2016 sediment testing results indicating elevated levels of zinc for the shoreside/inside Pier X South associated with the NPTU dredging expansion (US Department of the Navy and US Department of the Air Force. 2018). Alternative 1 would not contribute to the current arsenic or zinc levels and would still be expected to meet requirements of Sections 404, 401, and 303 of the Federal Clean Water Act as with the current dredging permit, and have no applicability to limitations under Section 301(b) and 302 and requirements of Sections 306 and 307. Therefore, no significant impacts would occur to water quality under Alternative 1.

Alternative 2 – Existing Maintenance Dredging.

No new impacts to water quality are expected than are experienced with current dredging, however advanced maintenance dredging would not occur. Under Alternative 2, elimination of advanced dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments in these areas that has reduced the navigable capacity of the waterway. The frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. This would lead to more frequent temporary, short-term increases in turbidity typical of dredging projects, but best management practices (see Appendix J) would be implemented as appropriate to minimize the migration of sediments.

While sediment testing of the JBC channels and berthing areas indicate arsenic levels above the ERL/TEL, past studies have demonstrated that arsenic is naturally occurring in this region due to high concentrations of arsenic found in basement rock. No impacts to wildlife have been documented in the ACE Basin where arsenic levels were detected at higher levels than the project site. In addition, in order to limit wildlife exposure to potential soil contaminants, JBC will implement SCDNR recommendations regarding placement of a turbidity curtain around the dredge area to the maximum extent practicable, and mixing or covering of contaminated dredged material with clean dredged material prior to disposal. SCDNR expressed concerns with 2016 sediment testing results indicating elevated levels of zinc for the shoreside/inside Pier X South associated with the NPTU dredging expansion (US Department of the Navy and US Department of the Air Force. 2018). Since Alternative 2 is similar to current dredging requirements and permits, it should meet requirements of Sections 404, 401, and 303 of the Federal Clean Water Act, and have no applicability to limitations under Section 301(b) and 302 and to requirements of Sections 306 and 307. Therefore, no significant impacts would occur to water quality under Alternative 2.

No Action Alternative.

Under the No Action Alternative, the proposed action would not occur and maintenance dredging of the navigational channels and berths would cease upon expiration of the existing permit. There would be no short term increases of turbidity, impacts to water chemistry or risk

of exposure to contaminants at the dredging and disposal sites. The No Action Alternative would result in gradual accumulation of sediments in the navigation channel and berthing areas.

3.4 BIOLOGICAL RESOURCES

3.4.1 Affected Environment

3.4.1.1 Threatened and Endangered Species

The Charleston area is home to abundant fish and wildlife species. Table 3-2 lists those species, including plants, that are protected by the Endangered Species Act of 1973 (as amended), which may be in the vicinity of the proposed action area based on their geographic habitat range (USFWS IPaC 2018). This list includes species that are under the jurisdiction of the US Fish and Wildlife Service (USFWS) and/or the National Oceanic and Atmospheric Administration (NOAA) as well as state listed species. There is no Federally-designated critical habitat for any threatened or endangered species in the proposed action area.

Table 3-3. Federal and State Listed Threatened and Endangered Species Potentially Present in the Vicinity of the Proposed Action Area.

Common Name	Scientific Name	Federal Status	State Status
Mammals			
West Indian Manatee	*Trichechus manatus*	T	E
Northern Long-eared Bat	*Myotis septentrionalis*	T	n/a
Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	n/a	E
Marine Turtles			
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	E
Leatherback sea turtle	*Dermochelys coriacea*	E	E
Loggerhead sea turtle	*Caretta*	T	T
Green sea turtle	*Chelonia mydas*	T	T
Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	E	E
Atlantic sturgeon	*Acipenser oxyrhynchus*	E	n/a
Birds			
American wood stork	*Mycteria americana*	E	E
Red-cockaded woodpecker	*Picoides borealis*	E	E
American Swallow-tailed Kite	*Elanoides forficatus*	n/a	E
Bald Eagle	*Haliaeetus leucocephalus*	n/a	E
Least Tern	*Sterna antillarum*	n/a	T
Amphibians			
Frosted flatwoods salamander	*Ambystoma cingulatum*	T	E
Gopher Frog	*Lithobates capito*	n/a	E

Reptiles			
American Alligator	*Alligator mississippiensis*	n/a	T
Southern Hognose Snake	*Heterodon simus*	n/a	T
Spotted Turtle	*Clemmys guttata*	n/a	T
Plants			
American chaffseed	*Schwalbea Americana*	E	n/a
Canby's dropwort	*Oxypolis canbyi*	E	n/a
Pondberry	*Lindera melissifolia*	E	n/a
E – Federal and/or State endangered		T – Federal and/or State threatened	

Mammals

Marine mammals, such as dolphins and manatees, are occasional transients in the Cooper River. The Federally-listed West Indian manatee (*Trichechus manatus*) is afforded additional Federal protection under the Marine Mammal Protection Act of 1972, as amended (16 USC 1461). There is an extensive description of the West Indian manatee, including its life history, distribution, population status and threats, as relates to the Charleston Harbor system in the "Biological Assessment of Threatened and Endangered Species" for Charleston Harbor Post 45 Project (USACE 2015). Manatees are most common in the warm waters of peninsular Florida, but some migrate along the South Carolina coast during the summer months. Manatees can inhabit shallow (5-20 feet) salt and fresh waters. Because of the high tidal amplitude in South Carolina, manatees feed on abundant salt marsh grasses at high tide and submerged algae beds at low tide. Most recently in 2016, a male manatee was rescued from cold stress in the Cooper River.

River otters, marsh rabbits, muskrats, marsh rice rats, beavers, and mink are dependent on estuarine areas along the Cooper River for foraging, cover, and/or nesting. Urban development and other human disturbances in estuaries threaten their habitat. The only Federally endangered terrestrial mammal in the vicinity of the upland placement areas is the Northern long-eared bat (*Myotis septentrionalis*). In the summer, these bats roost in cavities or crevices of both live and dead trees. The upland project areas consist of the Yellow House Creek, Joint Base Charleston, and Clouter Creek Placement Areas. These placement areas have been used extensively for JBC and Charleston Harbor dredging projects and do not contain suitable roosting habitat for the Northern long-eared bat species. This species has not been found in any of the placement areas.

Marine Turtles

Four of five species of sea turtles known to occur in South Carolina waters are identified to be in Charleston County: Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*) and green (*Chelonia mydas*). Substantial information on these four species, including their life history, distribution, population status and threats as they relate to the Charleston Harbor system can be found in the "Biological Assessment of Threatened and Endangered Species" for Charleston Harbor Post 45 Project (USACE 2015). Leatherback sea turtles are mainly found in offshore waters and Kemp's ridley sea turtles in nearshore waters. Loggerhead and green sea turtles are the most common species in South Carolina waters, respectively. Subadult and adult loggerheads move into coastal waters, such as Charleston

Harbor, to prey on benthic invertebrates including mollusks and decapod crustaceans. A trawling study conducted within the Charleston Harbor shipping channel between 2004-2007 showed that loggerhead sea turtles are present in the channel in increased numbers, and are of increased size, compared to the early 1990s (Arendt et al, 2011). However, according to Michelle Pate with the SCDNR, sea turtles have only been observed in the Cooper River as far north as Riverfront Park (email correspondence dated July 30, 2018). Riverfront Park is approximately 2.7 miles south of the downstream end of the JBC channel and only a small area adjacent to the TC dock is located in Charleston County. The majority of the affected area is located in Berkeley County. Due to its location further inland, sea turtles sea turtles are not found in Berkeley County.

Fish

Some of the economically important finfish species in the lower Cooper River include red drum (*Sciaenops ocellatus*), spotted sea trout (*Cynoscion nebulosus*), flounder (*Paralichtys sp*.), spot (*Leiostomus xanthurus*), and Atlantic croaker (*Micropogonias undulates*). Shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrhynchus*) are the two Federally-protected fish species in the vicinity of the proposed action area. Historically, over-fishing affected sturgeon populations. Current prominent threats include habitat loss or fragmentation, pollution, and decreased water quality. Extensive descriptions of both of these species, including their life history, distribution, population status and threats, as relates to the Charleston Harbor system can be found in the "Biological Assessment of Threatened and Endangered Species" for Charleston Harbor Post 45 Project (USACE 2015). Modeling conducted for the Charleston Harbor Post 45 Project indicated that the tailrace canal of the Cooper River (outside of the proposed action area) contains suitable habitat (based on velocity, temperature, substrate and salinity) for spawning, but not for egg and larval life stages. This is because the modeled outputs for temperature within the timeframe for egg and larval habitat was just below the threshold needed for development. Successful spawning and recruitment within the Cooper River is unlikely at this time. However, tagging and tracking by the SCDNR of shortnose and Atlantic sturgeon show movement throughout the Charleston Harbor, and in the Cooper River. The highest usage of the Cooper River by shortnose sturgeon occurs roughly between river km 30 and 45, which is approximately where the freshwater-to-saltwater interface occurs (outside of the proposed action area). Adult and sub-adult Atlantic sturgeon in the Cooper River are believed to be transient populations from other river systems.

Amphibians and Reptiles

Salamanders, frogs, toads, lizards, and snakes are common in the Charleston area. Most species require uplands and wetlands to complete their life cycle. Human activities, such as clear-cutting and land clearing or filling, impact their survival. The frosted flatwood salamander is the only Federally-endangered amphibian potentially in the vicinity of the upland placement areas. Their preferred habitat is open longleaf pine forests, pine flatwoods, or savannas with wiregrass. The placement areas have been used extensively for JBC and Charleston Harbor dredging projects and do not contain suitable roosting habitat for the frosted flatwood salamander.

Birds

There are 23 migratory bird species of conservation concern that could be in the vicinity of the proposed action area (see Appendix F). Federally-listed birds include the threatened American wood stork (*Mycteria Americana*) and the endangered red-cockaded woodpecker (*Picoides*

borealis). Substantial information on the American wood stork, including its life history, distribution, population status and threats as they relate to the Charleston Harbor system, can be found in the "Biological Assessment of Threatened and Endangered Species" for Charleston Harbor Post 45 Project (USACE 2015). Wood storks are wading birds that are found in brackish and freshwater wetlands in most coastal counties in South Carolina. They feed primarily on small estuarine fishes, such as sunfish. Habitat loss or alterations are cited as a major threat for wood storks, but the number of nesting pairs and nesting colonies of wood storks in South Carolina has been increasing, and the nesting range the South Atlantic coast is growing. Wood storks were reclassified from "endangered" to "threatened" under the Endangered Species Act in 2014. The project involves dredging of the JBC navigational channels and berthing areas and placement of dredged material in established upland placement areas.

The red-cockaded woodpecker can be found in mature pine forests, preferably longleaf pines. A major threat to these birds is also habitat loss. The affected area does not contain suitable habitat for this species and the species has not been observed in the area.

Plants

Marsh vegetation in the proposed action area is discussed in the subsection below. Three Federally endangered flowering plants that could be in the vicinity of the project action area include American chaffseed (*Schwalbea Americana*), Canby's dropwort (*Oxypolis canbyi*) and Pondberry (*Lindera melissifolia*). Pondberry is a deciduous shrub found in South Carolina along limestone sinks and shallow depressions, and in pinelands. Canby's dropwort is a perennial herb that grows along wetlands in South Carolina but can also be found along the shallows and edges of pine ponds and sloughs. American chaffseed is another perennial herb but also considered a hemiparasite and is found along the margins pine flatwood forests or grass-sedge areas.

A wetland vegetation survey was conducted by the SCDNR for the Charleston Harbor Post 45 Project, including 10 transects on the Cooper River covering brackish, brackish-fresh transition, and freshwater marshes (SCDNR 2017). Transects covered an elevation gradient spanning from the river edge to the upland edge. Although the study area began about 2.8 stream miles upriver from the JBC navigation channel, none of the Cooper River transects revealed the presence of pondberry, Canby's dropwort, or American chaffseed. Suitable habitat for these plant species is not available in the proposed action area.

3.4.1.2 Aquatic Resources

The Charleston Harbor system also supports large populations of white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), and blue crabs (*Callinectus sapidus*), which are harvested both commercially and recreationally. Sharks, skates, and rays can also be potentially found in the proposed project area. According to the SCDNR, there are a number of shark species that can be found in South Carolina's estuaries, including Atlantic sharpnose, the sandbar, the bonnethead, the blacktip, the finetooth, the scalloped hammerhead, the spinner, the bull, and the blacknose. These sharks move into estuaries in the spring, and then head offshore in the fall. The nurse shark, lemon shark, tiger shark, sand tiger shark and dusky sharks can also be found in inshore and nearshore waters and occasionally in estuaries but not primarily (SCDNR 2013.)

Many of these species are supported by tidal wetlands along the lower Cooper River. This includes emergent tidal marshes dominated by cordgrass (*Spartina alternaflora*) and black rush (*Juncus roemerianus*). High marsh areas include sea oxeye (*Borrichia frutescens*), salt grass

(*Distinchlis spicata*) and salt meadow hay (*Spartina patens*), along with scrub shrub wetlands that support wax myrtle (*Myrica cerifera*), salt marsh elder (*Iva frutescens*) and groundsel tree (*Baccharis halimifolia*). No freshwater wetlands are located in the proposed action area.

A more detailed description of how these habitats of the lower Cooper River support federally-managed fisheries, designated as Essential Fish Habitat under the Magnuson Steven Fisheries Management Act of 1996, can be found in the Essential Fish Habitat Assessment in Appendix G.

3.4.2 Environmental Consequences

3.4.2.1 Threatened and Endangered Species

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

Alternative 1 proposes maintenance dredging of JBC navigational channels and berthing areas in addition to new dredging impacts associated with the Pier C Security Dock and advanced maintenance dredging of three areas experiencing increased shoaling. New dredging for Pier C is proposed at a depth of no more than 10' MLLW required depth + 2' allowable overdepth. The USAF determined that the proposed action will have no effect on the Northern long-eared bat, red-cockaded woodpecker, wood stork, frosted flatwoods salamander, American chaffseed, Canby's dropwort, and pondberry; and may affect, but is not likely to adversely affect, the West Indian manatee. The USAF is committed to implementing the USFWS' standard protection guidelines for manatees for the proposed action, and for controlling night time lighting for protection of migratory birds. By letter dated October 18, 2018, (see Appendix F) the USFWS concurs with the USAF determination that dredging operations may affect, but are not likely to adversely affect the West Indian manatee. A conclusion of "no effect" was made for the remainder of threatened and endangered species managed by the Service. Based on the above, Alternative 1 would not result in significant impacts to threatened and endangered species managed by USFWS.

The USAF determined that Alternative 1 would have no effect to sea turtle species because it is highly unlikely that they would be present in the project area. According to SCDNR, sea turtles have only been observed in the Cooper River as far north as Riverfront Park. Riverfront Park is approximately 2.7 miles south of the downstream end of the JBC channel. The action area, with the exception of the TC dock, is located in Berkeley County where sea turtles are not found.

Potential direct and indirect impacts associated with dredging that can adversely impact sturgeon (Atlantic and shortnose) include entrainment and/or capture of adults, juveniles, larvae, and eggs by dredging activities, short-term impacts to foraging and refuge habitat, and disruption of migratory pathways. While the project area may be used as a migratory pathway for sturgeon species, it does not contain spawning or recruitment habitat. Dredging activities, which would be localized at any particular time and not span the length and width of the entire channel, will not prevent passage through migratory pathways or significantly reduce adequate areas for migration. In addition, the chance of injury or death from interactions with Atlantic or shortnose sturgeon with mechanical clamshell and cutter suction dredging equipment is low as these species are highly mobile and are likely to avoid the areas during construction. The USAF determined that dredging activities will have no effect to sea turtle species and may affect but are not likely to adversely affect the Atlantic or shortnose sturgeon species. The USAF submitted an expedited request to NMFS on February 22, 2019 and is currently waiting for written concurrence. Alternative 2 would not result in significant impacts to threatened and

endangered species or any federally designated critical habitat managed by USFWS and NMFS. The project area does not contain any federally designated critical habitat.

Alternative 2 – Existing Maintenance Dredging.

Under Alternative 2, no new dredging or advanced dredging would occur and maintenance dredging of the JBC channels, inside/shoreside Pier X South, and the TC dock would continue with upland placement of dredged material in the existing JBC, Clouter Creek, and Yellow House placement areas. Elimination of advance dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments in these areas that has reduced the navigable capacity of the waterway. The frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. Dredging can result in an increase in suspended sediments and turbidity. Suspended solids could adversely affect young fish if the sediments become trapped in their gills. However, natural events such as storms or floods can increase suspended sediments for longer periods than dredging activities and it is often difficult to distinguish between the environmental effects of dredging versus normal navigation activities or natural processes (Pennekamp et al 1996). In addition, best management practices (see Appendix J) would be implemented as appropriate to minimize the migration of sediments. Therefore, dredging on an annual basis versus an 18 month rotation would increase the frequency of turbidity and suspended sediments but these events would have no noticeable adverse effects to species. Alternative 2 may affect, but is not likely to adversely affect manatees and will have no effect on other species under the jurisdiction of the USFWS. By letter dated October 18, 2018, (see Appendix F) the USFWS concurs with the USAF determination.

While the project area may be used as a migratory pathway for sturgeon species, it does not contain spawning or recruitment habitat. Dredging activities, which would be localized at any particular time and not span the length and width of the entire channel, will not prevent passage through migratory pathways or significantly reduce adequate areas for migration. In addition, the chance of injury or death from interactions with Atlantic or shortnose sturgeon with mechanical clamshell and cutter suction dredging equipment is low as these species are highly mobile and are likely to avoid the areas during construction. Dredging on an annual basis versus an 18 month rotation would increase the frequency of turbidity and suspended sediments but these events would have no noticeable adverse effects to sturgeon species. The USAF determined that Alternative 2 would have no effect to sea turtle species and may affect, but is not likely to adversely affect the Atlantic or shortnose sturgeon species. The project does not contain any federally designated critical habitat. The USAF submitted an expedited request to NMFS on February 22, 2019 and is currently waiting for written concurrence. Alternative 2 would not result in significant impacts to threatened or endangered species or any federally designated critical habitat managed by USFWS and NMFS.

No Action Alternative.

Under the No Action Alternative, no dredging or placement of dredge material would occur. There would be no effect on endangered or threatened species, or federally designated critical habitat. However, the No Action Alternative would result in gradual accumulation of sediments in the navigation channel and berthing areas.

3.4.2.2 Aquatic Resources

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

This alternative proposes new impacts to EFH associated with approximately one acre adjacent to Pier C Security Dock. However, dredging at this location is proposed at a depth of no more than 10' MLLW required depth + 2' allowable overdepth. As described in the Essential Fish Habitat Assessment (see Appendix G), USAF identified that the proposed action area, including the estuarine water column, is designated as EFH for snapper-grouper and three species of sharks including the tiger shark, the black-tipped shark, and the spinner shark. No estuarine or marine emergent vegetation, tidal creeks, or oyster reefs will be directly or indirectly impacted by the Proposed Action. Alternative 1 would result in short-term, localized impacts to the water column and sub-bottom habitat such as increased turbidity, reduced dissolved oxygen, and loss of benthic communities in the dredged areas. However, these areas would return to normal once dredging activities cease. Contaminated sediments were previously identified for the inside/shoreside of Pier X South and the USAF intends to implement SCDNR recommendations, including placement of a turbidity curtain around the dredge area, to the maximum extent practicable, to protect aquatic species. Therefore, any new impacts to EFH resulting from the proposed action would be minimal.

By correspondence dated November 30, 2018, (see Appendix G), the National Marine Fisheries Service offered no EFH conservation recommendations regarding the proposed maintenance dredging activities. Based upon the information provided above, Alternative 1 would not result in significant impacts to EFH.

Alternative 2 – Existing Maintenance Dredging.

Under Alternative 2, no new dredging would occur. Maintenance dredging of the JBC channels, inside/shoreside Pier X South, and the TC dock would continue with upland placement of dredged material in the existing JBC, Clouter Creek, and Yellow House placement areas. Elimination of advance dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments in these areas that has reduced the navigable capacity of the waterway. The frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. Dredging can result in an increase in suspended sediments and turbidity. Suspended solids could adversely affect filter feeding organisms, such as shellfish, if the sediments clog their feeding and breathing equipment. However, natural events such as storms or floods can increase suspended sediments for longer periods than dredging activities and it is often difficult to distinguish between the environmental effects of dredging versus normal navigation activities or natural processes (Pennekamp et al 1996).

Alternative 2 would result in more frequent short-term, localized impacts to the water column and sub-bottom habitat such as increased turbidity, reduced dissolved oxygen, and loss of benthic communities in the high shoaling areas. However, the JBC navigation channels have been routinely dredged since the 1940s with no apparent long term effects to EFH. If contaminated sediments are present, turbidity curtains would be placed around the dredge, to the extent practicable, to reduce the potential for migration of sediments.

By correspondence dated November 30, 2018, (see Appendix G), the National Marine Fisheries Service offered no EFH conservation recommendations regarding the proposed maintenance dredging activities. Therefore impacts to EFH under Alternative 2 would be less than significant.

No Action Alternative.

Under the No Action Alternative, no dredging or placement of dredge material would occur. This would result in gradual accumulation of sediments in the navigation channel and berthing areas. This could impede navigation and result in vessel grounding, particularly in the berthing areas. The No Action Alternative would result in permanent but minor impacts on aquatic resources.

3.5 COASTAL ZONE RESOURCES

3.5.1 Affected Environment

The coastal zone environment of the proposed action is primarily estuarine waters and shorelines. Some of the shoreline is stabilized with rip rap. Although oysters are present in this area, shellfish harvesting is prohibited here. Common fish and wildlife species found in the proposed action area are described in Section 3.4.

The upland areas that will be used for materials placement are currently used for dredged material and thus, already disturbed and considered unsuitable habitat for many terrestrial species.

The USAF determined the maintenance dredging of JBC channels and berthing areas is consistent with the Certification requirements of the Coastal Zone Management Act, as well as Section 401 of the Federal Clean Water Act and the permitting requirements of R. 19-450 et Seq., 1976 SC Code of Laws. A request for coastal consistency for the Proposed Action was submitted to OCRM on August 7, 2019.

3.5.2 Environmental Consequences

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

This alternative proposes new impacts to Coastal Zone resources in the approximately one acre surrounding Pier C and advanced dredging depths of up to 4’ for two shoaling areas and the TC dock. However, the dredge depths proposed for Pier C are much shallower than the existing maintenance dredge areas and advanced dredging of high shoaling areas would ensure the navigational capacity of the waterway is maintained. Adverse impacts to water quality and other coastal resources would be avoided and minimized to the maximum extent practicable by conducting the alternative in a manner consistent with the Coastal Zone Management Program’s Dredging and Dredge Material Disposal Policies. The Action Proponent will implement appropriate best management practices to minimize the migration of sediments and implement safety measures to prevent the release of oil, tar, trash, debris and other pollutants. The action will take place in-water so that adjacent shorelines will only be minimally, indirectly impacted. Impacts to the water column and shoreline habitats are described in Section 3.3 and Appendix G (EFH Assessment), and will be short term and less than significant. No wetlands would be directly or indirectly affected. Existing upland placement areas that are already disturbed would be utilized. Dredged material with high concentrations of contaminants would be diluted or capped in the placement areas.

The preferred alternative would avoid and minimize impacts to wildlife and fisheries, although no new adverse impacts to wildlife nor fisheries are expected, as described in Section 3.4. No Geographic Areas of Particular Concern (GAPC) would be impacted. The USAF determined that Alternative 1 is consistent with the Certification requirements of the Coastal Zone Management Act, as well as Section 401 of the Federal Clean Water Act and the permitting requirements of R. 19-450 et Seq., 1976 SC Code of Laws. A coastal consistency request for

the Proposed Action was submitted to OCRM on August 7, 2019. Therefore, no significant impacts would occur to Coastal Zone Resources under Alternative 1.

Alternative 2 – Existing Maintenance Dredging.

Since this is not a new action, no new coastal zone resources would be impacted. The Alternative would avoid and minimize adverse impacts to water quality and other coastal resources to the maximum extent practicable by conducting it in a manner consistent with the Coastal Zone Management Program's Dredging and Dredge Material Disposal Policies. Best management practices to minimize the migration of sediments, and safety measures to prevent the release of oil, tar, trash, debris and other pollutants would be implemented. Elimination of advanced dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments that has reduced the navigable capacity of the waterway. This alternative would result in more frequent, temporary, and localized impacts to the water column and EFH habitats as described in Section 3.4. However, the JBC navigation channels and berthing areas have been periodically disturbed due to past and current dredging activities and the frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. Therefore, impacts to coastal zone resource under Alternative 2 would be short term and less than significant. No wetlands would be directly or indirectly affected. Existing upland placement areas would be utilized that are already disturbed and dredged material with high concentrations of contaminants would be diluted or capped in the placement areas.

The USAF determined that Alternative 2 is consistent with the Certification requirements of the Coastal Zone Management Act, as well as Section 401 of the Federal Clean Water Act and the permitting requirements of R. 19-450 et Seq., 1976 SC Code of Laws. A coastal consistency request was submitted to OCRM on August 7, 2019. Therefore, no significant impacts would occur to Coastal Zone Resources under Alternative 2.

No Action Alternative.

Under the No Action Alternative, the Proposed Action would not occur. Therefore, there would be no impacts to Coastal Zone resources.

3.6 CLIMATE CHANGE AND SEA LEVEL RISE

3.6.1 Affected Environment

According to the Intergovernmental Panel on Climate Change (IPCC), global warming and climate change have been observed since the mid-20th century and are expected to continue into the future which would contribute to a continued or possibly accelerated sea level rise. Climate change and sea level rise is largely attributed to human activities that increase atmospheric concentrations of carbon dioxide and other greenhouse gases (GHG). Executive Order 13693 Planning for Federal Sustainability in the Next Decade, was issued on March 19, 2015, with a goal of maintaining Federal leadership and sustainability in greenhouse gas emission reductions. On August 2, 2016, CEQ released *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. The guidance is applicable to all Federal actions subject to NEPA and recommends an assessment of GHG emissions as well as the effects of climate change on a proposed action and its environmental effects.

3.62 Environmental Consequences

To determine potential impacts from the proposed action, an emission inventory and forecast was generated. The EPA's "Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, Final Report" dated April 2009 provided the framework to determine air emissions for the proposed action. The detailed air emissions inventory and analysis is presented in the Air Quality Analysis (Appendix C).

Alternative 1 (Preferred Alternative) – New and Existing Maintenance Dredging.

Carbon dioxide emissions associated with fuel consumption are the primary contributor to greenhouse gas emissions associated with dredging projects. The air emissions inventory and analysis (Appendix C) evaluated carbon dioxide (CO_2) emissions associated with fuel consumption from dredge vessels and land-based equipment (dozers, excavators, and tractors) on an annual and monthly basis. Based on a 15-20 month rotation, dredging of the JBC navigational channels and berths (with the exception of the TC dock) would generate approximately 15,524 tons of CO_2 over a 10 year period with an annual average of 1,552 tons. Maintenance dredging of the TC dock on a 9-month rotation would generate approximately 2,147 tons of CO_2 over a ten year period with an annual average of 215 tons. Alternative 1 would generate an approximate annual average of 1,767 tons of CO_2 emissions representing 0.000034 percent of 2017 total U.S. CO_2 emissions. Also, JBC is committed to further minimizing CO_2 emissions by requiring dredge vessels to reduce vessel speeds. Therefore, Alternative 1 would have a less than significant effect on Climate Change.

Rising sea levels can result in changes to salinity regime (discussed under Section 3.3), shoreline erosion and recession, and inundation of low-lying areas. An increase in sea level rise could result in changes to the timing of dredging and placement of materials. For the current Charleston Harbor Deepening and Widening (Post 45) Project that proposes to deepen the Cooper River portion of the Federal navigation channel from 45 feet to 48 feet, the historical trend for sea level rise was estimated at 294 mm or 0.12 inches/year. Under Alternative 1, the Proposed Action would be short term, lasting no more than 10 years, and any effects due to sea level rise would be negligible.

Alternative 2–Existing Maintenance Dredging.

Under Alternative 2, no new impacts to Climate Change would occur. However, elimination of advanced dredging of the high shoaling areas would likely result in the need to dredge these areas on a more frequent basis than Alternative 1 (annual versus every 18 months) due to the rapid accumulation of sediments in these areas that has reduced the navigable capacity of the waterway. The frequency of the additional dredging would be dependent upon the rate at which the sediments accumulate in the high shoaling areas. While this would result in additional CO_2 emissions associated with fuel consumption from dredge vessels and land-based equipment, it would still represent only a fraction of the overall U.S. emissions. JBC is also committed to minimizing CO_2 emissions by requiring contractors to reduce the speed of dredge vessels. Therefore, impacts to Climate Change associated with Alternative 2 would be less than significant. Any effects due to sea level rise under this alternative would be negligible since the proposed action would be short term, lasting no more than 10 years, and the sea level change is only estimated to be 1.2 inches in 10 years.

No Action Alternative.

Under the No Action Alternative, the project would not occur and there would be no effect to climate change or sea level rise.

4.0 OTHER NEPA CONSIDERATIONS

4.1 Unavoidable Adverse Impacts

This EA identifies any unavoidable adverse impacts that would be required to implement the Proposed Action and the significance of the potential impacts to resources and issues. Title 40 of the Code of Federal Regulations Part 1508.27 specifies that a determination of significance requires consideration of context and intensity.

Unavoidable short-term adverse impacts associated with implementing the Proposed Action would include: a temporary increase in air emissions during the each maintenance cycle, a temporary increase in turbidity at the dredging and placement sites, and a temporary disruption of the water column and benthic community in the navigation channel with each maintenance event. However, these impacts would be temporary in nature, returning to normal following construction.

For the Proposed Action to be accomplished, these impacts would occur. The action is required in order to provide and sustain sufficient depth for navigation and berthing of military vessels that support JBC waterborne missions.

4.2 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one option may reduce future flexibility in pursuing other options, or that obligating a resource to a specific use often eliminates the possibility of other uses for that resource.
Implementing the Proposed Action is not expected to result in impacts that would reduce environmental productivity, permanently narrow the range of beneficial uses of the environment, or pose long-term risks to health, safety, or the general welfare of the public.

4.3 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be recovered or reversed. This EA identifies any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action if implemented. The short-term irreversible commitments of resources that would occur include human labor associated with dredging activities, fossil fuels that would be used to run the dredging equipment and associated vessels, and biological resources (benthic communities or other aquatic life) encountered in the navigational channel during dredging activities. No long-term irretrievable commitments of resources would result.

4.4 Cumulative Effects

This EA also considers the effects of cumulative impacts as required in 40 CFR 1508.7 and concurrent actions as required in 40 CFR 1508.25[1]. A cumulative impact, as defined by the CEQ (40 CFR 1508.7) is the "…impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such

actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

As explained in Chapter 3, implementation of the proposed action would have negligible or no impacts on Land Use, Noise, Wetlands, Floodplains, Safety and Occupational Health, Explosive Safety, Hazardous Materials and Waste, Geologic Resources, Cultural Resources, Navigation, Environmental Justice, and Socioeconomics. As such, these resources were not carried forward into the cumulative impacts analysis. Air Quality, Water Quality, Biological Resources, Coastal Zone Resources, and Climate Change/Sea Level Rise were evaluated under cumulative effects.

Past, present, and reasonably foreseeable actions announced for the region of influence for this project include:

- Joint Base Charleston has performed routine dredging along approximately 4.8 miles of the Cooper River and along approximately 0.4 miles of Goose Creek from the confluence of the Cooper River since the 1940s. The current 404 permit (SAC-2009-00175) authorizing the routine dredging will expire on March 31, 2020.
- Dredging of the Pier X South riverside/outside access channel and berthing areas was previously authorized and dredged as a 2011 modification to the existing 404 permit (SAC-2009-00175).
- The 2012 Environmental Assessment for Facilities Expansion at Nuclear Power Training Unit (NPTU) and the associated permit (SAC-2011-00715) includes dredging a 300 foot pier extension to Pier X-Ray North to moor the first replacement MTS.
- In 2018, dredging of the Pier X South shoreside/inside access channel and berthing area was evaluated under a Supplemental EA to the 2012 NPTU Expansion project.
- The USAF is currently conducting a Plant Investigative Study to determine options for controlling vegetation within a 50 foot buffer surrounding the security fencing at NPTU.
- The USAF is in the process of installation, placement and maintenance of restricted access signage along the Cooper River and associated shorelines to meet national security requirements.
- Potential future and long range projects on military lands could include wharf repairs, vehicular access improvements to the TC Dock, expansion of the rail system to Wharf Alpha, and improvements to the Grace Hopper Bridge.
- According to the most recent Berkeley County Comprehensive Plan, JBC is located within an area designated as Growth Allocation Area and is surrounded primarily by conservation and vacant lands to the north and east and single family residential to the south One potential growth area located west of the military base would be the area surrounding Red Bank Road which has been designated as a commercial corridor.
- A review of the 2017-2018 list of the federally obligated projects under the Charleston Area Transportation Study (CHATS) indicates no obligated transportation projects located in the immediate vicinity of JBC. However, the widening of Henry Brown Blvd (Phase I and II) from Liberty Hall Road to U.S. Highway 52 was previously approved and scheduled for construction in the near future. Other Department of Transportation (DOT) improvement projects identified just north of JBC include road improvements along Highway 52 and the widening of Cypress Garden Road in Moncks Corner.

For this EA analysis, these announced actions are addressed from a cumulative perspective and are analyzed in this section. Announced future actions would be evaluated under separate NEPA actions conducted by the appropriate involved federal agency. Based on the best available information for these proposals by others, the AF cumulative impact analysis does consider them.

Descriptions of the cumulative effects for the resource areas follow:

Air Quality

Any impacts to air quality resulting from construction activities would be temporary. The total increases in temporary air pollutants would be relatively minor in relation to the existing emissions in the tri-county area. Charleston, Berkeley, and Dorchester Counties are designated attainment areas. The action alternatives and any foreseeable future actions would be required to comply with federal and state air quality standards. Compliance with these standards would minimize any adverse cumulative effects of the action alternatives.

Water Quality

The identified past, present and future reasonably foreseeable actions, when combined with the effects of any of the action alternatives, could incrementally increase water turbidity and suspended sediments during dredging and dredge placement activities within the Cooper River and at upland placement sites. Since studies have demonstrated that arsenic is naturally occurring in this region due to high concentrations found in basement rock, arsenic levels above the ERL/TEL detected in sediment samples would not be expected to result in unacceptable adverse impacts to aquatic, mammalian, or wildlife resources when combined with past, present and future reasonably foreseeable actions. Also, to reduce the risk of exposure to contaminated dredge material, JBC would implement placement of a turbidity curtain around the dredge area, to the maximum extent practicable, and mix or cover contaminated dredged material with clean dredged material prior to disposal. The present and future actions are required to adhere to local, state, and federal regulations and best management practices, which are designed to limit negative impacts to water quality. Compliance of present and future projects with these regulations, combined with implementation of best management practices for the action alternatives, would minimize any adverse cumulative impacts.

Biological Resources

Direct project impacts associated with any of the action alternatives include the dredging of up to 2 million cubic yards of maintenance material annually over a 10 year period through approximately 4.8 miles of navigation channel and berthing areas. The dredging would result in temporary impacts to estuarine substrates utilized by EFH species and benthic organisms that are present at the dredging and placement sites. However, the proposed action would not have a significant individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the NMFS since benthic organisms would re-colonize the dredging areas within a few months. Indirect project impacts include potentially decreased levels of dissolved oxygen at the dredging sites as a result of turbidity. Motile organisms which use this area will relocate during construction activity. Again, these impacts would be temporary in nature, returning to normal following construction.

By letter dated October 18, 2018, the USFWS concurred with the USAF determination that the dredging activities "may affect, but are not likely to adversely affect", the West Indian manatee. Potential impacts to manatees that may occur as a result of the Preferred Alternative include injuries due to vessel collisions and dredging equipment. The USAF will implement USFWS standard protection guidelines as a conservation measure to avoid impacts to the West Indian manatee. A conclusion of "no effect" was made for the remainder of threatened and endangered species managed by the Service. Compliance with protection guidelines will ensure that any of the action alternatives, when combined with past, present and future reasonably foreseeable actions, would minimize any adverse cumulative impacts.

The USAF determined that dredging activities will have no effect on turtle species or result in the destruction or adverse modification of any federally designated critical habitat. Dredging activities may affect, but are not likely to adversely affect the Atlantic sturgeon and shortnose sturgeon species The USAF submitted an expedited request to NMFS on February 22, 2019 and is currently waiting for written concurrence. Potential direct and indirect impacts associated with dredging that may affect Atlantic and shortnose sturgeon include entrainment, injury, and/or capture by dredging activities, short-term impacts to foraging and refuge habitat, minor and short term impacts to water quality, and disruption of migratory pathways. The project area does not contain suitable habitat for sturgeon spawning or recruitment. The dredging activities would be localized and would not span the entire length or width of the channel so dredging activities would not prevent passage through migratory pathways. JBC will utilize mechanical clamshell or cutter suction dredge which would result in a low risk of injury or death to sturgeon species due to their high motility and ability to avoid the area. Impacts to water quality and foraging habitat would be short term and temporary. Therefore, past, present and future actions, when combined with the effects of any of the action alternatives, would not result in adverse cumulative impacts to sturgeon species.

Coastal Zone Resources

The Preferred Alternative would avoid and minimize impacts to water quality and other coastal resources to the maximum extent practicable by conducting the work in a manner consistent with the Coastal Zone Management Program's Dredging and Dredge Material Disposal Policies. The USAF will implement appropriate best management practices to minimize the migration of sediments and implement safety measures to prevent the release of oil, tar, trash, debris and other pollutants. The Alternative will avoid and minimize impacts to wildlife and fisheries, although no new adverse impacts to wildlife nor fisheries are expected. No Geographic Areas of Particular Concern will be impacted. The USAF determined the Preferred Alternative is consistent with the Certification requirements of the Coastal Zone Management Act, as well as Section 401 of the Federal Clean Water Act and the permitting requirements of R. 19-450 et Seq., 1976 SC Code of Laws. A coastal consistency request for the Proposed Action was submitted to OCRM on August 7, 2019. No cumulative impacts to Coastal Zone Resources are anticipated.

Climate Change/Sea Level Rise

Carbon dioxide emissions associated with fuel consumption are the primary contributor to greenhouse gas emissions associated with dredging projects. The Preferred Alternative would generate an approximate annual average of 1,767 tons of CO_2 emissions representing

0.000034 percent of 2017 total U.S. CO_2 emissions. Also, JBC is committed to further reducing CO_2 emissions by requiring dredge vessels to reduce vessel speeds which would minimize any adverse cumulative effects of the action alternatives. Effects to sea level rise were determined to be negligible.

5.0 LIST OF PREPARERS

This EA has been prepared by the U.S. Army Corps of Engineers for the U. S. Air Force.

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6.0 PERSONS AND AGENCIES CONSULTED/COORDINATED

The following Persons and Agencies were contacted in the preparation of this EA

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