



**US Army Corps
of Engineers®**

Charleston District

**ATLANTIC INTRACOASTAL WATERWAY
in SOUTH CAROLINA**

APPENDIX G: 404B1 ANALYSIS

August 2023

Clean Water Act, Section 404(b) (1) Evaluation

Maintenance Dredging of the Atlantic Intracoastal Waterway

Beaufort, Charleston, Colleton, Georgetown, and Horry Counties, South Carolina

The U.S. Army Corps of Engineers, Charleston District (USACE) is proposing to conduct maintenance dredging of the Atlantic Intracoastal Waterway (AIWW) in South Carolina. This document presents the Clean Water Act Section 404(b)(1) evaluation associated with the proposed dredging of the waterway and the placement of dredged materials necessary to maintain the federal channel.

I. PROJECT DESCRIPTION

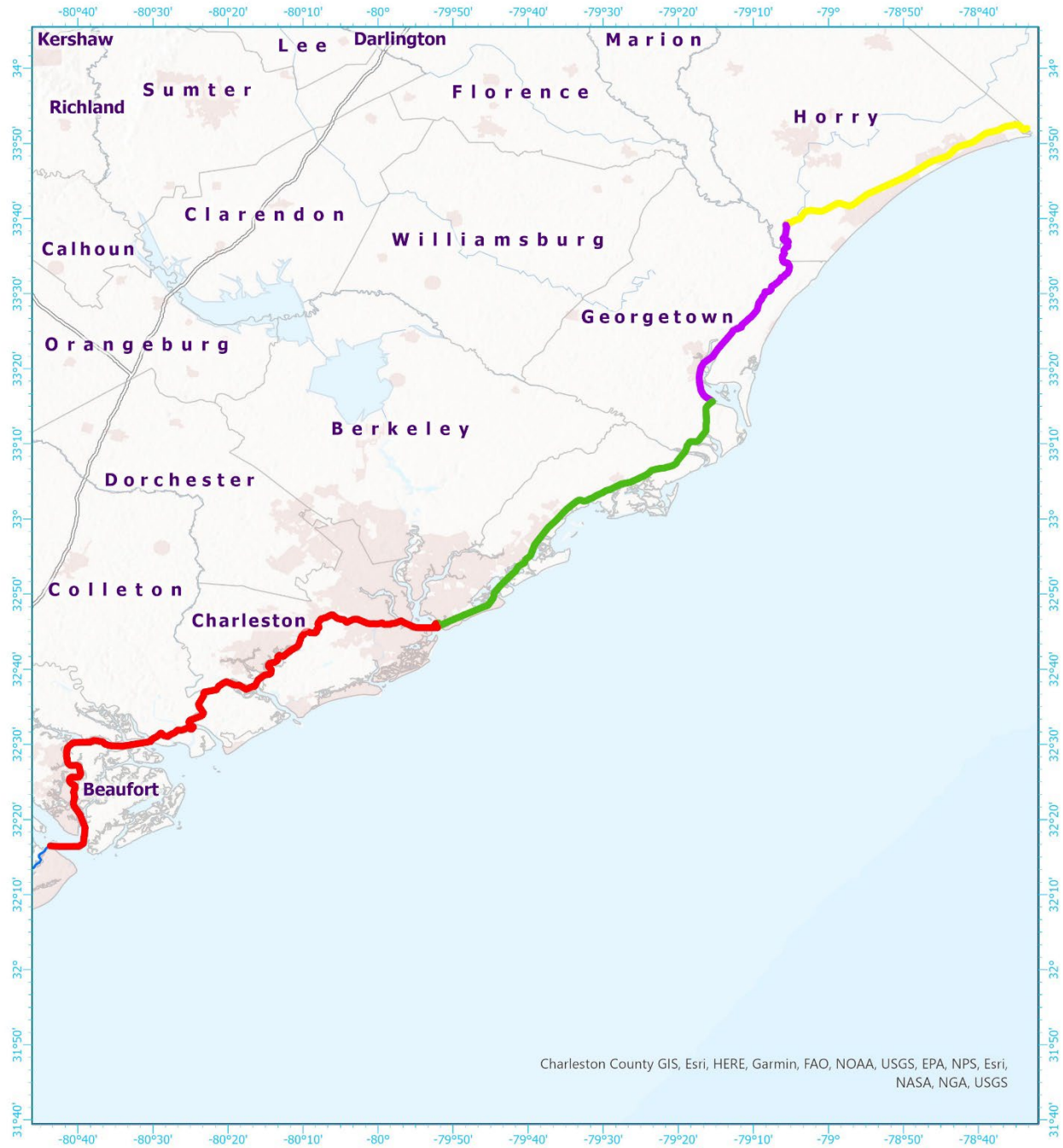
A. Location and General Description.

The AIWW extends 237 miles through the State of South Carolina (Figure 1). Charleston District maintains 212 miles of the AIWW beginning at the North Carolina – South Carolina state line above Little River Inlet and extending to Port Royal Sound near Hilton Head (Figure 1). Savannah District maintains the reach of the AIWW in South Carolina, from Port Royal Sound to the South Carolina/ Georgia state line. Throughout its length in South Carolina, the AIWW consists of a system of naturally deep estuaries, rivers, and sounds that have been connected by a series of man-made canals to provide a continuous inland navigation route.

For operation and maintenance purposes, Charleston District has divided the AIWW into three reaches; however, since a portion of Reach 1 follows the Waccamaw River and does not require dredging, Reach 1 has been further separated into two sub-reaches. The first section of this reach (1A) begins at the Little River Inlet at the North Carolina – South Carolina border and passes through the 26-mile Pine Island Cut before entering the Waccamaw River near Bucksport. The second section in this reach (1B) extends from Bucksport to Winyah Bay near Georgetown. Dredging does not occur in reach 1B.

Reach 2 begins at Winyah Bay and extends to the Charleston Harbor. From Winyah Bay, it flows through the Minim Creek canal, Four-mile Creek canal, and Alligator Creek through a land cut to McClellanville. From McClellanville, it passes through Matthews Cut, Harbor River, Graham Creek, and a land cut to Price Creek. From Price Creek, it passes north of Capers Island and through Bullyard Sound before moving north of Dewees Island and Sullivans Island and into Charleston Harbor.

Reach 3 begins at Charleston and extends 70 miles to Port Royal Sound. From Charleston Harbor, the AIWW flows through Wappo Creek and Elliott Cut and into the Stono River. From the Stono River, the waterway continues to Wadmalaw River, then passes through the Dawho River and North Creek and into the South Edisto River by way of Watts Cut. From the South Edisto River, it passes through Fenwick Cut, the Ashepoo River and the Ashepoo-Coosaw Cutoff into the Coosaw River. From the Coosaw River, it flows into Brickyard Creek and on to the Beaufort River to Port Royal Sound.



Charleston County GIS, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS, Esri, NASA, NGA, USGS

Charlie Kaufman: 2/10/2022 11:34 AM

AIWW Project Overview



1:1,219,096

0 12 24 48 Miles

- AIWW Reaches**
- Sections**
- █ Little River to Bucksport
- █ Bucksport to Winyah Bay
- █ Winyah Bay to Charleston
- █ Charleston to Port Royal
- Channel Reach
- City Limits
- Counties



Figure 1. Location of Atlantic Intracoastal Waterway in SC

B. Authority and Purpose.

The AIWW in South Carolina was authorized to its current dimensions under the Rivers and Harbors Act of 1937. The earliest authorization for the South Carolina portion of the Atlantic Intracoastal Waterway can be found in the Rivers and Harbors Act of 3 March 1881. This act authorized a 7 x 200-foot cut across the Ashley River bar and a 6 x 60-foot land cut between Wappoo Creek and the Stono River. Prior to 1937, the AIWW within South Carolina was treated as three separate projects with independent authorizations. Within Charleston District, the three segments of the AIWW are still referred to by their original names: Little River to Winyah Bay, Winyah Bay to Charleston Harbor, and Charleston to Port Royal.

The authorized project provides for a waterway 12 feet deep at mean low water and not less than 90 feet wide, extending from the North Carolina/South Carolina line at Little River to and including Port Royal Sound, with a branch channel of the same dimensions to McClellanville, a total distance of 212 miles; for the construction of three bridges crossing the waterway in Horry County; and or an anchorage basin 125 feet wide, 335 feet long, and 12 feet deep near Myrtle Beach. The three bridges were completed in 1936 and the waterway was completed in 1940. The anchorage basin was never completed and was deauthorized by the Water Resources Development Act of 1986.

C. Alternatives Considered.

For reference, Section 404(b)(1) guidelines of the Clean Water Act require that “except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.” The 404(b)(1) guidelines consider an alternative practicable “if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.”

In accordance with the National Environmental Policy Act (NEPA) and USACE guidance, two alternatives were reviewed: the Proposed Alternative and the No Action Alternative.

The proposed alternative involves continued Operations and Maintenance (O&M) activities, including beneficial use (BU) placement, for the AIWW Federal Navigation Channel. Maintenance dredging would be conducted using a cutterhead suction dredge with transport by pipeline to approximately 90 existing dredge material management sites (DMMA), two existing open water sites, and beneficial use (BU) placement in the nearshore and beaches of Sullivan’s Island and Isle of Palms.

D. General Description and Quantities of the Dredged or Fill Material.

1) General Characteristics and Source of Material

The *2023 Sediment Sampling and Analysis, Atlantic Intracoastal Waterway, SC* report analyzed 20 composite samples collected in 2021 from various locations along the waterway. Figure 2 depicts the locations and physical analysis of the 20 composite samples. Additional information is provided in Appendix H of the EA.

Material proposed for BU placement along the nearshore and beaches of Sullivan’s Island and Isle of Palms would either be dredged from the waterway or excavated from five existing dredged material management sites (DMMA). In 2021, 5 in-water sediment samples were collected in the Breach Inlet shoal location of the waterway. Physical analysis of these samples identified over 85% sands in two of the five samples. In 2023, 13 composite samples each were

collected from 5 DMMA's located near Breach Inlet. The physical analysis of these samples indicates that 4 of the 5 DMMA's contain predominately fine sand.

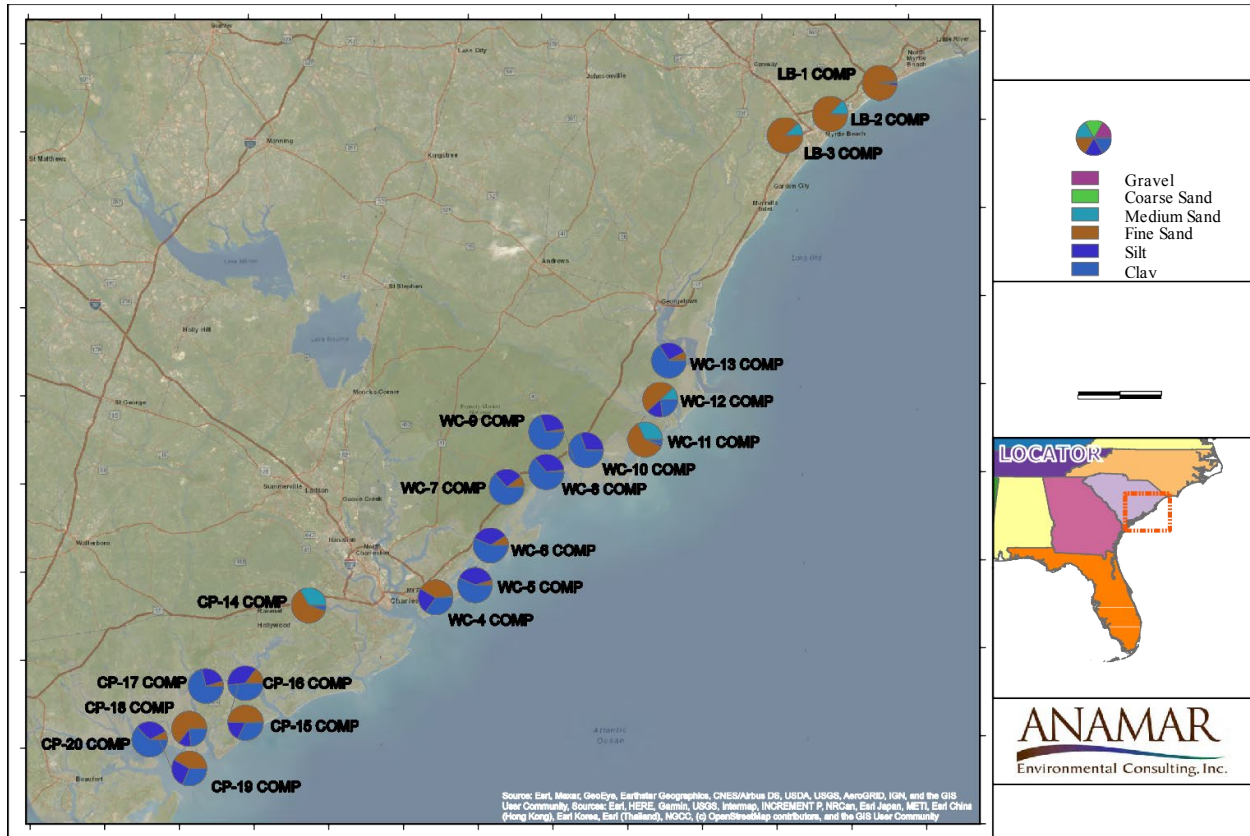


Figure 2. Sediment Sample Locations and Physical Characteristics

2) Quantity of Material

Table 4 in Section 2.4 of the EA provides estimated dredging locations, dredging frequency, dredging quantities, and the proposed discharge sites.

E. Description of the Discharge Site

Placement locations include the existing 90 DMMA's, two open water sites, and the beaches and nearshore areas of Sullivan's Island and Isle of Palms. DMMA's are located adjacent to the waterway and contain a dike system that provides a settling basin allowing consolidation of the dredged materials with effluent returned to the waterway via weir structures. Nearshore placement typically occurs from about the 8' MLLW contour landward. Beach placement would occur along the backshore (landward from the normal high tide line) and foreshore (between the normal high tide line and the normal low tide line) and would require earthmoving equipment on the beach. Open water sites are located at Dewees Inlet and the North Edisto River. The Dewees Inlet site is approximately 15.1 acres. The North Edisto River site is approximately 20.4 acres. Dredged materials would not be discharged into wetlands.

F. Description of Disposal Method

Sediments dredged from the waterway would be hydraulically pumped via pipeline to the DMMA's, open water placement sites, and the beaches and nearshore areas of Sullivan's Island and Isle of Palms.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations

(1) *Substrate Elevation and Slope*

Dredged materials discharged to the open water placement sites in Dewees Inlet and the N. Edisto River would be dispersed by the currents and would have no long-term effects on substrate elevation or slope. For nearshore placement, dredged material of at least 60% sand would be placed at a depth of 8 feet MLLW, forming shallow, longshore berms. Sandy materials placed in the nearshore would be transported landward by the currents. BU placement is intended to restore beach areas lost to erosion from past storms and would provide a beneficial effect on beach elevations and slope.

(2) *Sediment Type*

Sediment types dredged from the waterway vary by location and include fine and medium sands, silts, and clays. Sediments placed on the beaches of Sullivan's Island and Isle of Palms would contain a minimum 80% sand content and nearshore placement would require a minimum 60% sand content. Dredged sediments containing less than 60% sand content would be placed in the existing DMMA's and open water sites.

(3) *Dredged/Fill Material Movement*

Materials deposited in open water sites would be dispersed by the currents. Sandy materials placed in nearshore areas would be transported landward by the currents.

(4) *Physical Effects on Benthos*

Open water placement of dredged materials is expected to have minimal detrimental effects on benthic macrofauna due to tidal currents which rapidly disperse moderate amounts of sediments. Beach placement activities would result in temporary, localized loss of less motile intertidal species through direct burial, or changes in the sand grain size. These effects should be minor, with recovery expected to begin within 6 months post construction. Nearshore placement should have minimal effects on benthic organisms since most species occupying the surf/swash zone are well adapted to the high energy environment.

B. Water Circulation, Fluctuation and Salinity Determinations.

(1) *Water Column*

(a) **Salinity.** The confined placement areas for the AIWW are located adjacent to the waterway and the effluent from the DMMA's discharges to the waterway. The amount of effluent that would be discharged would be insignificant compared to the volume of water in the AIWW and would not result in changes to salinity. There are no anticipated impacts to salinity associated with open water placement of dredged materials at Dewees Inlet, North Edisto River or the nearshore of Sullivan's Island and Isle of Palms.

(b) **Water Chemistry.** There are no anticipated impacts expected to water chemistry.

(c) **Clarity and Color.** Discharge of dredged sediments into open waters could temporarily affect clarity and color due to increases in turbidity. These effects are

expected to be temporary and minor. Effluent from DMMA's is visually monitored to ensure the discharge meets water quality standards.

- (d) **Odor.** Placement of dredged material is not expected to result in changes to odor.
- (e) **Taste.** Not applicable. The waterway is not used as a drinking water resource.
- (f) **Dissolved Gas Levels.** The discharge of dredged materials into open water placement sites could result in temporary changes to dissolved oxygen levels due to increased turbidity. These changes would be localized and minor. Nearshore placement would involve the discharge of dredged materials via pipeline from the beach into the surf/swash zone and would result in temporary and negligible effects on dissolved oxygen levels due to the high energy wave action in this environment.
- (g) **Nutrients.** The discharge of dredged materials into open waters would have no effect on nutrients.
 - (i) **Eutrophication.** Eutrophication is typically attributed to an overabundance of nitrogen and phosphorus in water. The discharge of dredged materials into open and nearshore waters would not contribute to eutrophication.

(2) *Current Patterns and Circulation*

- (a) **Current Patterns and Flow.** Effluent discharge from the DMMA's would be insignificant compared to the volume of water in the AIWW and would therefore have negligible effects on patterns and flow. Discharge of dredged material into nearshore and open waters is not expected to alter current patterns or obstruct flows. Strong currents would be expected to quickly disperse moderate amounts of dredged sediments.
- (b) **Velocity.** Hydraulic pumping of dredged materials via pipelines to open and nearshore waters is expected to have minimal effects on water velocities.
- (c) **Stratification.** Discharge of dredged materials into open and nearshore waters is not expected to result in changes to stratification.
- (d) **Hydrologic Regime.** Discharge of dredged materials into open and nearshore waters is not expected to alter the hydrologic regime of the receiving waterbodies.

(3) *Normal Water Level Fluctuations and Salinity Gradients*

The discharge of dredged material into nearshore and open waters would not result in prolonged periods of inundation, or exaggerated extremes of high and low water, and therefore, would not alter salinity gradients.

C. Suspended Particulate/Turbidity Determinations.

(1) *Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site*

The discharge of dredged material will result in minor increases in suspended particulate and turbidity levels. These effects are expected to be temporary and localized.

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

- (a) **Light Penetration.** Discharge of dredged materials will temporarily reduce light penetration due to an increase in suspended sediments in the water column.
- (b) **Dissolved Oxygen.** The discharge of dredged materials into open water placement sites could result in temporary changes to dissolved oxygen levels due to increased turbidity. These changes would be localized and minor. Nearshore placement would result in temporary and negligible effects on dissolved oxygen levels due to the high energy wave action in this environment.
- (c) **Toxic Metals, Organics, and Pathogens.** The 2023 *Sediment Sampling and Analysis, Atlantic Intracoastal Waterway, SC* report analyzes 20 composite samples collected from the waterway in 2021. Chemical analysis of the composites samples indicates waterway sediments are within acceptable levels for toxic metals, organics, and pathogens.
- (d) **Aesthetics.** Visual resources would be temporarily affected during O&M activities.

(3) *Effects on Biota*

- (a) **Primary Production & Photosynthesis.** Primary production and photosynthesis may decrease temporarily during the discharge of dredged material into open waters associated with turbidity increases; however, effects would be minor, and conditions should return to normal shortly after activities cease.
- (b) **Suspension/Filter Feeders.** The discharge of dredged material into open waters may result in a decrease in dissolved oxygen levels and an increase in suspended solids, which could cause minor impacts to filter feeders. These impacts would be temporary, and conditions should return to normal once construction is complete.
- (c) **Sight Feeders.** Turbidity levels would be elevated during the discharge of dredged materials into open waters; however, most sight feeders are transient therefore, adverse impacts should be temporary and minimal.

D. Contaminant Determinations

The 2023 *Sediment Sampling and Analysis, Atlantic Intracoastal Waterway, SC* report indicates waterway sediments are within acceptable levels for contaminants, therefore the discharge of dredged sediments into open and nearshore waters would not introduce, relocate, or increase contaminants in these areas. Effluent discharge from DMMA's would not introduce, relocate, or increase contaminants in the waterway.

E. Aquatic Ecosystem and Organism Determinations

1) *Effects on Plankton*

The project is not expected to result in significant adverse effects to plankton since the placement of dredged material into open waters would not alter temperature or salinity or

increase nutrient concentrations. To avoid periods of peak larval recruitment, USACE intends to adhere to NMFS recommended time of year restrictions, as practicable.

(2) *Effects on Benthos*

Discharge of dredged material along the beaches would result in temporary and localized impacts to benthos through burial and changes in sediment grain size distribution. These effects should be minor, with recovery expected to begin within 6 months post construction. Nearshore placement should have minimal effects on benthic organisms since most species occupying the surf/swash zone are well adapted to the high energy environment. Open water placement would have negligible effects on benthic communities due to the currents ability to rapidly disperse moderate amounts of sediment.

(3) *Effects on Nekton*

Motile aquatic species are expected to avoid the area during disposal of dredged material so direct impacts such as burial would not be likely. Indirect effects such as turbidity may benefit decapod species by reducing predator foraging.

(4) *Effects on Aquatic Food Web*

Reductions in primary productivity from turbidity would be temporary and localized in the open water and nearshore placement sites; however benthic organisms would be expected to recolonize quickly. No long-term adverse impacts to higher trophic level organisms or the food web are expected.

(5) *Effects on Special Aquatic Sites.*

(a) **Sanctuaries and Refuges.** The project is near or adjacent to several estuarine sanctuaries and wildlife refuges including Sandy Island, North Inlet/Winyah Bay, and the ACE basin; however, the project will have no effect on these areas.

(b) **Wetlands.** No discharge of dredged material will occur in wetlands.

(c) **Mud Flats.** No discharge of dredged material will occur in mud flats.

(d) **Vegetated Shallows.** Not applicable.

(e) **Coral Reefs.** Not applicable.

(f) **Riffle and Pool Complexes.** Not applicable.

(6) *Threatened and Endangered Species*

Suitable habitat is likely present within the project area for Atlantic sturgeon, shortnose sturgeon, West Indian manatee, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, seabeach amaranth, piping plover, rufa red knot, and loggerhead sea turtle. Proposed critical habitat for the rufa red knot is also present in the action area.

USACE has determined that the project may affect but is not likely to adversely affect the Western Indian manatee, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and seabeach amaranth, or adversely modify rufa red knot proposed critical habitat. Beneficial use placement along the beaches and nearshore of Sullivan's Island and Isle of Palms may result in temporary adverse effects on piping plover, rufa red knot,

and the loggerhead sea turtle during construction; however, long-term, nearshore placement of dredged materials would restore beach areas, providing additional foraging and nesting habitat for these species. There would be no effect on the Northern long-eared bat, Bachman's warbler, Eastern black rail, red-cockaded woodpecker, monarch butterfly, American chaffseed, Canby's dropwort, or pondberry.

Per Section 7 of the ESA, USACE submitted a biological assessment to FWS on 27 March 2023. To reduce the likelihood of adverse impacts to listed species, USACE intends to adhere to all protective measures provided in the BA. USACE is currently in consultation with FWS.

Species under the jurisdiction of NMFS include Atlantic sturgeon, shortnose sturgeon, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle and whale species. Maintenance dredging and placement activities, including beneficial use activities, are covered under the 2020 South Atlantic Regional Biological Opinion (SARBO). USACE intends to adhere to all applicable project design criteria per the 2020 SARBO; therefore, additional consultation with NMFS under ESA is not required.

(7) *Other Wildlife*

The discharge of dredged material could result in temporary and minor impacts to fish and wildlife resources. During open water placement activities, marine mammals and fish species are likely to avoid the area and return once activities cease. To reduce the risk of impacts to manatees, standard manatee safety conditions would be implemented. Beneficial use placement activities could also result in temporary and localized impacts to foraging habitat for shorebird species through the loss of benthic organisms. These effects would be temporary, and conditions should return to normal once activities cease.

F. Proposed Disposal Site Determinations

(1) *Mixing Zone Determination*

The discharge of dredged material would occur in two open water locations: the North Edisto River and Dewees Inlet. Material would be dispersed into open waters via pipeline at adequate depths to avoid environmental impacts. For N. Edisto, materials would not discharge above 20 feet mean low water. Sediment testing of the waterway indicates waterway sediments are within acceptable levels for contaminants.

(2) *Determination of Compliance with Applicable Water Quality Standards*

The project will comply with all applicable state water quality standards.

(3) *Potential Effects on Human Use Characteristics*

The project is not expected to result in long term adverse effects to human use characteristics. Placement along the beaches and nearshore could temporarily disrupt recreation activities during construction; however, work is expected to occur in the fall and winter when the area would be less crowded. BU placement is expected to restore beach areas lost to erosion, which would have a long-term positive effect on human use characteristics.

- (a) **Municipal and Private Water Supply.** The project would have no effect on municipal or private water supplies.
- (b) **Recreational and Commercial Fisheries.** The discharge of dredged material could result in temporary impacts to recreational and commercial fisheries; however, the effects would be minor, and conditions would be expected to return to normal post construction.
- (c) **Water Related Recreation.** Water related recreation will be temporarily impacted during O&M activities; however, maintenance of the waterway will provide safe navigation for recreational vessels.
- (d) **Aesthetics.** Discharge of dredged material into nearshore and beach areas could temporarily alter aesthetics during placement; however, BU placement would improve aesthetics for Sullivan's Island and Isle of Palms in the long-term. Open water discharge of dredged material would result in temporary and minor impacts to aesthetics.
- (e) **Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.** The project area is near several Heritage Trust sites (Capers Island Heritage Preserve, Buzzards Island Heritage Preserve, Fort Frederick Heritage Preserve), state parks (Myrtle Beach state park), state wildlife refuges (Sandy Island), and estuarine sanctuaries (North-Inlet/Winyah Bay and ACE Basin); however, the discharge of dredged material would not result in any long-term adverse impacts to these areas.

G. Determination of Secondary and Cumulative Effects on the Aquatic Ecosystem.

The proposed alternative would include discharge of dredged material into 90 existing DMMA's which would not contribute cumulative adverse effects associated with O&M activities for the waterway. Since sediment testing indicates waterway sediments are within acceptable levels for contaminants, there is no expected secondary impacts associated with leaching of materials discharged into the DMMA's. Secondary impacts associated with disposal of dredged material for beneficial use would be considered positive. The project would have no incremental impacts that, when considered with past, present, and reasonably foreseeable future projects, would result in major cumulative impairment of the environment, or interfere with the productivity and water quality of the existing aquatic ecosystem.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE.

- a. No significant adaptation of the Section 404(b)(1) guidelines was made relative to this evaluation.
- b. There are no practicable alternatives that would have less adverse impact on the aquatic ecosystem.
- c. The proposed plan described in this evaluation would not cause or contribute to violations of any known applicable state water quality standards.

- D.** The continued maintenance activities and BU placement will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.
- E.** The proposed project will not result in significant adverse effects on human health and welfare, recreational and commercial fishing, plankton, fish, shellfish, wildlife, special aquatic sites, or overall ecosystem diversity, productivity, and stability.
- F.** The composition of the dredged material would not contribute organics or pollutants to the aquatic environment. All responsible precautions will be taken to prevent hazardous materials discharge from all activities and equipment.
- G.** Appropriate steps to minimize potential adverse impacts from the proposed action will be implemented.
- H.** The proposed disposal sites for the discharge of dredged or fill material are specified as complying with the requirements of the Clean Water Act Section 404(b)(1) guidelines, with the inclusion of appropriate and practical conditions to minimize adverse effects on the aquatic ecosystem.

Robert W. Nahabedian
Lieutenant Colonel, U.S. Army
Commander and District Engineer