



DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE

**DRAFT ENVIRONMENTAL
ASSESSMENT (EA) for
MAINTENANCE DREDGING OF AN INNER
SHOAL of the MURRELLS INLET FEDERAL
NAVIGATION PROJECT**

Prepared by:
United States Army Corps of Engineers
Charleston District
July 15, 2016



FINDING OF NO SIGNIFICANT IMPACT

MAINTENANCE DREDGING of the MURRELLS INLET FEDERAL NAVIGATION PROJECT

Background

Authorized in 1971 and constructed between 1977 and 1981, the Murrells Inlet Navigation Project consists of two jetties, a deposition basin, an entrance channel, two inner channels and a turning basin. The initial project provided for an Entrance Channel 300 feet wide, 10 feet deep and extends 3,900 feet from -12-foot ocean contour. Inner Channel A is 200 feet wide, 10 feet deep and extends from the entrance channel to the mouth of Main Creek, approximately 2000 feet. Inner Channel B is 90 feet wide, 8 feet deep and extends to an old Army crash boat dock where it terminates with a turning basin 300 feet long and 150 feet wide. The Auxiliary Channel is 200 feet wide, 10 feet deep and is approximately 1000 feet long. The Entrance Channel is stabilized by ocean jetties extending seaward 3,445 feet and 3,319 feet on the north and south sides of the Inlet, respectively (Figure I). The north jetty was constructed with a weir section at the north end to allow for passage of sediment within the littoral drift traveling essentially between the shoreline and the -4-foot contour. Inside the north jetty is a deposition basin that has the capacity to hold up to 600,000 cubic yards of material. The project resulted in approximately 1,103,300 cubic yards being initially excavated.

The project also authorized routine maintenance of the federal channel. Historically, past maintenance was limited to the entrance channel, the depositional basin, Inner Channel A and the upper reaches of Inner Channel B. The materials that were excavated with both initial construction and previous maintenance efforts was used to either enhance the storm damage reduction project on Garden City Beach or placed within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty. The material placed on Huntington Beach State Park served to restore shorebird habitat and provide protection for the jetty. The impacts of the previous maintenance projects are addressed in a 2001 Environmental Assessment completed by the US Army Corps of Engineers.

Proposed Action

The proposed action includes excavating 25,000 yd³ of material from a one and eight tenths acre reach of the Murrells Inlet Federal Navigation Channel near Marlin Quay Marina (Inner Shoal C). The material will be excavated by hydraulic pipeline cutterhead dredging and placed within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty. Testing of the proposed dredged material shows that it consists of approximately 78% fine sands and contains no pollutants in sufficient concentrations that would pose either a human health or environmental risk. The placed material will be used to protect the terminal end of the south jetty and to restore shorebird habitat.

Purpose and Need

The purpose and need of this project is to provide safe navigation for existing and prospective vessel traffic and reestablishing and maintaining a safe navigation channel. Shoals have accumulated in areas within the channel and are impacting navigation. The findings of the 2001 EA are still considered valid, and this EA serves to evaluate a shoal that had not previously been covered under NEPA and other environmental compliance.

Preferred Alternative and No-Action Alternative

The preferred alternative involves the removal of approximately 25,000 yd³ of material from a one and eight tenths acre reach of the Federal Channel near Marlin Quay Marina (Inner Shoal B) and placing the dredged material within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty.

Under the no-action alternative, passage through the Murrell's Inlet Federal Navigation Channel will further deteriorate as sand deposition continue, further impeding vessel traffic. Additionally, long term erosion will continue to threaten the integrity of the terminal end of the south jetty and degrade the existing shorebird habitat.

Consequences

The EA evaluated potential effects on land use, aesthetics and visual resources, air quality, noise, water resources, biological resources, cultural resources, socioeconomics, traffic and transportation, and hazardous and toxic substances. The predicted effects on evaluated resource areas resulting from the proposed project are shown in the Table below. The table provides a summary and comparison of the effects of the Preferred Alternative versus the No-Action Alternative.

Summary of Potential Environmental and Socioeconomic Consequences		
Resource	Preferred Alternative	No-Action Alternative
Climate	No Effect	No Effect
Land Use	No Effect	No Effect
Plankton	Minor, Temporary	No Effect
Nekton	Minor, Temporary	No Effect
Benthos	Minor, Temporary	No Effect
Other Animals	Minor, Temporary	No Effect
Tidal Marsh	Minor, Temporary	No Effect
Sand and Mud Flats	Minor, Temporary	No Effect
Water Classification	Minor, Temporary	No Effect
Clean Water Act	Minor, Temporary	No Effect
TMDL	Minor, Temporary	No Effect
Sediment	Minor, Temporary	No Effect
Terrestrial Resources and Wildlife	No Effect	No Effect
Air Quality and Noise	Minor, Temporary	No Effect
Cultural Resources	No Effect	No Effect
Endangered Species	*	No Effect
Hazardous Toxic and Radioactive Waste	No Effect	No Effect
Commercial Fishing	Minor, Temporary	Minor Adverse
Commercial Shellfish Harvesting	Minor, Temporary	No Effect
Overall Economic Value	Minor, Temporary	No Effect
Recreational Fishing	Minor, Temporary	Minor Adverse
Recreational Shellfish Harvesting	Minor, Temporary	No Effect
Recreational Boating	Minor, Temporary	Minor Adverse
Other Recreational Opportunities	Minor, Temporary	No Effect
Aesthetics	Minor, Temporary	No Effect

*Depending on species; no affect, may affect, and not likely to adversely affect are the determinations

Cumulative Effects

The project will have only temporary and minor effects on environmental resources, however, due to the size of the project and the use of the excavated material, the overall cumulative impacts are minimal, but beneficial.

Conclusions

Implementing the preferred alternative would not be expected to have any significant effects on the quality of the natural or human environment.

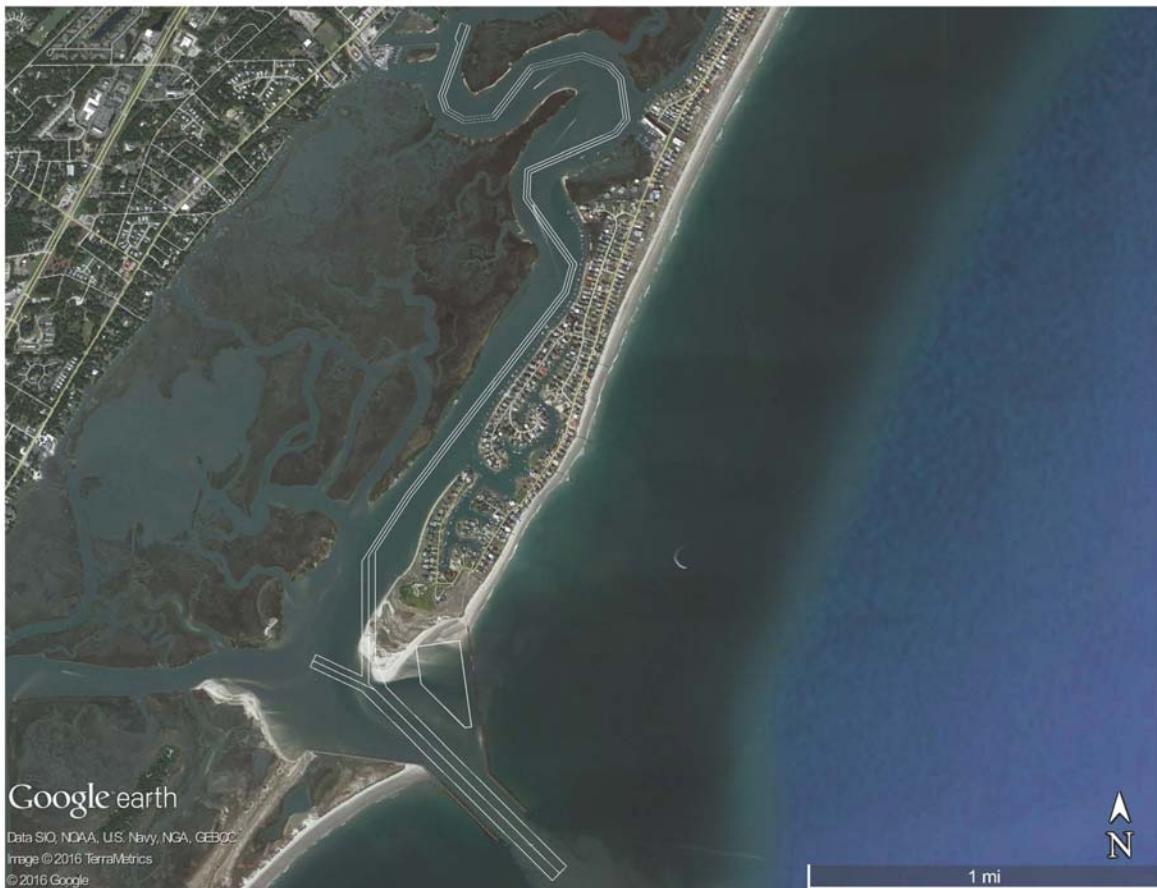


Figure I. Murrells Federal Navigation Channel Project

Table of Contents

1.1 Description of Document	3
1.2 Project Authorization	3
1.3 Background and Description	3
1.4 Purpose and Need.....	5
1.5 Incorporation by Reference	6
CHAPTER 1 ALTERNATIVES	6
2.1 Proposed Action	6
2.2 Alternative 1: Deposition of Material in a Confined Disposal Facility (CDF)	6
2.3 Alternative 2: Upland Storage and Dewatering.....	7
2.4 Alternative 3: Using the Dredged Material for Beneficial Use (Preferred Alternative)	7
2.5 No Action Alternative	9
2.6 Alternative Analysis	9
CHAPTER 2 ENVIRONMENTAL SETTING AND CONSEQUENCES.....	10
3.1 Project Location.....	10
3.2 Climate	10
3.3 Land Use	10
3.4 Water Resources and Aquatic Habitat.....	11
3.4.1 Open Water	11
3.4.2 Plankton.....	11
3.4.3 Nekton	12
3.4.3 Benthos.....	12
3.4.4 Other Animals	13
3.4.5 Tidal Marsh	13
3.4.6 Sand and/or Mud Flats.....	14
3.5 Water Quality.....	15
3.5.1 Water Classification	15
3.5.2 TMDL	15
3.5.4 Sediment.....	16
3.6 Terrestrial Resources and Wildlife.....	18
3.7 Air Quality and Noise.....	19
3.8 Cultural Resources	20
3.9 Endangered Species	20
3.10 Hazardous Toxic and Radioactive Waste (HTRW)	23
3.11 Socioeconomics.....	23
3.11.1 Commercial Fishing	23
3.11.2 Commercial Shellfish Harvesting.....	24
3.11.3 Overall Economic Value	24
3.14 Recreation	25
3.14.1 Recreational Shellfish Harvesting.....	25
3.14.2 Recreational Fishing.....	26
3.14.3 Recreational Boating.....	26

3.14.4 Other Recreational Opportunities	27
3.15 Aesthetics.....	27
CHAPTER 3 CUMULATIVE IMPACTS.....	28
CHAPTER 4 COORDINATION	29
Clean Water Act	29
Clean Air Act	29
Endangered Species Act	29
Farmland Protection Policy Act.....	29
Fish and Wildlife Coordination Act	30
Floodplain Management (EO 11988)	30
Protection of Wetlands (EO 11990)	30
National Wild and Scenic Rivers	30
National Historic Preservation Act (NHPA).....	30
Coastal Zone Management Act.....	30
CHAPTER 5 REFERENCES.....	30

Appendices

APPENDIX A:	Cultural Resources Map
APPENDIX B:	Map of Shellfish Grounds, Murrells
APPENDIX C:	404(b)(1) Analysis

INTRODUCTION

1.1 Description of Document

This Environmental Assessment (EA) has been prepared by the U.S. Army Corps of Engineers, Charleston District (Corps) in compliance with the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321- 4370f, and its implementing regulations, 40 C.F.R. §§ 1500-1508, and 33 C.F.R. Part 230, to evaluate the proposed excavation of material from a reach of the Murrells Inlet Federal Navigation Channel and the placement of that material on Huntington Beach State Park.

1.2 Project Authorization

The project was authorized by the House Committee on Public Works on 10 November 1971 and the Senate Committee on Public Works on 18 November 1971, under authority of Section 201, P.L. 89-298, and 1965 Flood Control Act. Section 67 of the Water Resources Act of 1974 authorized interim maintenance to permit free and safe movement of vessels until the authorized project was completed. The project construction initiated in September 1977 and completed in August 1981. The project also authorized channel maintenance.

1.3 Background and Description

Murrell's Inlet is located on the Atlantic coast in Georgetown County, South Carolina (SC), approximately 80 miles north of Charleston, SC and 12 miles south of Myrtle Beach, SC. The Inlet is located between the south end of Garden City Beach and the north end of Huntington Beach State Park (Figure 1).

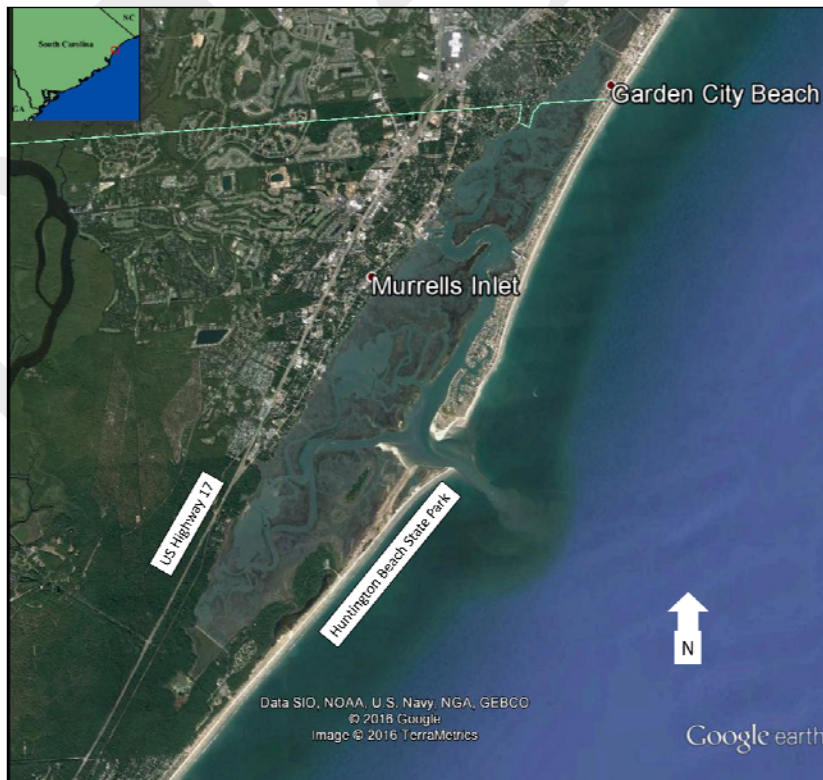


Figure 1. Murrells Inlet

The project authorized the construction of two jetties and the construction of a deposition basin, an entrance channel, two inner channels and a turning basin. The initial project provided for an Entrance Channel 300 feet wide, 10 feet deep and extends 3,900 feet from –12-foot ocean contour (Figure 2). Inner Channel A is 200 feet wide, 10 feet deep and extends from the entrance channel to the mouth of Main Creek, approximately 2000 feet. Inner Channel B is 90 feet wide, 8 feet deep and extends to an old Army crash boat dock where it terminates with a turning basin 300 feet long and 150 feet wide. The Auxiliary Channel is 200 feet wide, 10 feet deep and is approximately 1000 feet long. The Entrance Channel is stabilized by ocean jetties extending seaward 3,445 feet and 3,319 feet on the north and south sides of the Inlet, respectively. The north jetty was constructed with a weir section at the north end to allow for passage of littoral drift traveling essentially between the shoreline and the –4-foot contour. Inside the north jetty is a deposition basin that has the capacity to hold up to 600,000 cubic yards of material. The project resulted in approximately 1,103,300 cubic yards being initially excavated.

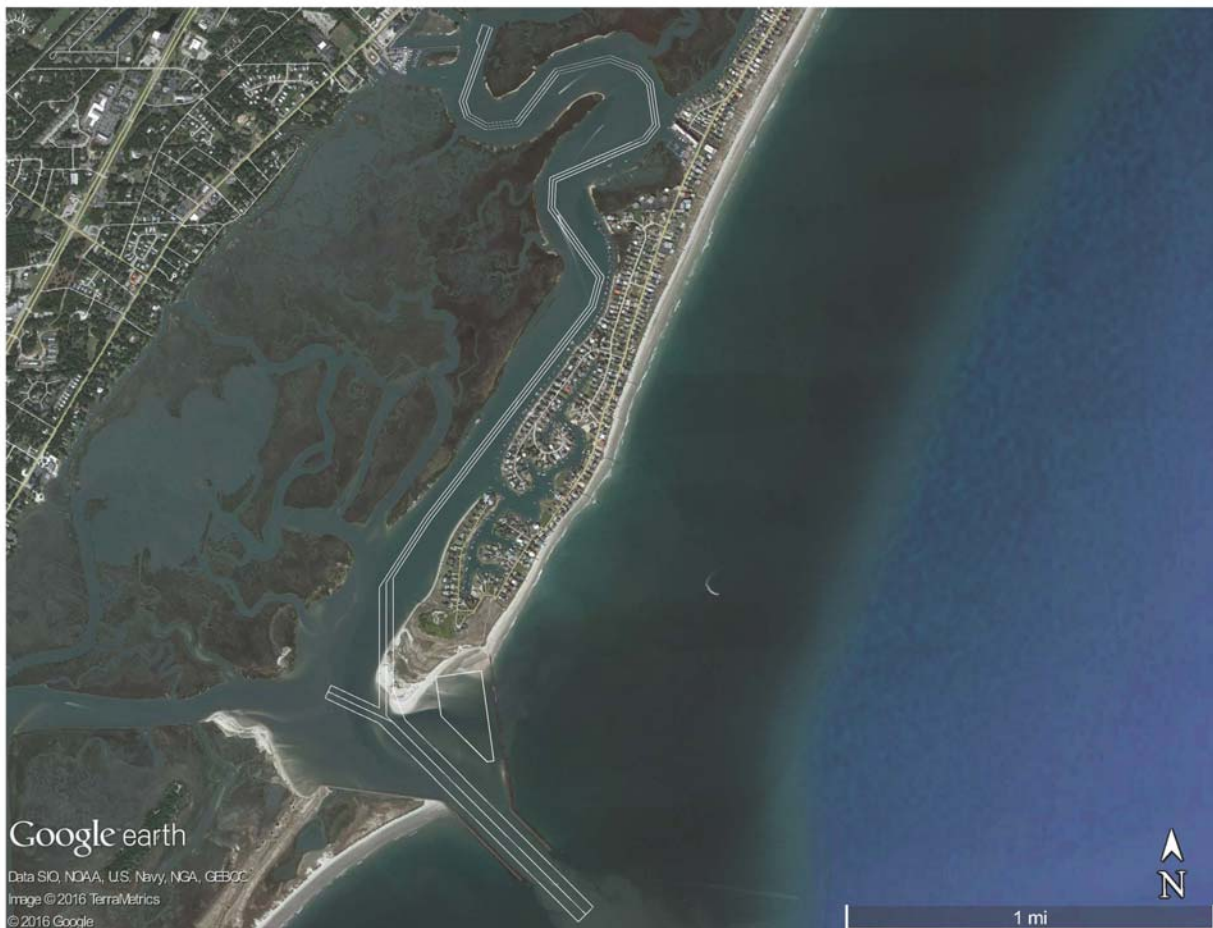


Figure 2. Murrells Inlet Federal Navigation Project

The project also authorized regular operation and maintenance (O&M) dredging, with disposal of material on Garden City Beach and Huntington Beach State Park. The last dredging was conducted in 2002, when approximately 680,000 cubic yards of material was dredged from both the entrance channel and deposition basin and placed on Garden City Beach and Huntington Beach State Park. Maintenance dredging has been previously performed in 1988 and 2001.

1.4 Purpose and Need

The purpose of this Project is to provide safe navigation for existing and prospective vessel traffic by maintaining a safe navigation channel from the 12-foot contour in the open ocean to the village of Murrell's Inlet. Shoals have accumulated in areas within the channel and are impacting navigation. Portions of the entrance channel, inner channels A and B, and the deposition basin (Figure 2) will be dredged with the material being placed either on Garden City Beach or Huntington Beach State Park, respectively.

The proposed action is being undertaken in conjunction of other maintenance dredging actions within Murrells Inlet that include dredging of the entrance channel, inner shoal, and the depositional basin, as seen in Figure 3. Therefore, this Environmental Assessment will address only the impacts from dredging approximately 25,000 yd³ of material from a one and eight tenths acre reach of the Federal Channel near Marlin Quay Marina (Inner Shoal B) and placing the dredged material within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty (Figure 3). The impacts resulting from dredging the entrance channel, the deposition basin, Inner Channel A are addressed in the 2001 Environmental Assessment and the 1976 Environmental Impact Statement.

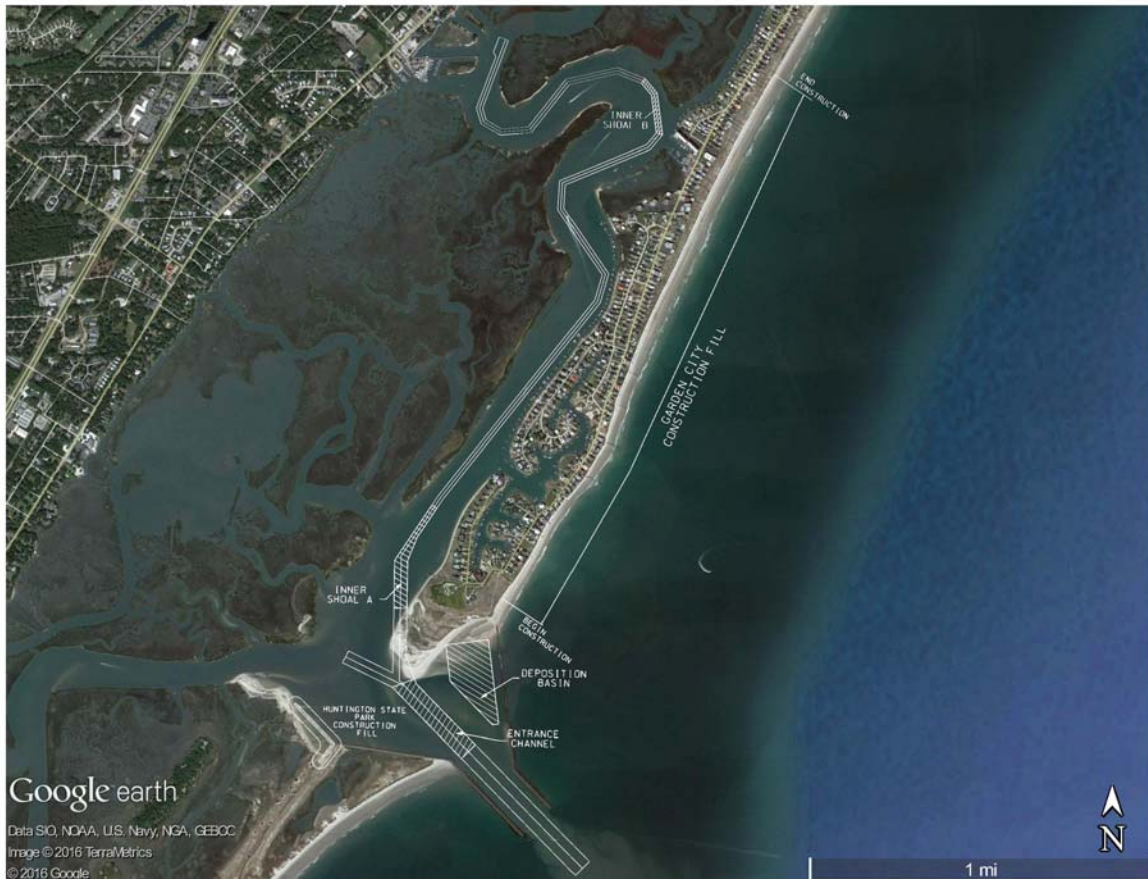


Figure 3. Overview of Other Actions being initiated in Murrells Inlet

1.5 Incorporation by Reference

In addition to addressing the impacts of dredging the new shoal new Marlin Quay Marina and the placement on Huntington Beach State Park, this document is intended to communicate new environmental information and update the coordination between a number of Federal and State regulatory agencies. All other findings from the aforementioned documents are still valid, however are not reiterated in this EA. Specific details for the project are provided in the following reports and are hereby incorporated by reference in accordance with NEPA:

US Army Corps of Engineers, 1976. Final Environmental Impact Statement for Murrell's Inlet Navigation Project. November 1976

US Army Corps of Engineers, 2001. Final Environmental Assessment and Finding of No Significant Impact for Operation & Maintenance Dredging of the Murrell's Inlet Entrance and Auxiliary Channels and New Information Relating to Placement of Material on Garden City Beach and Huntington Beach State Park Georgetown County, South Carolina. May 2001.

CHAPTER 1 ALTERNATIVES

2.1 Proposed Action

The proposed action includes excavation and disposal of 25,000 yd³ of material dredged from a one and one eighth acre of the Murrells Inlet Federal Navigation Channel near Marlin Quay Marina referred to as Inner Shoal B (Figure 4). The material will be excavated by using hydraulic pipeline cutterhead dredge. The dredging location, method and evaluated impacts will be the same for each Alternative, therefore, the Alternatives discussed will focus on the disposal of the dredged material.

2.2 Alternative 1: Deposition of Material in a Confined Disposal Facility (CDF)

This Alternative would require transport, via pipeline of all the excavated material to an enclosed upland facility for storage. This alternative is advantageous in that it would remove all the material and potential contaminants from environment and prevent any re-release and subsequent exposure, however, there is no upland disposal facility within close proximity to the project that may be used. This Alternative is eliminated from further evaluation.



Figure 4. Proposed Dredge Area

2.3 Alternative 2: Upland Storage and Dewatering

This Alternative entails pumping the dredged material into geotubes, placing the geotubes adjacent to one of the Murrells Inlet receiving waters, and allowing the return water to reenter the Inlet. The geotubes would then be transported to a permanent confined facility, such as a landfill. This Alternative is not feasible in that there was no available space to place the geotubes for dewatering and is eliminated from further evaluation.

2.4 Alternative 3: Using the Dredged Material for Beneficial Use (Preferred Alternative)

This Alternative involves placing the dredged material within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty (Figure 5). The material would be used to provide protection to the terminal end of the jetty and to restore shorebird habitat. The material would be placed

between two containment dikes to prevent runoff into areas outside of the construction zone. The dikes will be set at an elevation of + 2 Mean High Water (Figure 6). This material placed with material from other excavation areas and will be part of a 105,000 yd³ depositional effort. This area was originally identified as a depositional placement area in the 1976 Environmental Assessment and has been used of this purpose in previous maintenance dredging efforts.

Testing of the proposed dredged material shows that it consists of 78% fine sands and contains no pollutants in sufficient concentrations that would pose either a human health or environmental risk.



Figure 5. Proposed Depositional Placement Area. The Center Line Indicates Mid-point of Construction Shown in Figure 6

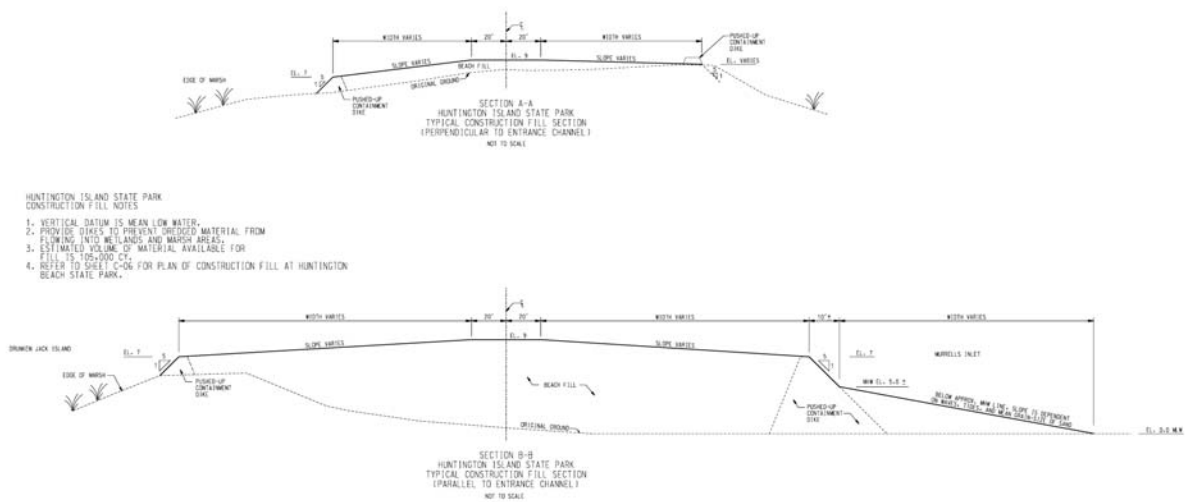


Figure 6. Cross-sections of Preferred Alternative. Upper Figure Represents Construction of Bottom of the “L”: Lower Figure is Representative of the Section Parallel to Huntington Beach State Park

2.5 No Action Alternative

A "No Action" Alternative is required under NEPA. The No Action Alternative is the most probable future condition if no action is taken. Under the no-action alternative, passage through the Murrell’s Inlet Federal Navigation Channel will continue to deteriorate as deposition associated with Inner Shoal B will continue, further impeding vessel traffic.

2.6 Alternative Analysis

Alternative 3 is the preferred Alternative for this project. By using the dredged material for protecting the jetty and restoring bird habitat, this alternative allows for the beneficial use of dredged material that the other Alternatives do not possess. In addition, this Alternative follows precedent, and requires neither out of project area transport of material nor additional uplands for material storage, saving costs, time and disruption to the local communities.

As previously stated, the actions explored in this EA are in conjunction with similar maintenance actions to be undertaken in Murrells Inlet. The other Actions shown in Figure 3 have been address in previous NEPA documentation.

The Preferred Alternative and the No Action Alternative are the only Alternatives that will be evaluated as part of this EA.

CHAPTER 2 ENVIRONMENTAL SETTING AND CONSEQUENCES

3.1 Project Location

Murrells Inlet is a small, tidally driven estuary located on the northeast coast of South Carolina at the Horry County-Georgetown County Border. The Inlet is flanked by Surfside Beach and Garden City Beach to the northeast, Huntington Beach to the southwest, and US Highway 17 Business. The Inlet's dimensions are approximately five and one half nautical miles length and one to one mile in width. The watershed draining into the Inlet is approximately 10,250 acres, with approximately 3,108 acres considered suitable for shellfish production. Tidal range varies from 4.2 feet to 5.3 feet within the Inlet. The Inlet contains intertidal mudflats, marshes, oyster beds, tidal creeks and created canals. The average depth of the main channel is around 13 feet (SCDHEC, 2005). Freshwater input is limited to overland runoff and groundwater contribution, thus salinity is usually above 30 parts per thousand.

3.2 Climate

The climate in the region consists of long hot summers and cool winters. Summers are warm and humid (average July high and low temperatures are 92°F and 71°F, respectively). Winters are relatively mild (average January high and low temperatures are 58°F and 35°F, respectively). Average annual precipitation is approximately 57 inches per year.

Environmental Consequences

Implementing either the Preferred Alternative or the No Action Alternative will have no impact to climate.

3.3 Land Use

SCDHEC's 2005 estimates of land use for the watershed is shown in Table 1 below.

Table 1 Land Use in the Murrells Inlet Watershed (SCDHEC, 2005)

Land Use	Acreage	% Coverage
Forest	3,177.5	31
Open Water	2,767.5	27
Urban Buildup	2,460	24
Urban Grasses	1,640	16
Wetlands	205	2

Murrells Inlet is bound by two towns on its northeast border, Surfside Beach and Garden City Beach, respectively, and by Huntington Beach State Park on the southwest border. Land use varies within the watershed and includes high density, single family residential, commercial, open space, and waterfront uses (docks and marinas). Development within the watershed is trending southward along US Highway 17 and most open space is concentrated in the southern end of the watershed.

Environmental Consequences

Implementing either the Preferred Alternative or the No-Action Alternative will not conflict with any known existing or proposed Federal, state, or local land use plans.

3.4 Water Resources and Aquatic Habitat

Biological Resources: Since the entrance channel, deposition basin, Inner Channel A and the upper reaches of Inner Channel B dredging and placement of materials on Huntington Beach State Park and GCB was addressed in the previous EIS and EA, for the purposes of this EA, the biological resources considered will be those associated with the O&M dredging of Inner Shoal B and the placement of material in the intertidal zone of Huntington Beach State Park.

Environmental Consequences

Preferred Alternative: Dredging and placement activities will have a temporary and minor increase in water column turbidity.

No Impact Alternative: No impacts to open water would be expected as neither excavation nor placement would be implemented.

3.4.1 Open Water

The open water community, as defined here, includes all marine and estuarine waters together with all underlying bottoms below the intertidal zone. The open water biota includes the plankton and nekton inhabiting the water column and the benthos living on or in the substrata.

Environmental Consequences

Preferred Alternative: Dredging and placement activities will have a temporary and minor increase in water column turbidity.

No Impact Alternative: No impacts to open water would be expected as neither excavation nor placement would be implemented.

3.4.2 Plankton

The plankton community is mainly composed of unicellular algae, larval stages of many fish and invertebrates and the adult stages of several microscopic invertebrates. Adult stages of several macro invertebrates such as jellyfish (*Chrysaora*, *Cyanea*, *Stomolophus*, and *Rhopilema*) and comb jellies (*Mnemiopsis*) that are carried by current and tides are also an important part of the plankton community.

Environmental Consequences

Preferred Alternative: Some of the planktonic organisms entrained by the dredging operations will suffer injury or mortality. Turbidity resulting from the dredging activity may reduce primary productivity by phytoplankton as light penetration into the water column is reduced. Both of

these potential effects on plankton are expected to be minor and temporary as they would coincide in significance with the short duration of dredging.

No Impact Alternative: No impacts to plankton would be expected as neither excavation nor construction would be implemented.

3.4.3 Nekton

Fish are the principal nektonic species although some crustaceans such as portunid crabs, penaeid shrimp and some mollusks, such as the squid spend at least a portion of their life as nekton. A number of fish species are considered to be estuarine dependent and utilize the coastal estuaries for at least a portion of their life cycle. Fish species commonly observed in the project area include spotted seatrout (*Cynoscion nebulosus*), weakfish (*Cynoscion regalis*), bluefish (*Pomatomus saltatrix*), red drum (*Sciaenops ocellata*), black drum (*Pogonias cromis*), spot (*Leiostomus xanthurus*), croaker (*Micropogonius undulatus*), sheepshead (*Archosargus probatocephalus*), menhaden (*Brevoortia tyrannus*), gizzard shad (*Dorosoma cepedianum*), mullet (*Mugil cephalus*), flounder (*Paralichthys sp.*), silversides (*Atherinidae*), and sea catfish (*Ariidae*).

Environmental Consequences

Preferred Alternative: Nekton, because of their mobility, are less likely to be adversely affected by the dredging and beach work than benthic invertebrates. Dredging can be beneficial to certain species of fish, especially those that prey on larger benthic organisms. During the dredging operation, benthic organisms buried in the sediments are dislodged and become susceptible to predation. Similarly, organisms dislodged from sandy sediments during beach disposal, become prey by fishes inhabiting the surf zone.

Due to the sandy nature of the sediments proposed for dredging (Approximately 78% sands), turbidity plumes will be minimal and restricted primarily to the dredging and disposal areas. Fish species that would have the highest probability of being affected are the filter feeders (primarily menhaden, herring, and shad) and juvenile forms. Some larval fishes may be destroyed by the mechanical action of the cutterhead. However, information from similar dredging projects in other areas indicates that impacts would be temporary and minor, and would not significantly affect the fish stocks.

No Impact Alternative: No impacts to nekton would be expected as neither excavation nor construction would be implemented.

3.4.3 Benthos

The benthic environment includes a number of communities correlated largely with substratum type. Multicellular green, red, and brown algae, and unicellular algae (especially diatoms), are the primary producers within the photic zone of the benthic environment. The benthic fauna is divided into two groups: epifauna, living on the substratum; and infauna, living within the substratum. Infauna communities are dominated by a great diversity of burrowing and tube dwelling crustaceans (e.g., amphipods), polychaete worms, and by burrowing bivalve mollusks. Some infauna invertebrates, especially among the crustaceans, are capable of a high degree of lateral mobility, but the majority is essentially sedentary. The infauna is, with rare exception, comprised of filter and detritus feeding invertebrates. The epifauna and flora of sandy bottoms such as those in the project area tend to be much lower in diversity, and most inhabitants are microscopic. These surfaces are unsuitable for attachment by sessile invertebrates. In addition, sand bottoms such as those found in the estuary are depositional and the

continual rain of sediment quickly buries attached animals. Thus, these substrata support diatoms, other unicellular algae, protistans, and attached multicellular algae. Invertebrates primarily include motile deposit feeders, such as polychaete worms, sea cucumbers, and sand dollars. Some fish and crabs also graze on the bottom. Attached organisms are restricted largely to the occasional bit of shell or small rock lying at the surface. The development of oyster reefs on muddy intertidal bottoms, for example, is dependent on the presence of bits of shell or rock for initial larval attachment.

Murrells Inlet has approximately 106.9 acres of designated shellfish grounds (Appendix B), with an additional 2,212.2 acres of potential shellfish habitat available through replanting and habitat restoration (Waccamaw COG, 2014). The Inlet has lost historical oyster habitat due to rapid coastal development, increased siltation, and lack of shellfish ground maintenance (SCDNR, 2005).

Environmental Consequences

Preferred Alternative: Some of these organisms may be destroyed during the dredging of the shoal, however, the long-term productivity of the area should not be affected to any significant degree. Repopulation will commence shortly after construction is completed and species composition should be similar to that which existed prior to construction. The effects will be minor and temporary.

No Impact Alternative: No impacts to the benthic would be expected as neither excavation nor construction would be implemented.

3.4.4 Other Animals

Murrells Inlet is also utilized by waterfowl and shorebirds particularly during the winter months. Many waterfowl are surface feeders and dabblers, and are commonly found along the shallow water zones where they feed on submerged or emergent vegetation.

Environmental Consequences

Preferred Alternative: The dredging and placement of material at the back Huntington Beach State Park may have a temporary effect on waterfowl, shorebirds or other animals that feed in the construction area, but these effects will be minor and temporary since these animals are mobile and capable of relocating until construction is complete. The long term impacts of the project will be beneficial due to the increased area for nesting, roosting, and foraging.

No Impact Alternative: No impacts to other animals would be expected as neither excavation nor construction would be implemented.

3.4.5 Tidal Marsh

Huntington Beach State Park is bordered by tidal marsh, sand and/or mud flats, and meandering tidal streams which separate these areas from the mainland. Marsh communities have been well documented in terms of productivity, animal diversity, and importance to the marine system. The basis of the importance of these marsh communities involves the high productivity and a source of nutrients to local ocean waters (Dame, et. al 1986). The dense plant growth in the marsh provides excellent cover for many species of birds, aquatic and semi-aquatic mammals, reptiles and amphibians. Substrates in these

communities are inhabited by a myriad of foraminifera, nematodes, annelids, arthropods, mollusks such as the salt marsh snail (*Melampus bidentatus*), marsh periwinkle (*Littorina littorea*), ribbed muscle (*Geukensia demissa*), and eastern oyster (*Crassostrea virginica*), and crustaceans such as the penaeid shrimps (*Penaeidae*), sand fiddler (*Uca pugilator*), mud fiddler (*U. pugnax*) and blue crabs. The marsh community provides a nursery ground for the principal commercial marine organisms of the state; white (*Penaeus setiferus*) and brown shrimp (*P. aztecus*) and blue crabs. Marsh creeks also serve as spawning and nursery grounds for many of our commercial and sport fishes and shellfishes, in addition to being valuable shellfish growing areas. Throughout these marsh communities numerous shorebirds, waterfowl, gulls, herons, and egrets will be found. Birds such as the clapper rail (*Rallus longirostris*), plovers, dowitchers (*Limnodromus sp.*) and sandpipers thrive on the benthic invertebrate population around the shoreline and on open flats. In the open water bordering these communities, waterfowl will be found feeding on vegetation or small marine fishes and free-swimming invertebrates. The herons and egrets feed on fish, invertebrates, reptiles, amphibians, and small mammals in the marsh. They also are found nesting and roosting during the summer months. Many gulls will be found the year around utilizing these communities for resting and scavenging. Other birds such as the red-winged blackbird (*Agelaius phoeniceus*), common and boat-tailed grackles (*Quiscalus sp.*), sparrows, and warblers will be found nesting and feeding on insects and grains. Birds of prey such as the osprey (*Pandion haliaetus*) and marsh hawk (*Circus cyaneus*) will also be found utilizing these communities to some degree. Mammals of the marshes typically include the raccoon (*Procyon lotor*), otter (*Lutra canadensis*), marsh rice rat (*Oryzomys palustris*), opossum (*Didelphis virginiana*) and marsh rabbit (*Sylvilagus palustris*).

Environmental Consequences

Preferred Alternative: The proposed dredging will not affect any of the area's valuable tidal marshes. The tidal marsh area behind Huntington south of the Huntington Beach South Jetty will receive additional protection from the buildup of the intertidal area resulting from the dredge material placement. During construction, containing dikes will be used to limit temporary impacts.

No Impact Alternative: If the project is not implemented, there may be a small minor detrimental effect to the marsh adjacent to the construction area as the additional protection will not be provided.

3.4.6 Sand and/or Mud Flats

Sand and/or mud flats are found in the project area. In most areas they lie below the mean high water line and are alternately covered and exposed by wind-driven or lunar tides and are typically devoid of vascular plants, but may be inhabited by numerous species of diatoms, bacteria, oysters, and infauna invertebrates. These flats are usually fringed with stands smooth cordgrass and open water or beach and open water. Tidal action provides a constant influx of particulate organic matter to these habitats supplying nutrients to filter feeding benthic invertebrates. When the tidal flats are covered during high tides, they are a significant foraging area for a variety of fish species. When the flats are exposed, numerous wading birds and shorebirds feed upon the benthic animals.

Environmental Consequences

Preferred Alternative: The proposed excavation will not affect any of the area's sand and/or mud flats except for the sand/mud flat adjacent of the Huntington Beach South Jetty that will be covered during construction. However, as the newly built area reaches natural state, similar

sand/mud flats will reappear and will be re-colonized. Further, this will provide protection for the tidal marsh located south of the south jetty. Any effects are minor and temporary.

No Impact Alternative: No impacts to any sand or mud flats would be expected as neither excavation nor construction would be implemented.

3.5 Water Quality

3.5.1 Water Classification

The waters within Murrells Inlet are classified by the State of South Carolina as Shellfish Harvesting (SFH) Waters. State water classifications are promulgated in the South Carolina Pollution Control Act, Section 48-1-10 *et seq.* Chapter 61, Regulation 61-68 (Water Classifications and Standards). SFH classification is defined as:

Tidal saltwaters protected for shellfish harvesting and uses listed in Class SA and SB. Suitable for primary and secondary contact recreation, crabbing, and fishing. Also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Environmental Consequences

Preferred Alternative: Implementation of the proposed project would result in temporary, minor water quality degradation at the dredging and disposal sites. Although dredging and disposal activities typically contribute to localized turbidity increases, the sandy sediments which will be utilized for this project tend to settle rapidly, so the turbidity increase should be minor and of short duration. Chemical analysis of sediments from this shoal has revealed no significant concentration of toxic or harmful substances that could adversely affect water quality of the area. The very low concentrations of organic matter in the sandy sediments should result in very little, if any, dissolved oxygen depression. Hence, water quality impacts from project construction should be insignificant and the State's Classification Standards should not be contravened. Previous 401 Water Quality Certifications did not apply to the proposed dredged area, so a new Water Quality Certification will be applied for. Construction will not initiate until said Certification is issued.

No Impact Alternative: No impacts to either water quality or classification would be expected as neither excavation nor construction would be implemented.

3.5.2 TMDL

The State of South Carolina has developed a Total Maximum Daily Load (TMDL) with respect to fecal coliform bacteria loading in Murrells Inlet. This TMDL was developed in 2005 and identified nonpoint source pollution loading, primarily urban runoff, domestic animal, and wildlife wastes as the primary sources of fecal impacting water quality standards for safe shellfish harvesting within the Inlet.

Environmental Consequences

Preferred Alternative: The dredging and disposal of the material may result in the temporary resuspension of sediments and attached fecal coliform bacteria, however this resuspension should

be temporary, minor and localized. The proposed project will not interfere with the implementation of the TMDL nor will it result in a significant downgrade of water quality standards. Effects will be temporary and minor.

No Impact Alternative: No impacts to the TMDL would be expected as neither excavation nor construction would be implemented.

3.5.4 Sediment

GEL Engineering conducted a sediment analysis with respect to contaminants and composition of the proposed dredging area. Sampling and analysis was conducted per USACE sediment sampling analysis protocol (SAP) (USACE, 2015). Six sediment samples were collected, with three collected within the project area (Figure 5); two for chemical analysis and one for grain size composition. The samples collected for chemical analysis were combined into one composite sample. The parameters analyzed are shown in the table below:

Table 2. Sediment and Elutriate Parameters Tested for in Murrells Inlet Dredged Sites

Parameter	Parameter
Metals	Polychlorinated Biphenyls (PCBs)
Total Organic Carbon (TOC)	PCB Congeners
Grain size	Butyltins, including Tributyltin
Specific Gravity	Dioxins
Atterberg Limits	Pesticides
Polybrominated Diphenyl Ethers (PBDES)	Polynuclear Aromatic Hydrocarbons (PAHs)

Sediment bulk chemistry was compared to screening values for the constituents detected. The screening values were:

- Effects Range Low (ERL) Values
- Effects Range Median (ERM) Values, and
- EPA’s Region IV Draft Sediment Ecological Screen Values (ESL)

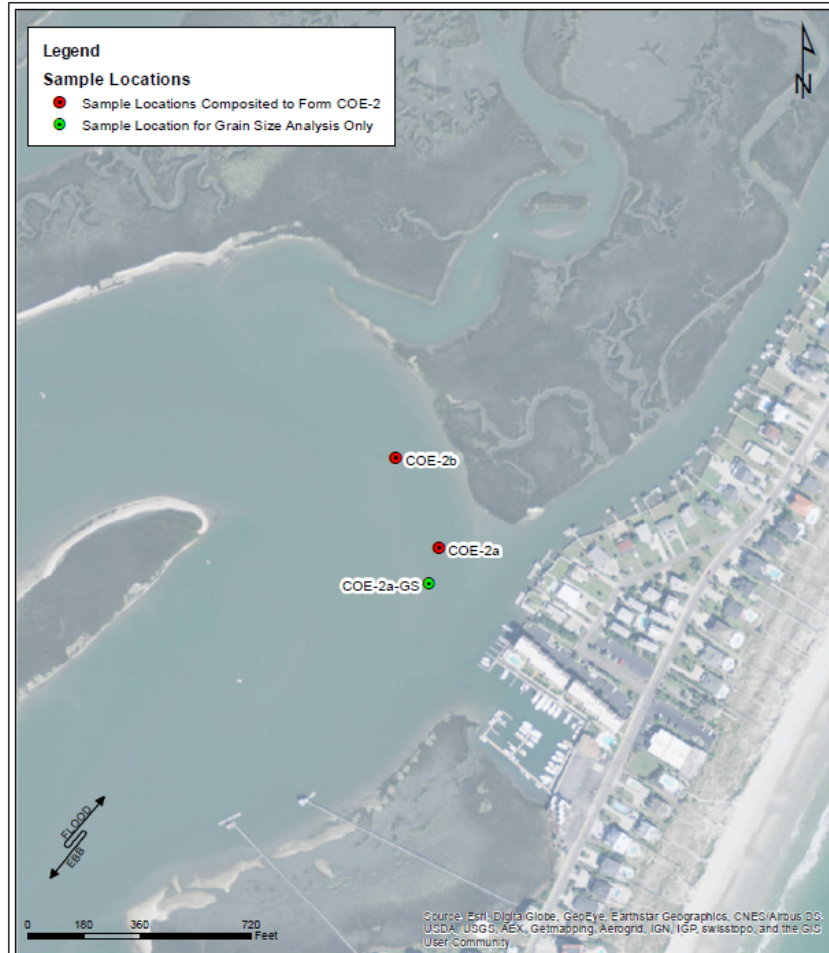


Figure 5. Sediment Sampling Sites

The ERL, ERM, and ESL values are based on toxicity studies of marine organisms. None of the sampled parameters were found in concentrations exceeding their respective ERL, ERM, and ESL values. Several parameters (PCB Congeners, Dioxins, and PBDES do not have ERL, ERM, and ESL values and their results are discussed below:

PCB Congeners- PCB Congeners were detected in three of the seven sediment samples, however the concentrations were below 1.0 ug/kg, indicating that the concentrations were low and should not be a concern.

Dioxins and Furans- Dioxins and Furan Toxic Equivalency Quotients (TEQs) were calculated per World Health Organization (2005) protocol. All TEQ concentrations were below EPA's TEQ Screening Value of 2.5 pg/g and should not be a concern.

PBDEs- PBDEs were detected, however the reported concentrations were below SAP required detection limits and should not be a concern.

In addition to the sediment testing, the samples were also modified for elutriate testing. The elutriate samples were analyzed for the same parameters listed in Table 2, and were compared to SCDHEC Water Classifications and Standards, Criteria Maximum Concentration (CMC) for Saltwater, Criteria

Continuous Concentration (CCC) for Saltwater, and EPA's Saltwater Acute Screening Values (ASV). The CCC is the highest instream concentration of a toxicant to which an organism can be exposed to without chronic effects. CMC is the highest concentration of a toxicant to which an organism can be exposed to without acute effects. EPA's ASV criteria are designed for the protection of aquatic life. Exceedances of all criteria are discussed below.

Arsenic- Arsenic exceeded its CCC value of 36 ug/l, but did not exceed the other criteria.

Copper-The CCC, CMC, and ASV criteria were all exceeded.

Nickel- Nickel exceeded its CCC value of 8.3 ug/l, but did not exceed the other criteria.

PCB Congeners- PCB Congeners were detected in three of the seven sediment samples, however the concentrations were below 0.1 ug/kg, indicating that the concentrations were low and should not be a concern.

Dioxins and Furans- Dioxins and Furan Toxic Equivalency Quotients (TEQs) were calculated per World Health Organization (2005) protocol. All reported TEQ concentrations were very low and should not be a concern.

PBDES-PBDES were detected, however the reported concentrations were below SAP required detection limits.

The collected sediment was characterized as a dark grey silty sand. Grain size analysis revealed that the material is approximately 78% sand, 6% silt, and 16% clay.

Environmental Consequences

Preferred Alternative: Based on the water and sediment chemistry, the excavation and placement of the material adjacent to Huntington Beach State Park should have no impact to water quality and will not cause a toxicity problem with respect to either human health or aquatic life.

The material being placed near the terminal end of the south jetty at Huntington Beach State Park is approximately 78% sand, with the rest consisting of silts and clays. The fine grained material will be lost during the process: some will be lost during excavation, some through the pipeline, and some will be winnowed out during construction. The overall effect will be the release of fines at both the excavation and construction site, however, this impact should be minor and temporary.

No Impact Alternative: No impacts resulting from sediment disturbance would be expected as neither excavation nor construction would be implemented.

3.6 Terrestrial Resources and Wildlife

The southwestern portion of the watershed contains both Brookgreen Gardens and Huntington Beach State Park. These areas represent several thousand acres of protected, undeveloped area, are home to multiple species and are representative of typical coastal South Carolina upland ecosystems.

Furbearers found in the watershed include beaver, otter, bobcat, gray fox, raccoon, and opossum. Deer, turkey, bobcat, and feral hogs are found within the watershed. Other small mammals, such as gray squirrels, rabbits, and several small rodent species are also found within the vicinity of the project area. Invasive species such as coyotes and armadillos have also been observed.

Brookgreen Gardens is restoring longleaf pine habitat on its grounds, providing potential habitat for red-cockaded woodpeckers as well as other songbirds and squirrels (<http://www.brookgreen.org/conservation.html> Dated July 1, 2016).

Environmental Consequences

None. Neither the Preferred Alternative nor the No-Action will have an impact on upland terrestrial wildlife resources.

3.7 Air Quality and Noise

The Clean Air Act (CAA), which was last significantly amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national ambient air quality standards- primary and secondary. Primary standards are levels established by the EPA to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are levels established to protect the public welfare, including protection from decreased visibility and damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants which are called “criteria” pollutants. Those pollutants are Carbon Monoxide, Lead, Nitrogen Oxides, Particulate Matter (PM₁₀), Particulate Matter (PM_{2.5}), Ozone and Sulfur Dioxide. All air pollutants are listed as in attainment for Georgetown Counties (EPA 2012).

Environmental Consequences

Preferred Alternative: Temporary increases in exhaust emissions from construction equipment are expected during the construction of the proposed project. The pollution produced, however would be similar to that produced by other large pieces of machinery and would be readily dispersed. Dredges will comply with the applicable US Environmental Protection Agency (EPA) standards. As previously stated, Georgetown County is designated as an attainment area. A conformity determination is not required for this project because of the following reasons: 1) it is located in an attainment area; 2) the direct and indirect emissions from the project fall below the prescribed de minimus levels; and 3) the ambient air quality for the impacted Counties has been determined to be in compliance with the National Ambient Air Quality Standards.

Noise in the outside environment associated with construction activities would be expected to minimally exceed normal ambient noise in the project area. However, construction noise would be attenuated by background sounds from wind and waves. In-water noise would be expected in association with the dredging activities. Specifically, noise associated with dredging could occur from (1) ship/machinery noise—noise associated with onboard machinery and propeller and thruster noise, (2) pump noise—noise associated with pump driving the suction through the pipe, (3) collection noise—noise associated with the operation and collection of material on the sea floor, (4) deposition noise—noise associated with the placement of the material within the barge or hopper, and (5) transport noise—noise associated with transport of material up the suction

pipe. The increase in noise levels are minor and temporary in nature and will return to normal following completion of the project.

No Impact Alternative: No impacts to either air quality or noise would be expected as neither excavation nor construction would be implemented.

3.8 Cultural Resources

ArchSite is a tool provided by the South Carolina Institute of Archaeology and Anthropology and South Carolina department of Archives and History (<http://archsite.cas.sc.edu/ArchSite>). A search of ArchSite revealed no cultural resources with the project area (Appendix C), however, the project area is adjacent to the Murrells Inlet Historic District. Architectural reconnaissance identified no buildings of any kind or landscapes within or immediately adjacent to the footprint of the either the dredging or disposal sites.

Environmental Consequences

None, as the proposed project is maintenance dredging of an existing channel, with no expected expansion and there are no listed or eligible resource proximate to the project area. Neither the Preferred Alternative nor the No Action Alternative will have impact on historical or cultural resources.

3.9 Endangered Species

In May of 2016, the US Army Corps of Engineers published a Biological Assessment (BA) that addressed multiple actions in Murrells Inlet. The BA listed the species shown in Tables 3 and 4 below that may occur in the project area (USFWS, 2016).

Table 3. Federally threatened species (T), federally endangered species (E), federal candidate species (C) and species in Coastal Georgetown County

Common Name	Scientific Name	Status	Occurrences
West Indian manatee	<i>Trichechus manutus</i>	Federally Endangered	Known
Piping plover	<i>Charadrius melodus</i>	Federally Threatened, Critical Habitat	Known
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i> *	Federally Endangered	Known
Leatherback sea turtle	<i>Dermochelys coriacea</i> *	Federally Endangered	Known
Loggerhead sea turtle	<i>Caretta caretta</i>	Federally Threatened, Critical Habitat	Known
Green sea turtle	<i>Chelonia mydas</i> *	Federally Threatened	Known
Shortnose sturgeon	<i>Acipenser brevirostrum</i> *	Federally Endangered	Known
Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i> *	Federally Endangered	Known
Sea-beach amaranth	<i>Amaranthus pumilus</i>	Federally Threatened	Known
West Indian manatee	<i>Trichechus manutus</i>	Federally Endangered	Known

Table 4. Threatened and Endangered National Marine Fisheries Service Species found in South Carolina Waters

Common Name	Scientific Name	Status	Date Listed
Blue whale	<i>Balaenoptera musculus</i>	Federally Endangered	12/02/70
Finback whale	<i>Balaenoptera physalus</i>	Federally Endangered	12/02/70
Humpback whale	<i>Megaptera novaeangliae</i>	Federally Endangered	12/02/70
Right whale	<i>Eubaleana glacialis</i>	Federally Endangered, Critical Habitat	12/02/70
Sei whale	<i>Balaenoptera borealis</i>	Federally Endangered	12/02/70
Sperm whale	<i>Physeter macrocephalus</i>	Federally Endangered	12/02/70
Green sea turtle	<i>Chelonia mydas</i>	Federally Threatened	07/28/78
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Federally Endangered	06/02/70
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	Federally Endangered	12/02/70
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Federally Endangered	06/02/70
Loggerhead sea turtle	<i>Caretta caretta</i>	Federally Threatened, Critical Habitat	07/28/78
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Federally Endangered	03/11/67
Atlantic sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>	Federally Endangered	02/06/12

The potential impacts to and mitigation for the NMFS species are addressed in the current regional Biological Opinion (NMFS, 1997) and in the ongoing consultation between the USACE, BOEM, and NMFS for a proposed new South Atlantic Regional Biological Opinion.

In addition to the species listed in the tables above, there are federally listed species that in Georgetown County that inhabit freshwater or forested environments and will not be impacted by this project. These species are shown in the Table 5 below.

Table 5. Federally Listed Species found in Georgetown County but not found in Vicinity of the Project Area

Group	Name	Name	Status
Birds	<i>Haliaeetus leucocephalus</i>	Bald eagle	Recovery
Birds	<i>Setophaga kirtlandii</i>	Kirtland's Warbler	Endangered
Birds	<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered
Birds	<i>Mycteria americana</i>	Wood stork	Threatened
Birds	<i>Calidris canutus rufa</i>	Red knot	Threatened
Flowering Plants	<i>Lindera melissifolia</i>	Pondberry	Endangered
Flowering Plants	<i>Oxypolis canbyi</i>	Canby's dropwort	Endangered
Flowering Plants	<i>Schwalbea americana</i>	American chaffseed	Endangered

Environmental Consequences

Preferred Alternative: The Biological Assessment did not examine the dredging of material from Inner Shoal B, nor did it evaluate the placement of that material (~78% sand) on the

backside of Huntington Beach State Park. The BA did address the dredging of the Entrance Channel, Inner Channel A, and the depositional basin as well as the placement of >90% sand on Huntington Beach State Park and on Garden City. The potential impacts of that action on designated habitat and listed species of plants and animals that are, or have been, present in the project area. Both primary and secondary impacts to habitat have been considered. Based on the analysis provided by the BA, the following determinations have been made.

- It has been determined that the proposed project is not likely to adversely affect the manatee.
- It has been determined that the proposed project is not likely to adversely affect leatherback sea turtle, and will have no effect on Kemp's ridley, or hawksbill sea turtles.
- It has been determined that the proposed project will have no effect on the shortnose sturgeon.
- It has been determined that the proposed project will have no effect on the Atlantic sturgeon.
- It has been determined that the proposed project is not likely to adversely affect the rufa red knot.
- It has been determined that the proposed project may effect, but is not likely to adversely affect sea beach amaranth.
- It has been determined that the proposed project may affect, but is not likely to adversely affect the piping plover.
- It has been determined that the proposed project may affect, but is not likely to adversely modify piping plover critical habitat for the wintering piping plover.
- It has been determined that the proposed project may affect but is likely to adversely affect the nesting loggerhead and green sea turtle and any resulting hatchlings.
- It has been determined that the proposed project will have no effect on critical habitat for the loggerhead sea turtle.
- It has been determined that the proposed project is not likely to adversely affect the right whale and will not adversely modify critical habitat for the North Atlantic right whale.

While the BA did not address the proposed project in this EA, USACE is in consultation with the USFWS on the action. The USACE determination is that the proposed project (Inner Shoal B to Huntington Beach State Park) will either have "no effect" or "is not likely to adversely affect" all listed species and the specific effect determinations are the same as those listed above. While the proposed project involves placement of material in Critical Habitat for piping plover, it is not anticipated that any adverse effects will result from the project and none of the Primary Constituent Elements for the piping plover will be affected in the long term.

No Impact Alternative: No impacts to any listed species or critical habitat will occur if the project is not implemented.

3.10 Hazardous Toxic and Radioactive Waste (HTRW)

The South Carolina Department of Health and Environmental Control list no sources of Hazardous, Toxic, or Radioactive Waste within the project area. Additionally the Environmental Protection Agency (EPA) EnviroMapper was queried on June 21, 2015 (EPA 2015). No immediate sources of Hazardous Toxic or Radioactive Waste were shown to occur within the vicinity of the project area.

Environmental Consequences

None. There are no known hazardous or toxic waste sites within the immediate vicinity of the project footprint. No hazardous toxic or radioactive waste would be generated as a result of either the excavation or the placement of the dredged material on Huntington Beach State Park. Neither the Preferred Alternative nor the No Action Alternative will have effect to HTRW.

3.11 Socioeconomics

Murrells Inlet is considered one of the most intensively utilized estuary of its size along the eastern US coast and has greatly shaped the economic development of the region (Salvino and Walshman, 2013). Some commercial and recreational businesses exist only due to the presence of the Inlet and many more enterprises are enhanced by being proximate.

3.11.1 Commercial Fishing

Development of a commercial fishing industry at Murrells Inlet has been limited as a result of difficulties navigating Murrells Inlet. The principal commercial fishery resources of the project area include shrimp (*Penaeus sp.*), blue crab (*Callinectes sapidus*), marine and estuarine finfish such as spot (*Leiostomus xanthurus*), croaker (*Micropogonius undulatus*), whiting (*Menticirrhus americanus*), and flounder (*Paralichthys sp.*). Other species commercially harvested species include shark (*Carcharhinus sp.*), black sea bass (*Centropristis ocyurus*), and mullet.

Environmental Consequences

Preferred Alternative: While the proposed maintenance dredging and placement at the south terminal jetty at Huntington Beach State Park may be an inconvenience to commercial fishers during construction, it is not expected to have any long-term adverse effects on fishing activities in the area. Dredging for this project will be conducted with a pipeline dredge, which is stationary while working in a specific area. When the area within reach of the cutterhead has been dredged, the dredge swings forward slowly on its spuds to the next area. As result, the dredge and cutterhead are slow moving, allowing adequate time for mobile organisms to relocate out of the way

Deepening the navigation channel will provide fishing vessels better access to and from Murrell's Inlet, which may actually improve commercial fishing. The presence of the dredge and associated equipment could create temporary inconveniences for boats (recreational and commercial) navigating in the vicinity. However, since the dredge is either stationary or slow moving, it does not provide a swiftly moving target that must be avoided.

No Impact Alternative: If the proposed project is not implemented, there may be a minor adverse impact to commercial fishing as the existing conditions represent a nuisance to navigation.

3.11.2 Commercial Shellfish Harvesting

There are eight commercial shellfish Culture Permit holders in Murrells Inlet. The Culture Permits consist of 68.7 acres. Both oysters and clams are harvested within the Inlet. Harvesting trends have been relatively constant over the last decade. SCDNR estimates that the dockside harvest values of shellfish collected over the last decade it be approximately \$800,947.42 (Waccamaw COG, 2014).

Environmental Consequences

Preferred Alternative: The proposed dredged area is proximate to Marlin Quay Marina. The South Carolina Department of Health and Environmental Control has 1000 foot closure zone around all marinas that prohibits shellfish harvesting (SCDHEC 2015), which includes the majority of the proposed dredged area. Impacts to commercial shellfish harvesting should be minimal and temporary.

There are no commercial lease or culture areas close to the construction location, so any impacts there should be minor and temporary.

No Impact Alternative: No impacts to shellfish resources would be expected as neither excavation nor construction would be implemented.

3.11.3 Overall Economic Value

The presence of the Murrells Inlet marsh has a significant impact on several factors of the local economy, including food and beverage sell, real estate values, boating, fishing, and other tourism activities. Salvino and Wachsmann (2013) summarized the value of the Inlet in the following bullet points:

- The economic value of the salt marsh exceeds \$720 million, and includes the impact on real estate values, restaurant sales, the value of boating, channel navigability, and other tourism activity.
- The cultural importance of the salt marsh is reflected in SC Department of Natural Resources commercial fish catch records. Ninety-eight percent of all spot documented in the state is caught in or around Murrells Inlet, 30 percent of all flounder, and 23 percent of all snapper.
- The Marsh increases residential real estate valuations of properties on the Marsh by at least \$194 million in the aggregate.
- Visitor spending in the 29576 zip code in 2012 exceeded \$497 million, and of this we attribute fifty percent or \$249 million directly or indirectly to the draw of the Marsh.
- Restaurant sales in the 29576 zip code exceeded \$112 million in 2012, and of this, thirty nine percent or just over \$44 million were generated by restaurants on or across from the Marsh.

- Over \$785 million of personal income was earned by residents of the 29576 zip code in 2011.
- In 2011, approximately 11,000 residents of the 29576 zip code were employed, with an unemployment rate of 4.9 percent, one of the lowest in the Southeast.
- Retail sales taxes, hospitality fees, and accommodations taxes for the counties of Horry and Georgetown generated a total of \$27.4 million from the 29576 zip code.
- An estimated 4.9 million visitors helped generate total retail sales activity of \$1.2 billion, which directly employed 15,100 people. The 29576 zip code provides many jobs for people outside the zip code.

Environmental Consequences

Preferred Alternative: The proposed activity should have an overall beneficial impact to the over socioeconomics of the Inlet. The proposed dredging and placement of fill may be an inconvenience during construction, there are no long term adverse impacts on commercial boating or fishing activities. The project will be a net benefit to boating traffic as the removal of the built up shoal will result in easier and safer passages.

The proposed project will have no overall long term adverse impacts to the economics and may have a small positive impact due to improvements in navigation.

No Action Alternative: Not implementing the proposed project will have no impacts to the region's economy.

3.14 Recreation

Murrells Inlet is an intensively used estuary as it offers opportunities for recreational shellfish harvesting, recreational fishing, recreation boating, and wildlife viewing.

3.14.1 Recreational Shellfish Harvesting

Murrells Inlet has three designated State Shellfish Grounds covering 26.8 acres and two designated Recreational Shellfish Grounds covering 11.4 acres. The State Shellfish Grounds may be harvested by both commercial and recreational harvesters, while no commercial harvests are allowed in the Recreational Shellfish Grounds.

Environmental Consequences

Preferred Alternative: Neither the proposed excavation nor the construction area will impact any State designated Recreational Shellfish Harvesting Grounds.

No Action Alternative: The No Action Alternative will not impact recreational shellfish harvesting.

3.14.2 Recreational Fishing

The waters in and around the project area offer recreational anglers excellent opportunities to catch an assortment of marine species using a variety of methods and is a popular destination. Charter sport fishing and head boats both make excursions out of the marinas located in the Inlet. The South Carolina Department of Natural Resources estimates that 98% of all spot, 30% of all flounder, and 23% of all red snapper taken in South Carolina waters are caught within the vicinity of Murrells Inlet (Salvino and Wachsmann 2013).

The Inlet is also provides opportunities for recreational crabbing, with both blue crabs (*Callinectes sapidus*) and stone crabs (*Menippe mercenaria*), both found in the Inlet. Brown and white shrimp are also found in Murrells Inlet and can be caught with a cast net.

Environmental Consequences

Preferred Alternative: While the proposed maintenance dredging and placement at the south terminal jetty at Huntington Beach State Park may be an inconvenience to recreational fishers during construction, it is not expected to have any long-term adverse effects on fishing activities in the area. Dredging for this project will be conducted with a pipeline dredge, which is stationary while working in a specific area. When the area within reach of the cutterhead has been dredged, the dredge swings forward slowly on its spuds to the next area. As result, the dredge and cutterhead are slow moving, allowing adequate time for mobile organisms to relocate out of the way.

Deepening the navigation channel will provide fishing vessels better access to and from Murrell's Inlet, which may actually improve commercial fishing. The presence of the dredge and associated equipment could create temporary inconveniences for boats navigating in the vicinity. However, since the dredge is either stationary or slow moving, it does not provide a swiftly moving target that must be avoided.

Navigational impacts are considered similar to any other channel area where pipeline dredging is being conducted.

No Impact Alternative: Not implementing the proposed project may have minor adverse effects as navigation will still be impacted by the shoal.

3.14.3 Recreational Boating

Murrells Inlet is one of the most popular recreational boating destinations along the Grand Strand and in all of South Carolina. Most of the boating activity in Murrells Inlet is limited to daytime use, with infrequent transient boat traffic (Waccamaw Regional COG, 2014). Murrells Inlet has one public boat ramp, two private boat ramps, and three marinas. The public boat ramp has three lanes, a courtesy dock and paved parking for up to 112 vehicle and trailers and is considered the five busiest ramps in the State of South Carolina (Waccamaw COG, 2014).

The three marinas within the Inlet are Voyager View, Crazy Sister (Formerly Captain Dick's), and Marlin Quay, all contain wet slips and Marlin Quay has slips for transient boaters. Both Marinas offer sport fishing opportunities and the Crazy Sister Marina conducts eco-tours, rents boats, jet skis, and kayaks.

Environmental Consequences

Preferred Alternative: Deepening the navigation channel will provide vessels better access to and from Murrell's Inlet, which may actually improve commercial fishing. The presence of the dredge and associated equipment could create temporary inconveniences for boats navigating in the vicinity. However, since the dredge is either stationary or slow moving, it does not provide a swiftly moving target that must be avoided. Short term effects will be temporary and minor.

No Impact Alternative: Not implementing the proposed project may have minor adverse effects as navigation will still be impacted by the shoal.

3.14.4 Other Recreational Opportunities

Recreational opportunities have the Inlet have expanded beyond traditional fishing/shellfishing/boating activities and now includes kayaking, paddle boarding, ecotourism, and bird watching. Huntington Beach State Park is a popular bird watching destination and recent walkways around the Inlet has also increased access to the marsh for recreation.

Environmental Consequences

Preferred Alternative: Implementing the Preferred Alternative would cause an inconvenience in many of the water related activities, as kayaks and paddle boards may have to avoid the excavation and construction areas and birds may be driven off during excavation and construction. These impacts are temporary and minor, as the construction can be navigated around and the birds will most likely use other areas of the Inlet. Once excavation and construction has ceased, normal recreational opportunities will resume.

No Action Alternative: No impacts to recreation would be expected as neither excavation nor construction would be implemented.

3.15 Aesthetics

Environmental Consequences

Preferred Alternative: The presence of assorted dredging and construction equipment will create a minor, temporary impact to the natural beauty of the project area. This temporary change would be observed by anyone navigating the project area by commercial or recreational vessels during project operations. However, these impacts are temporary, minor, and will not affect the preservation of this coastal setting. Existing conditions will return to the area following completion of the project.

No Action Alternative: No impacts to Aesthetics would be expected as neither excavation nor construction would be implemented.

CHAPTER 3 CUMULATIVE IMPACTS

Cumulative impacts are defined under section 1508.7 of NEPA as: "...the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." The following paragraphs summarize the cumulative impacts expected from the proposed project.

The Murrells Inlet Federal Navigation Channel was completed in 1981. Since construction, maintenance dredging has occurred twice with activities focused on the entrance channel, depositional basin, and the upper reaches of the inner channels. No excavation activities have occurred in the project area since initial construction. The proposed construction area has been used in previous maintenance dredging activities for the same purpose.

The proposed maintenance dredging of Inner Channel and the placement of the material adjacent to the terminal end of the south jetty is a temporary. Minimal adverse effects may be expected to result from this action, and this action should not contribute to any long-term or large-scale adverse impacts or detrimental effects on the overall ecological health of the Murrell's Inlet estuarine system. As is characteristic of any dredging operation, water turbidity in the vicinity of the dredge would increase as a result of both the mechanical action of the dredge and the placement of the dredged material. Due to the nature of the material, however, any increases in turbidity are expected to be insignificant and of short-term duration.

Benthic assemblages likely to occur in the dredging areas will be impacted during excavation, however they should recover after activities cease. The impacts would be a short-term as recolonization by organisms disturbed by the dredge and recruitment from adjacent areas would begin almost immediately after dredging is completed. The suitability of newly dredged areas for recolonization would of course, be dependent on the interaction of factors such as bottom topography, bottom substrates and habitats, water velocity and current patterns, and future sediment distribution patterns. However, since the composition of bottom sediments is not expected to change appreciably as a result of the maintenance activities, it is expected that the populations that eventually become established would be similar to those presently found in the area.

Nekton, because of their mobility, is less likely to be adversely affected by the dredging and construction. Dredging may temporarily enhance foraging for fish as the dredge activity will expose normally hidden infauna to predation.

The project would temporarily present minor disturbances to many commercial and recreational activities, however these disturbances will cease when project is completed.

As previously discussed, the proposed action is being undertaken in conjunction with other dredging and maintenance activities within the Federal Navigation Channel. The amount of excavation and deposition as a result of this project is similar to other activities in the Inlet and the amount of excavation and deposition is minor as shown in the Table below:

Table 6. Comparison of Propose Project Excavation and Deposition to with other Concurrent Dredging Projects in the Murrells Inlet Federal Channel

Location	Approximate Cubic Yards Dredged	Approximate Cubic Yards Placed
Entrance Channel	95,000	0
Inner Channel A	40,000	0
Deposition Basin	423,000	0
Inner Shoal B	25,000	
Garden City Beach	0	478,000
Terminal West End of Jetty Huntington Beach SP	0	105,000

The proposed action does not constitute a major Federal action significantly affecting the quality of the human environment; therefore, the preparation of an Environmental Impact Statement (EIS) is not required.

Given the size of the project, the overall many minor and temporary nature of any adverse effects, and the beneficial use of the dredged material, there should be little cumulative impact resulting from the proposed project.

CHAPTER 4 COORDINATION

Executive Order 12372, Intergovernmental Review of Federal Programs, states that Federal agencies shall provide opportunities for consultation by elected officials of those State and local governments that would provide the non-federal funds for or that would be directly affected by, proposed Federal financial assistance or direct Federal development.

Clean Water Act

The proposed activities outlined in the Preferred Alternative are regulated under the Clean Water Act. A 404(b)(1) Analysis of the project is found in Appendix C. A 401 Water Quality Certification will be applied for. No activities will be initiated until both the 404(b)(1) and the 401 WQC are issued

Clean Air Act

The proposed project has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under the proposed project are exempt by 40 C.F.R. Part 93.153.

Endangered Species Act

The requirements of Section 7 of the Endangered Species Act of 1973 would be fulfilled upon completion of consultation with the USFWS. Project documentation is being provided to the USFWS for their review and comment.

Farmland Protection Policy Act

Not applicable with respect to the preferred alternative.

Fish and Wildlife Coordination Act

The proposed project is being coordinated with the USFWS in order to fulfill the requirements of Section 2(a) of the Fish and Wildlife Coordination Act.

Floodplain Management (EO 11988)

Not applicable with respect to the preferred alternative.

Protection of Wetlands (EO 11990)

Not applicable for this project.

National Wild and Scenic Rivers

Not applicable for this project.

National Historic Preservation Act (NHPA)

The proposed project has been reviewed for historic properties (cultural resources listed on or eligible for listing on, the National Register of Historic Places) pursuant to regulations implementing Section 106 of the National Historic Preservation Act (NHPA). In accordance with 36 C.F.R. §800.4(d) (1), it was determined that the proposed undertaking would have no effect on historic properties. Documentation of this determination is being coordinated with the South Carolina State Historic Preservation Officer.

Coastal Zone Management Act

A Coastal Zone Consistency Certification will be applied for. The proposed project will not proceed until a CZM has been issued.

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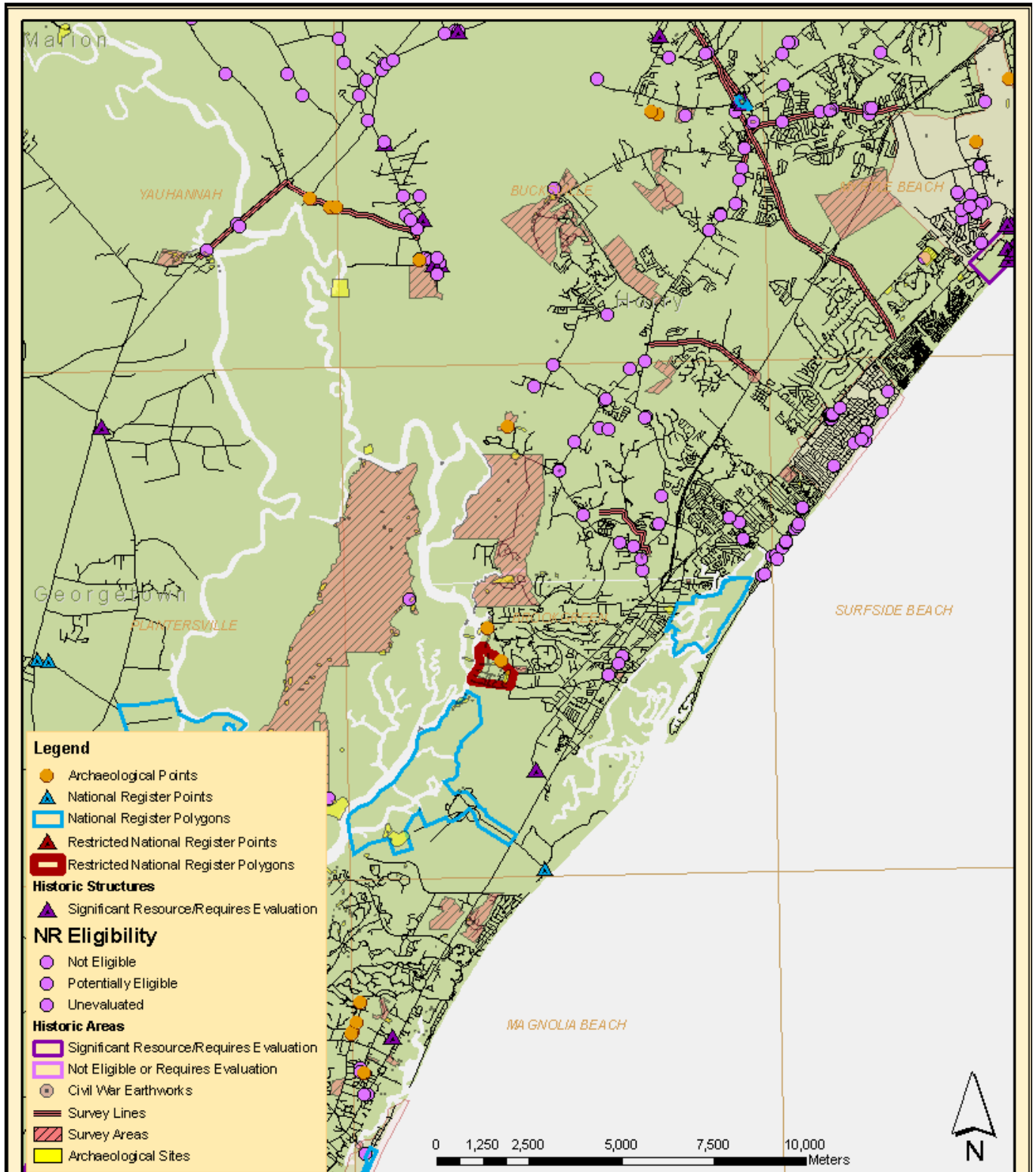
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APPENDIX A: CULTURAL RESOURCES MAP

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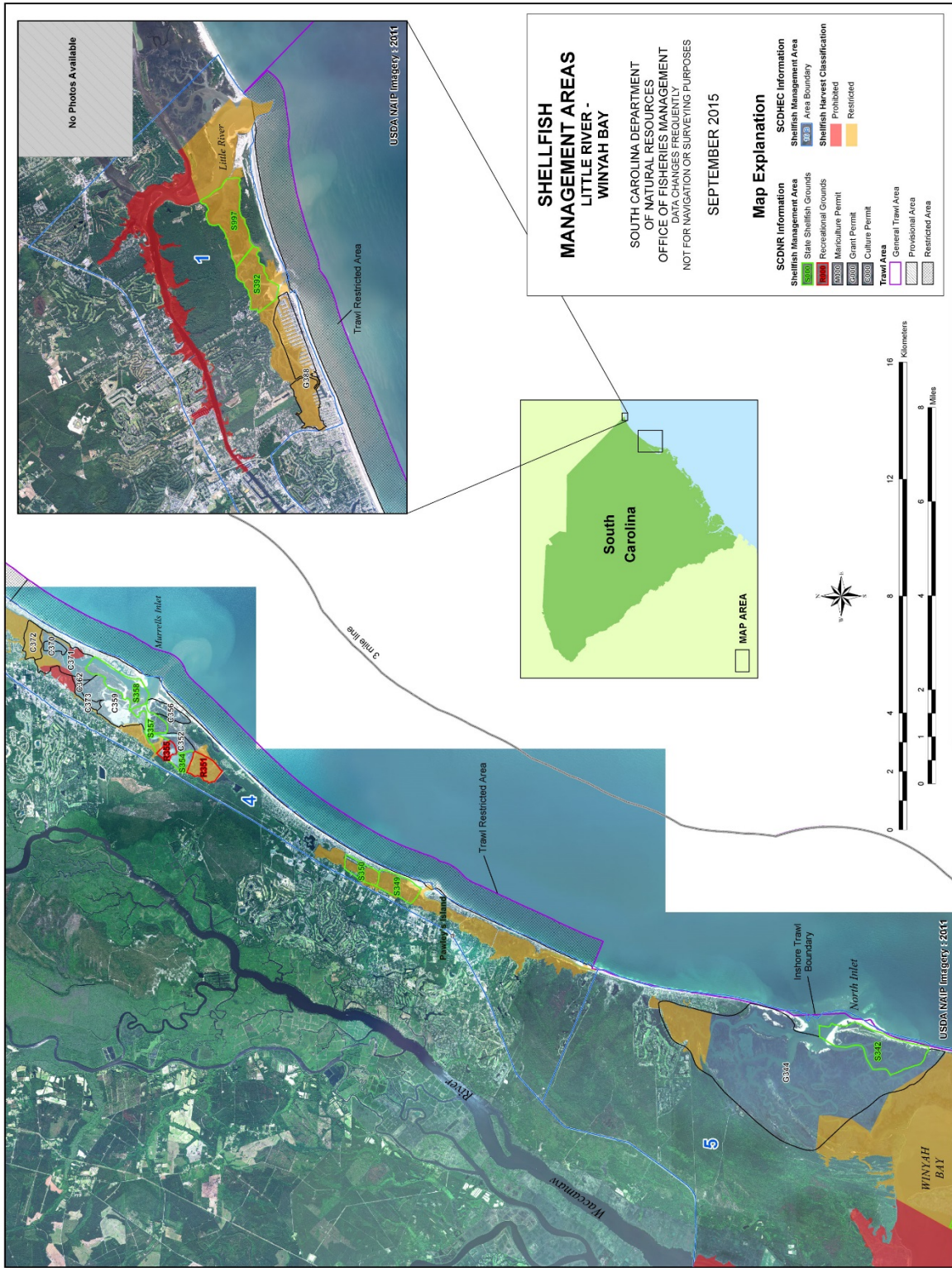
Disclaimer: This map is a product of the University of South Carolina Department of Computer Services. The data depicted on this map have been developed through a joint project involving the South Carolina Institute of Archaeology and Anthropology, the South Carolina Department of Archives and History, and the South Carolina Department of Transportation. These parties expressly disclaim responsibility for damages or liability that may arise from the use of this map.

Murrells Inlet



**APPENDIX B: SHELLFISH GROUNDS IN MURRELLS
INLET**

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APPENDIX C: 404(b) (1) ANALYSIS

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**US Army Corps
of Engineers**

**(Draft) Clean Water Act Section 404(b)(1) Evaluation
Maintenance Dredging of the
Murrells Inlet Federal Navigation Project**

Prepared by:
U.S. Army Corps of Engineers, Charleston District

July 15, 2016

I. Project Description

a. Location and General Description

Murrells Inlet is a small, tidally driven estuary located on the northeast coast of South Carolina at the Horry County-Georgetown County Border. The Inlet is flanked by Surfside Beach and Garden City Beach to the northeast, Huntington Beach to the southwest, and US Highway 17 Business. The Inlet's dimensions are approximately five and one half nautical miles length and one to one mile in width. The watershed draining into the Inlet is approximately 10,250 acres, with approximately 3,108 acres considered suitable for shellfish production. Tidal range varies from 4.2 feet to 5.3 feet within the Inlet. The Inlet contains intertidal mudflats, marshes, oyster beds, tidal creeks and created canals. The average depth of the main channel is around 13 feet (SCDHEC, 2005). Freshwater input is limited to overland runoff and groundwater contribution, thus salinity is usually above 30 parts per thousand.

This Section 404 (b)(1) evaluations addresses the discharge of dredged or fill material into the waters of the U.S. The U.S. Army Corps of Engineers (USACE) prepared a draft Environmental Assessment for the excavation and deposition of the Inner Shoal B located in the Murrells Inlet Federal Channel near Marlin Quay Marina.

c. Alternatives Considered

Section 404(b)(1) guidelines of the Clean Water Act requires 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 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." During the NEPA process the following alternatives were thoroughly reviewed: No Action Alternative, and multiple Principles and Guidelines Based Alternatives (P&G alternative). During the P&G Alternative, alternative measures were analyzed. The P&G and NEPA selected alternative that met the project goal is outlined below.

The proposed alternative includes excavation and disposal of 25,000 yd³ of material dredged from a one and one eighth acre of the Murrells Inlet Federal Navigation Channel near Marlin Quay Marina referred to as Inner Shoal B. The material will be excavated by using hydraulic pipeline cutterhead dredge. The dredged material will be deposited within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty. The material would be used to provide protection to the terminal end of the jetty and to restore shorebird habitat. The material would be placed between two containment dikes to prevent runoff into areas outside of the construction zone. The dikes will be set at an elevation of + 2 Mean High Water (Figure 6). This material placed with material from other excavation areas and will be part of a 105,000 yd³ depositional effort. This area was originally identified as a depositional placement area in the 1976 Environmental Assessment and has been used of this purpose in previous maintenance dredging efforts.

d. Authority and Purpose

The project was authorized by the House Committee on Public Works on 10 November 1971 and the Senate Committee on Public Works on 18 November 1971, under authority of Section 201, P.L. 89-298, and 1965 Flood Control Act. Section 67 of the Water Resources Act of 1974

authorized interim maintenance to permit free and safe movement of vessels until the authorized project was completed. The project construction initiated in September 1977 and completed in August 1981. The project also authorized channel maintenance.

The purpose of this Project is to provide safe navigation for existing and prospective vessel traffic by maintaining a safe navigation channel from the 12-foot contour in the open ocean to the village of Murrell's Inlet. Shoals have accumulated in areas within the channel and are impacting navigation. Portions of the entrance channel, inner channels A and B, and the deposition basin will be dredged with the material being placed either on Garden City Beach or Huntington Beach State Park, respectively.

The proposed action is being undertaken in conjunction of other maintenance dredging actions within Murrells Inlet that include dredging of the entrance channel, inner shoal, and the depositional basin, as seen in Figure 3. Therefore, this Environmental Assessment will address only the impacts from dredging approximately 25,000 yd³ of material from a one and eight tenths acre reach of the Federal Channel near Marlin Quay Marina (Inner Shoal B) and placing the dredged material within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty (Figure 3). The impacts resulting from dredging the entrance channel, the deposition basin, Inner Channel A are addressed in the 2001 Environmental Assessment and the 1976 Environmental Impact Statement.

d. General Description of Dredged or Fill Material

(1) General Characteristics of Material

The proposed project involves the excavation of 25,000 yd³ of material dredged from a one and one eighth acre of the Murrells Inlet Federal Navigation Channel near Marlin Quay Marina referred to as Inner Shoal B. The material will be excavated by using hydraulic pipeline cutterhead dredge. The dredged material will be deposited within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty.

Testing of the material shows that it is approximately 78% sand, 6% silt and 14 % sand.

e. Description of the Proposed Discharge Sites

(1) Location and Disposal Method

The proposed discharge site is near the terminal end of the south jetty of Huntington Beach State Park. This area has been used in previous maintenance dredging operations as a disposal site. The site is approximately 3.8 acres in size. The material would be placed between two containment dikes to prevent runoff into areas outside of the construction zone. The dikes will be set at an elevation of + 2 Mean High Water. The material would be used to provide protection to the terminal end of the jetty and to restore shorebird habitat. This area was originally identified as a depositional placement area in the 1976 Environmental Assessment and has been used of this purpose in previous maintenance dredging efforts. Material will be pumped to the disposal site using a cutterhead dredge and placed using a bulldozer or similar equipment.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Substrate

The substrate of the both the excavation and deposition site is sands and silts.

(2) Sediment Type

Sediments at the project sites are mostly fine sediments, sands, and deposited material from the River Bank.

(3) Dredged/Fill Material Movement

Movement of fill material is not expected, however fine grained materials are expected to be lost during the dredging process.

(4) Physical Effects on Benthos

Temporary and localized impacts to benthic organisms and their habitats would occur in the immediate areas of construction and deposition placement; however, benthic organisms are expected to quickly rebound from the short-term impacts of material placement.

(5) Other Effects

No other effects are known.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water

- (a) **Preferred Alternative:** Implementation of the proposed project would result in temporary, minor water quality degradation at the dredging and disposal sites. Although dredging and disposal activities typically contribute to localized turbidity increases, the sandy sediments which will be utilized for this project tend to settle rapidly, so the turbidity increase should be minor and of short duration. Chemical analysis of sediments and elutriate parameters from this shoal has revealed no significant concentration of toxic or harmful substances that could adversely affect water quality of the area. The very low concentrations of organic matter in the sandy sediments should result in very little, if any, dissolved oxygen depression. Hence, water quality impacts from project construction should be insignificant and the State's Classification Standards should not be contravened.

(b) Salinity

There are no impacts expected to salinity.

(c) Water Chemistry

There are no impacts expected to water chemistry.

(d) Clarity

There may be a local and temporary increase in turbidity during excavation and deposition construction activities. Water clarity is expected to improve, from preconstruction conditions, shortly after operations are completed

(e) Color

Water immediately surrounding the excavation and construction areas may become discolored temporarily due to disturbance of the sediment.

(f) Odor

There are no expected impacts with respect to odor.

(g) Taste

There are no expected impacts with respect to taste.

(h) Dissolved Gas Levels

There are no expected impacts with respect to dissolved gases

(i) Nutrients

There are no expected impacts with respect to nutrients.

(j) Eutrophication

Construction activities would not lead to eutrophication of surrounding waters.

(k) Others as Appropriate

None known

(2) Current Patterns and Circulation

(a) Current Patterns and Flow

Construction activities would not have an effect on inflows to the system or water surface elevations.

(b) Velocity

Placement of material within the channel would not significantly impact velocities.

(c) Stratification

No change in this condition is expected.

(d) Hydrologic Regime

Hydrologic regimes would not be altered with placement of material.

(3) Normal Water Level Fluctuations.

No change in this condition is expected.

(4) Salinity Gradients.

No change in this condition is expected.

(5) Actions That Would Be Taken to Minimize Impacts

The proposed excavation is limited to removing accumulated sediments and returning the Federal Navigation Channel to its original design. There are no plans to expand the footprint of the Federal Navigation Channel.

c. Suspended Particulate/Turbidity Determination

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

As is characteristic of any dredging operation, water turbidity in the vicinity of the dredge would increase as a result of both the mechanical action of the dredge and the placement of the dredged material. Due to the nature of the material, however, any increases in turbidity are expected to be insignificant and of short-term duration.

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

(a) Light Penetration

Turbidity levels would increase during both the excavation and construction phases of the project, however these increases are temporary and minor and would cease after the proposed project is completed.

(b) Dissolved Oxygen

No adverse impacts to dissolved oxygen (DO) are expected.

(c) Toxic metals and organics

Based on the water and sediment chemistry, the excavation and placement of the material adjacent to Huntington Beach State Park should have no impact to water quality and will not cause a toxicity problem with respect to either human health or aquatic life.

(d) Pathogens

None expected or found.

(e) Aesthetics

No impacts to aesthetics are expected.

(f) Others as Appropriate

None known

(3) Effects on Biota

No impacts are expected on photosynthesis, suspension/filter feeders, and sight feeders, except for temporary and localized impacts from the excavation and placement operations.

(4) Actions Taken to Minimize Impacts

The proposed excavation is limited to removing accumulated sediments and returning the Federal Navigation Channel to its original design. There are no plans to expand the footprint of the Federal Navigation Channel.

d. Contaminant Determinations

Sediment testing has shown that there are no known contaminants existing in the proposed excavation material.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

Some of the planktonic organisms entrained by the dredging operations will suffer injury or mortality. Turbidity resulting from the dredging activity may reduce primary productivity by phytoplankton as light penetration into the water column is reduced. Both of these potential effects on plankton are expected to be minor and temporary as they would coincide in significance with the short duration of dredging.

(2) Effects on Benthos

Some of these organisms may be destroyed during the dredging of the shoal, however, the long-term productivity of the area should not be affected to any significant degree. Repopulation will commence shortly after construction is completed and species composition should be similar to that which existed prior to construction. The effects will be minor and temporary.

(3) Effects on Nekton

Nekton, because of their mobility, are less likely to be adversely affected by the dredging and beach work than benthic invertebrates. Dredging can be beneficial to certain species of fish, especially those that prey on larger benthic organisms. During the dredging operation, benthic organisms buried in the sediments are dislodged and become susceptible to predation. Similarly, organisms dislodged from sandy sediments during beach disposal, become prey by fishes inhabiting the surf zone.

Due to the sandy nature of the sediments proposed for dredging (Approximately 78% sands), turbidity plumes will be minimal and restricted primarily to the dredging and disposal areas. Fish species that would have the highest probability of being affected are the filter feeders (primarily menhaden, herring, and shad) and juvenile forms. Some larval fishes may be destroyed by the mechanical action of the cutterhead. However, information from similar dredging projects in other areas indicates that impacts would be temporary and minor, and would not significantly affect the fish stocks.

(4) Effects on Aquatic Food Web

Reductions in primary productivity from turbidity would be temporary and localized around the immediate area of the excavation and construction sites and would be limited to the duration of the plume at a given site.

(5) Effects on Special Aquatic Sites

Excavation and construction activities will not have detrimental effects on special aquatic sites in the study area (i.e., sanctuaries and refuges, wetlands, mudflats).

(6) Threatened and Endangered Species

No adverse impacts to endangered species are anticipated

(7) Other Wildlife

No significant impacts to other wildlife species are anticipated.

(8) Actions to Minimize Impacts

USACE is coordinating with the USFWS regarding potential impacts to threatened and endangered species in the action area.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination

N/A

(2) Determination of Compliance with Applicable Water Quality Standards

In the No Action Alternative condition, water and sediment quality are not expected to substantially change in the Ohio River or its surrounding waters.

For the proposed project alternative, no violation of water quality standards is anticipated.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply

NA

(b) Recreational and Commercial Fisheries

The proposed maintenance dredging and placement of material at the south terminal jetty at Huntington Beach State Park may be an inconvenience to commercial and recreational fishers during construction, it is not expected to have any long-term adverse effects on fishing activities in the area. Dredging for this project will be conducted with a pipeline dredge, which is stationary while working in a specific area. When the area within reach of the cutterhead has been dredged, the dredge swings forward slowly on its spuds to the next area. As

result, the dredge and cutterhead are slow moving, allowing adequate time for mobile organisms to relocate out of the way

Deepening the navigation channel will provide fishing vessels better access to and from Murrell's Inlet, which may actually improve commercial fishing. The presence of the dredge and associated equipment could create temporary inconveniences for boats (recreational and commercial) navigating in the vicinity. However, since the dredge is either stationary or slow moving, it does not provide a swiftly moving target that must be avoided.

(c) Water-related Recreation

Implementing the proposed project would cause an inconvenience in many of the water related activities, as kayaks and paddle boards may have to avoid the excavation and construction areas and birds may be driven off during excavation and construction. These impacts are temporary and minor, as the construction can be navigated around and the birds will most likely use other areas of the Inlet. Once excavation and construction has ceased, normal recreational opportunities will resume.

(d) Aesthetics

No impacts to aesthetics are expected.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

NA.

g. Determination of Cumulative Effects on the Aquatic Ecosystem

The construction activities of the proposed project are expected to have negligible impacts to Huntington Beach State Park and will have the beneficial effect of protecting the jetty and restoring habitat for shorebirds.

h. Determination of Secondary Effects on the Aquatic

No adverse significant secondary effects on the aquatic ecosystem should occur as a result of the proposed project.

III. Findings of Compliance with Restrictions on Discharge with the Restrictions on Discharge

a. Determination of Compliance with Applicable Water Quality Standards

The discharges associated with the proposed project alternative are not anticipated to cause or contribute to violation of any water quality standards. A Clean Water Act Section 401 Water Quality Certification will be obtained from the State of South Carolina before commencing any work in waters of the U.S.

b. Determination of Compliance with Other Restrictions on Discharge.

(1) There is no practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem.

(2) The proposed discharge will not cause or contribute to significant degradation of waters of the United States.

(3) All appropriate and practicable steps have been taken to minimize any potential adverse effects on the aquatic ecosystem.

(4) Coordination with the USFWS is ongoing. It is anticipated that the proposed discharge will not jeopardize the continued existence of any species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or to result in destruction or adverse modification of any habitat determined by the Secretary of the Interior under that Act to be critical habitat.

1. No significant adaptations of the Guidelines were made relative to the evaluation for this project.
2. The proposed project is the result of thorough evaluation of four proposed alternatives (including the No-Action Alternative).
3. The proposed project would not violate any applicable State or Federal water quality criteria or toxic effluent standards of Section 307 of the Clean Water Act.
4. The proposed project would not adversely affect any federally or State-listed threatened or endangered species or their critical habitat or violate any protective measures for any sanctuary. The US Fish and Wildlife Service is being consulted regarding the potential issues of any federally or State-listed threatened or endangered species or their critical habitat.
5. The proposed project would not result in adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. There are no significant adverse impacts expected to the aquatic ecosystem diversity, productivity and stability, or recreational, aesthetic, and economic values.
6. Appropriate steps to minimize potential adverse impacts on the estuarine system include close coordination with the State and Federal resource agencies during the final design prior to construction to incorporate all valid suggestions.
7. On the basis of the guidelines, the proposed construction is specified as complying with the requirement of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

Date

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Commander and District Engineer