



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

**FINDING OF NO SIGNIFICANT  
IMPACT  
MAINTENANCE DREDGING OF AN INNER  
SHOAL of the MURRELLS INLET FEDERAL  
NAVIGATION PROJECT**

Prepared by:  
United States Army Corps of Engineers  
Charleston District

## **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 1). 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 yd<sup>3</sup> 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. This material will be placed at an existing, previously evaluated and used disposal area in a manner that will both protect the terminal end of the south jetty at Murrells Inlet and create additional habitat for listed species. This FONSI addresses dredging of a shoal that had not previously been covered under NEPA and other environmental compliance requirements.

## **Preferred Alternative and No-Action Alternative**

The preferred alternative involves the removal of approximately 25,000 yd<sup>3</sup> 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, socioeconomic, 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.

<b>Summary of Potential Environmental and Socioeconomic Consequences</b>		
<b>Resource</b>	<b>Preferred Alternative</b>	<b>No-Action Alternative</b>
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 too 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.

## Summary

The draft Supplemental EA and FONSI has been distributed for a 30-day comment and review period. The final Supplemental EA addresses the comments received during this review period. Since the Corps' findings demonstrate that the project will not significantly adversely affect environmental resources or human health, the proposed action does not represent either a substantial change to the Project relevant to environmental concerns or present significant new circumstances or information relevant to environmental concerns, the preparation of a Supplemental Environmental Impact Statement is not warranted. The full Supplemental EA can be downloaded from the internet at <http://www.sac.usace.army.mil/Missions/CivilWorks/NEPADocuments.aspx>

3 Apr 17  
DATE

  
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**Figure 1. Murrells Federal Navigation Channel**





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CHARLESTON DISTRICT, CORPS OF ENGINEERS  
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**SUPPLEMENTAL ENVIRONMENTAL  
ASSESSMENT (EA) for  
MAINTENANCE DREDGING OF AN INNER  
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# CHAPTER 1 INTRODUCTION

## 1.1 Description of Document

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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. Previous NEPA documents for the Project include:

*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.*

Additional and updated coordination with Federal and State resource agencies has occurred in conjunction with this EA. The purpose of this EA is 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. If the impacts are considered insignificant, and the proposed action does not represent either a substantial change to the Project relevant to environmental concerns or present significant new circumstances or information relevant to environmental concerns, a Finding of No Significant Impact (FONSI) would be issued.

## 1.2 Project Authorization

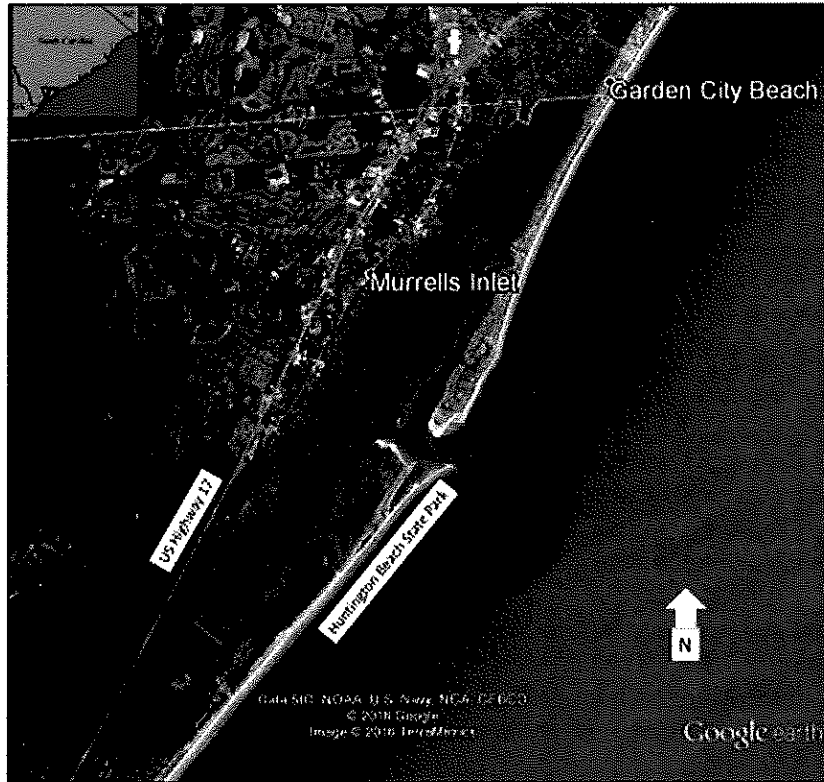
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The project was authorized by the House Committee on Public Works on 10 November 1971 and the Senate Committee on Public Works on 18 November 1971, under authority of Section 201, P.L. 89-298, and 1965 Flood Control Act. Section 67 of the Water Resources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

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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 yd<sup>3</sup> of material from a one and eight tenths acre reach of the Federal Channel near Marlin Quay Marina (Inner Shoal B) which has not been dredged since construction of

the original project, and placing the dredged material at the previously used placement area within the intertidal zone of the Huntington Beach State Park, near the terminal end of the South jetty (Figure 3). This placement areas has been previously used during initial construction of the project and in two subsequent maintenance events. The impacts resulting from dredging the entrance channel, the deposition basin, Inner Channel A, and placing material on Garden City Beach and within Huntington Beach State Park 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 2 ALTERNATIVES**

### **2.1 Proposed Action**

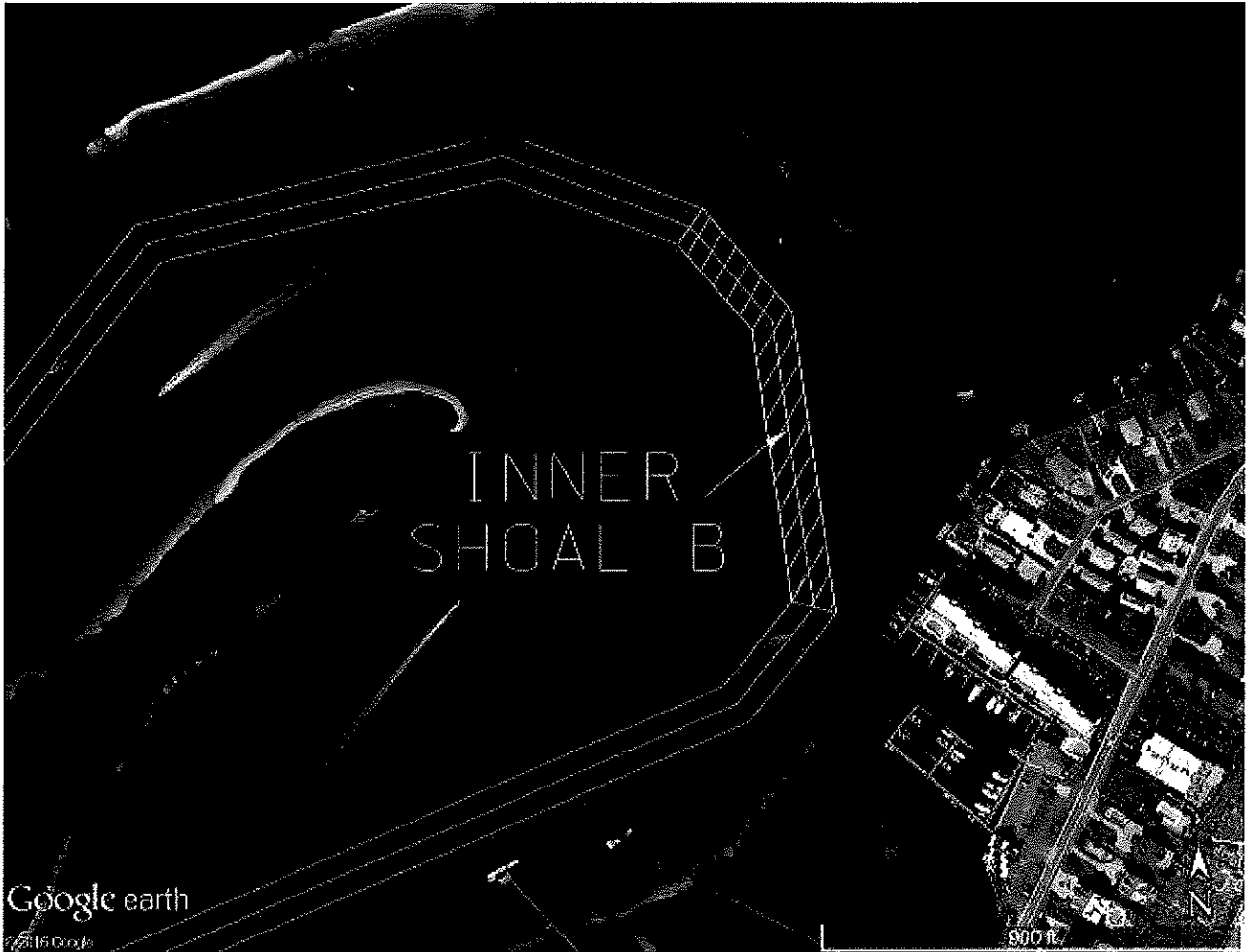
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The proposed action includes excavation and disposal of 25,000 yd<sup>3</sup> of material dredged from a one and one eighth acre of the Murrells Inlet Federal Navigation Channel near Marlin Quay Marina referred to as Inner Shoal B (Figure 4). The material 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)**

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This Alternative would require transport, via pipeline of all the excavated material to an enclosed upland facility for storage. In some cases, deposit into a CDF is advantageous in that it can 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, so this option would be cost-prohibitive. In addition, the material is suitable for inshore placement and placement in a CDF would have the undesirable effect, in this case, of removing it from the system and precluding beneficial use. This Alternative is eliminated from further evaluation.



**Figure 4. Proposed Dredge Area**

### **2.3 Alternative 2: Upland Storage and Dewatering**

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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. Even assuming that space was available, this alternative, too, would be cost-prohibitive. In addition, the material is suitable for inshore placement and placement in a CDF would have the undesirable effect, in this case, of removing it from the system and precluding beneficial use. Accordingly, this alternative is eliminated from further evaluation.



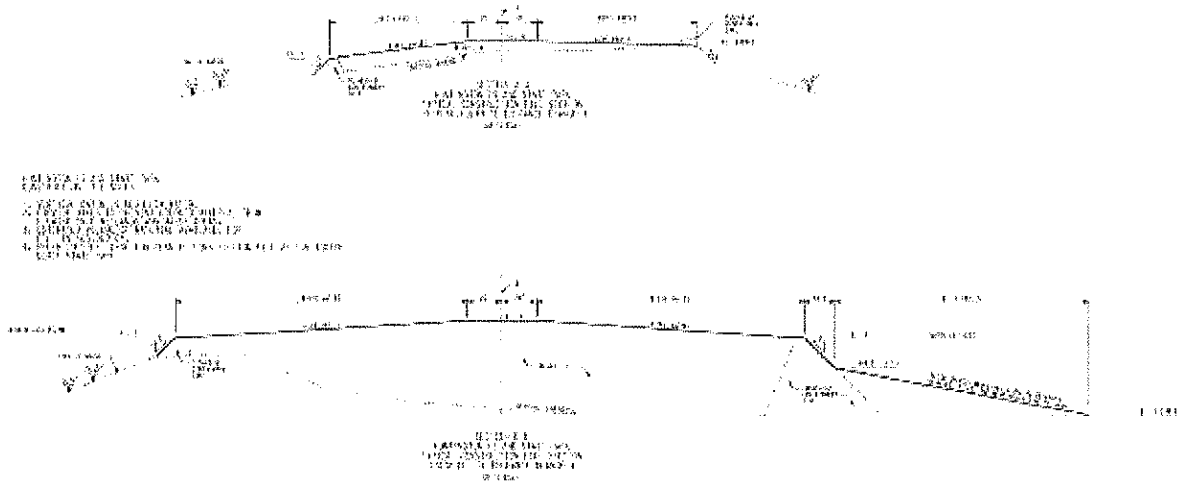
## 2.4 Alternative 3: Using the Dredged Material for Beneficial Use (Preferred Alternative)

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 yd<sup>3</sup> 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. There will be no beneficial use placement of materials to serve the dual purpose of protecting the jetty and restoring bird habitat.

## 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 addressed 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 3 ENVIRONMENTAL SETTING AND CONSEQUENCES

## 3.1 Project Location

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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

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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

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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

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

#### 3.4.1 Open Water

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

#### 3.4.2 Plankton

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

### 3.4.3 Nekton

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

### 3.4.3 Benthos

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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, protists, 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 Action Alternative:** No impacts to the benthic would be expected as neither excavation nor construction would be implemented.

### **3.4.4 Other Animals**

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

### **3.4.5 Tidal Marsh**

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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 Action 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**

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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 Action 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

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

### 3.5.2 TMDL

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

### 3.5.3 Sediment

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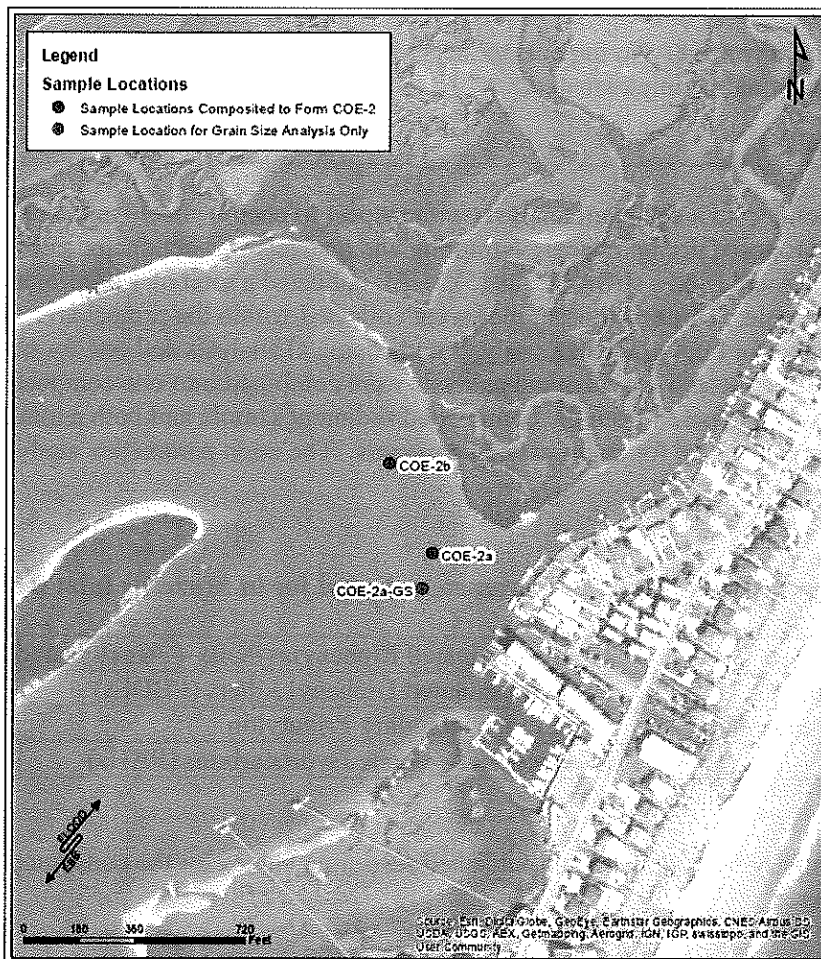
GEL Engineering conducted a sediment analysis with respect to chemical contaminants and grain size composition of the proposed dredging area. Sampling and analysis was conducted per USACE sediment sampling analysis protocol (SAP) (USACE, 2015). GEL collected a total of 14 sediment samples, and a background water sample. Three of the samples were collected within the project area (Figure 5). Two samples were collected for both grain size analysis and chemical analysis and one for only grain size analysis. The samples collected for chemical analysis were combined into one composite sample. In addition, elutriates were prepared from the composited sediment sample and both a total and dissolved elutriate fraction were analyzed for chemical contaminants. The main parameters analyzed are shown in the table below:

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

Metals	Polychlorinated Biphenyls (PCBs – Aroclors and congeners)
Dioxins and furans	Polybrominated Diphenyl Ethers (PBDEs)
Chlorinated Pesticides	Butyltins, including Tributyltin
Grain Size	PolycyclicAromatic Hydrocarbons (PAHs)

Sediment bulk chemistry was compared to published 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** – Several PCB Congeners were detected in the sediment sample, however the concentration was below 1.0  $\mu\text{g}/\text{kg}$ , indicating that the concentrations were very low; therefore, PCB congeners are not a contaminant of concern in the sediment.

**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 ng/kg; therefore, dioxins and furans are not a contaminant of concern in the sediment.

**PBDEs** – Several PBDE compounds were detected, however the reported concentrations were below SAP required detection limits; therefore, PBDEs are not a contaminant of concern in the sediment.

The elutriate samples 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 (both total and dissolved) exceeded the CCC value of 36 µg/l, but did not exceed the other criteria. Since the CMC and ASV criteria were not exceeded, arsenic is not a contaminant of concern in the water column.

**Copper** -The CCC, CMC, and ASV criteria were all exceeded in the total sample. Copper was below the detection limit in dissolved sample. Since the screening criteria are based on the dissolved fraction in the water column, copper is not a contaminant of concern in the water column.

**Nickel** - Nickel (both total and dissolved) exceeded the CCC value of 8.3 µg/l, but did not exceed the other criteria. Since the CMC and ASV criteria were not exceeded, nickel is not a contaminant of concern in the water column.

Several parameters (PCB Congeners, Dioxins, and PBDEs do not have CCC, CMC nor ASV values and their results are discussed below:

**PCB Congeners** – Several PCB Congeners were detected in both the total and dissolved sample; however, the concentrations were below 0.1 ng/L, indicating that the concentrations were very low. Because of the very low detections, PCB Congeners are not a contaminant of concern in the water column.

**Dioxins and Furans** - Dioxins and Furan Toxic Equivalency Quotients (TEQs) were calculated for both the total and dissolved sample per World Health Organization (2005) protocol. All reported TEQ concentrations were below 0.01 ng/L; therefore, dioxins and furans are not a contaminant of concern in the water column.

**PBDES** – Several PBDE compounds were detected in both the total and dissolved sample, however the reported concentrations were below SAP required detection limits. Therefore, PBDEs are not a contaminant of concern in the water column.

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

finer at both the excavation and construction site, however, this impact should be minor and temporary.

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

### 3.6 Terrestrial Resources and Wildlife

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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

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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 (PM<sub>10</sub>), Particulate Matter (PM<sub>2.5</sub>), 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 Action 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 manatus</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
Red knot	<i>Calidris canutus rufa</i>	Threatened	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 oxyrhynchus oxyrhynchus</i> *	Federally Endangered	Known
Sea-beach amaranth	<i>Amaranthus pumilus</i>	Federally Threatened	Known
West Indian manatee	<i>Trichechus manatus</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 oxyrhynchus oxyrhynchus</i>	Federally Endangered	02/06/12

In addition to the species listed in the tables above, there are federally listed species that occur 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 that will not be impacted by this project**

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
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:** A biological opinion was issued on maintenance dredging in Murrells Inlet in 2001. However, since the issuance of that opinion new species or habitats have been listed and, as such, new coordination with the USFWS was required for this action. A biological assessment covering the proposed project and other Corps actions at Garden City Beach and Myrtle Beach was prepared and coordinated with the USFWS. This document examined the potential impacts of this 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 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 and that this placement will likely restore and/or improve piping plover habitat.

A biological opinion, covering the proposed project, was issued by the USFWS on August 10, 2016. Coordination with NMFS for maintenance dredging in Murrells Inlet was conducted in 2001. Additional coordination with NMFS regarding ESA and EFH was conducted in June 2016. No significant changes from the coordination conducted in 2001 occurred. NMFS responded to the draft EA and a letter from USACE requesting concurrence on EFH compliance and ESA determinations by letter on October 18, 2016. They concurred that the previous documentation was still valid and that the addition of the inner shoal would cause no significant changes and that additional coordination was not required.

**No Action 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)**

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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**

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#### **Environmental Justice and Protection of Children**

The goal of environmental justice is to ensure that all Americans are afforded the same degree of protection from environmental and health hazards and have equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work. On February 11, 1994, President Bill Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," to focus Federal agencies' attention on the environmental and human health conditions in minority and/or low-income communities with the goal of achieving environmental justice. The Executive Order directs Federal agencies to make environmental justice part of their mission to the greatest extent practicable and permitted by law.

Executive Order 13045 requires the Protection of Children from environmental health risks and safety risks. It states that the Federal government would review the effects of its proposed actions on children, because they may suffer disproportionately from environmental health risks and safety risks. Federal agencies are to "identify and assess environmental health risks and safety risks that may disproportionately affect children;" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."



## Demographics

The proposed project is located entirely within Georgetown County. The Murrells Inlet Navigation Channel is contained within two census block groups (450439205022, and 450439205012) (Figure 3). Key demographic measures for these census block groups are given in Table 6. The total population from the US Census Bureau's American Community Survey (ACS) within these census block groups is 2,738 (Table 2). The percent minority within the analyzed census block groups ranges from a low of 6% to a high of 7% (Table 2). The mean percent minority within the census block groups of interest is 6.5%. The percent low income within the analyzed census block groups ranges from a low of 27% to a high of 33% (Table 2). The mean percent below the poverty level within the census block groups of interest is 30%.

**Table 6. Demographic data for census block groups adjacent to the navigation channel and the placement areas. All data is taken from the USEPA's environmental justice mapping and screening EJSCREEN. Definitions of table metrics are available online at: <https://www.epa.gov/ejscreen/overview-demographic-indicators-ejscreen>**

<b>Blockgroup ID:</b>	450439205012	450439205022
<b>State:</b>	SC	SC
<b>Total Population (ACS):</b>	775	1963
<b>Supplementary Demographic Index:</b>	13% (37%ile)	13% (38%ile)
<b>% minority:</b>	7% (17%ile)	6% (14%ile)
<b>% low income:</b>	33% (52%ile)	27% (42%ile)
<b>% linguistic isolation:</b>	0% (44%ile)	0% (44%ile)
<b>% less than high school:</b>	8% (38%ile)	7% (35%ile)
<b>% under age 5:</b>	0% (3%ile)	5% (35%ile)
<b>% over age 64:</b>	32% (96%ile)	36% (97%ile)
<b>Demographic Index:</b>	20% (30%ile)	16% (22%ile)

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.

## Environmental Consequences

**Preferred Alternative:** According to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, each federal agency must conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, national origin, or income level. Agencies must ensure that disproportionately high and adverse effects are not being imposed on minority or low-income areas by federal actions.

The area of impact from the proposed project does not contain disproportionate populations of minority, juvenile, elderly, or low-income communities when compared to the surrounding area.

No significant construction or operation impacts to the human environment are expected from construction of the proposed project. Therefore, populations of minority, juvenile, elderly, or low-income families would not be disproportionately affected by the proposed deepening. Schools/childcare facilities and hospitals are not disproportionately located near the proposed project, so disproportionate impacts to children are not expected.

The proposed project is not designed to create a benefit for any group or individual, but rather provides a region-wide benefit. There are no indications that the proposed maintenance dredging of a federal navigation channel would be contrary to the goals of Executive Order 12898, or would create disproportionate high and adverse human health or environmental impacts on minority or low-income populations of the surrounding community. Implementation of the proposed project would cause no significant adverse environmental impacts to residents in Georgetown County, or surrounding counties regardless of race, national origin, or level of income of residents. Disproportionate adverse effects to minority or low-income individuals would not occur. In all, the Corps has determined that in the absence of adverse impacts to human health, environmental health risks, and safety risk, this project will have no significant or disproportional negative impacts to any communities, including environmental justice communities or children. Therefore, the Corps has satisfied the requirements of the Environmental Justice Executive Order 12898.

**No Action Alternative:** No positive or negative impacts to environmental justice communities would occur if the project is not implemented.

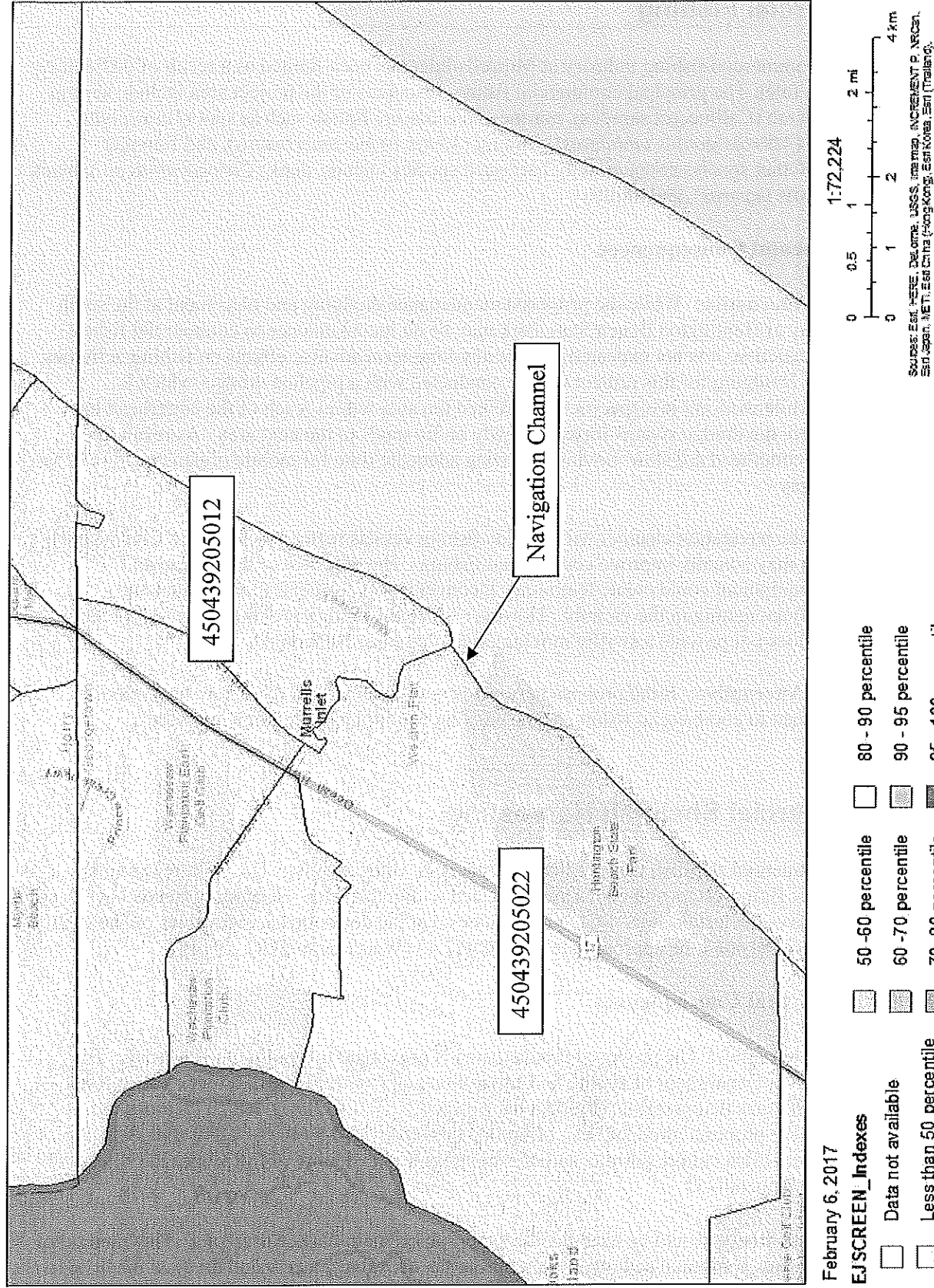


Figure 7. Map of Murrells Inlet showing percent minority for census block groups adjacent to the navigation channel and placement area

### 3.11.1 Commercial Fishing

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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 Action 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. Detailed maps provided by the SCDNR that show the location of shellfish culture permits and closure areas in the vicinity of the proposed project are provided in Appendix B.

A cutter head dredge would be used the for the proposed maintenance dredging. This method of dredging creates a minimal sediment plum during the dredging process and dredged material is contained within a pipeline during transit to the disposal area. The Corps does not anticipate any

spills or leaks of dredged material, along the dredge pipe route, during this project. Guidelines for spill prevention and management are included in all USACE dredging contracts. Dredging will be in a well-defined area within the federally authorized channel and all pipelines transporting material will be monitored.

Based on the sediment testing all contaminants detected are below thresholds for triggering the closure of shellfish areas. The shellfish closure areas within Murrells Inlet are closed to harvest due to an exceedance of fecal standards for shellfish consumption and to maintain a buffer around prohibited areas such as the Marlin Quay Marina. The project will not significantly increase fecal contamination within Murrells Inlet nor will it impact the closure area around Marlin Quay Marina, nor will it lead to chemical contamination of the area.

Based on analysis and coordination with the SCDNR shellfish program, impacts to commercial shellfish harvesting should be minimal and temporary.

**No Action 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.

## **3.12 Recreation**

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

### **3.12.1 Recreational Shellfish Harvesting**

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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.

### **3.12.2 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 Action Alternative:** Not implementing the proposed project may have minor adverse effects as navigation will still be impacted by the shoal.

### **3.12.3 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 Action Alternative:** Not implementing the proposed project may have minor adverse effects as navigation will still be impacted by the shoal.

### 3.12.4 Other Recreational Opportunities

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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.

### 3.13 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 4 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 commercial and recreational activities, however these disturbances will cease when project is completed.

As previously discussed, the proposed action is the dredging of a small section of the Murrells Inlet Federal Navigation Channel that has not been covered under NEPA documentation since the construction of the navigation channel. The proposed action will be conducted along with other maintenance dredging of the federal navigation by the Corps. Independently of the federal actions, other entities (local government and private parties) will also be conducting dredging within Murrells Inlet. This federal actions and actions by others will occur during the same time window to reduce impacts to the environment, and individuals and businesses that use the inlet. No other future dredging projects or other activities, that when taken with the proposed action, could have negative cumulative impact are known to be planned within Murrells Inlet.

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, the beneficial use of the dredged material, and the lack of other significant future projects in Murrells Inlet there should be little cumulative impact resulting from the proposed project.

## **CHAPTER 5 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. Project documentation has been coordinated with the state of South Carolina's water quality certification program (section 401) staff. The proposed project will not be initiated until the 401 WQC is issued.

### **Clean Air Act**

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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**

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The requirements of Section 7 of the Endangered Species Act of 1973 have been fulfilled. Project documentation has been provided to the USFWS for their review and comment.

### **Farmland Protection Policy Act**

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Not applicable with respect to the preferred alternative.

### **Fish and Wildlife Coordination Act**

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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)**

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Not applicable with respect to the preferred alternative.

### **Protection of Wetlands (EO 11990)**

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Not applicable for this project.

### **National Wild and Scenic Rivers**

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Not applicable for this project.

### **National Historic Preservation Act (NHPA)**

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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 has been coordinated with the South Carolina State Historic Preservation Officer.

## **Coastal Zone Management Act**

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The Coastal Zone Management Act (CZMA), passed in 1972, provides for the management of the nation's coastal resources by balancing economic development with environmental conservation. The goal of the CZMA is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." The CZMA applies to many different federal actions including federal agency activities, federal license or permit activities, outer continental shelf plans, and federally assisted state projects. The CZMA promotes cooperation and coordination between states and the federal government in order to promote federal consistency and protect our nation's coastal resources.

Pursuant to the Act, and to associated Code of Federal Regulations, Title 15, Part 930, the Planning Branch of the Charleston District United States Army Corps of Engineers (USACE) requested concurrence with the determination that the project was consistent to the maximum extent practicable with the enforceable policies of South Carolina Coastal Zone Management Program (SCCZMP). This determination was based on an analysis of the project with the applicable enforceable resource policies of the SCCZMP and included: (1) Wildlife and Fisheries Management, (2) Dredging, (3) Erosion Control, (4) Activities in Areas of Special Resource Significance, (5) Beach and Shoreline Access, and the (6) Geographic Areas of Particular Concern. Additionally, the public participation guidelines as outlined in 15 C.F.R. 930.42, were met by the USACE and SCDHEC joint public notices inviting public comment for 30 days beginning July 29, 2016 covering the dredging and sand placement of Inner Shoal B, and for an additional 10 days beginning September 30, 2016 covering the dredging of material in the immediate proximity of the jetties with beachfront sand placement. Conditional concurrence was received from SCDHEC OCRM on November 15, 2016.

## **CHAPTER 6 REFERENCES**

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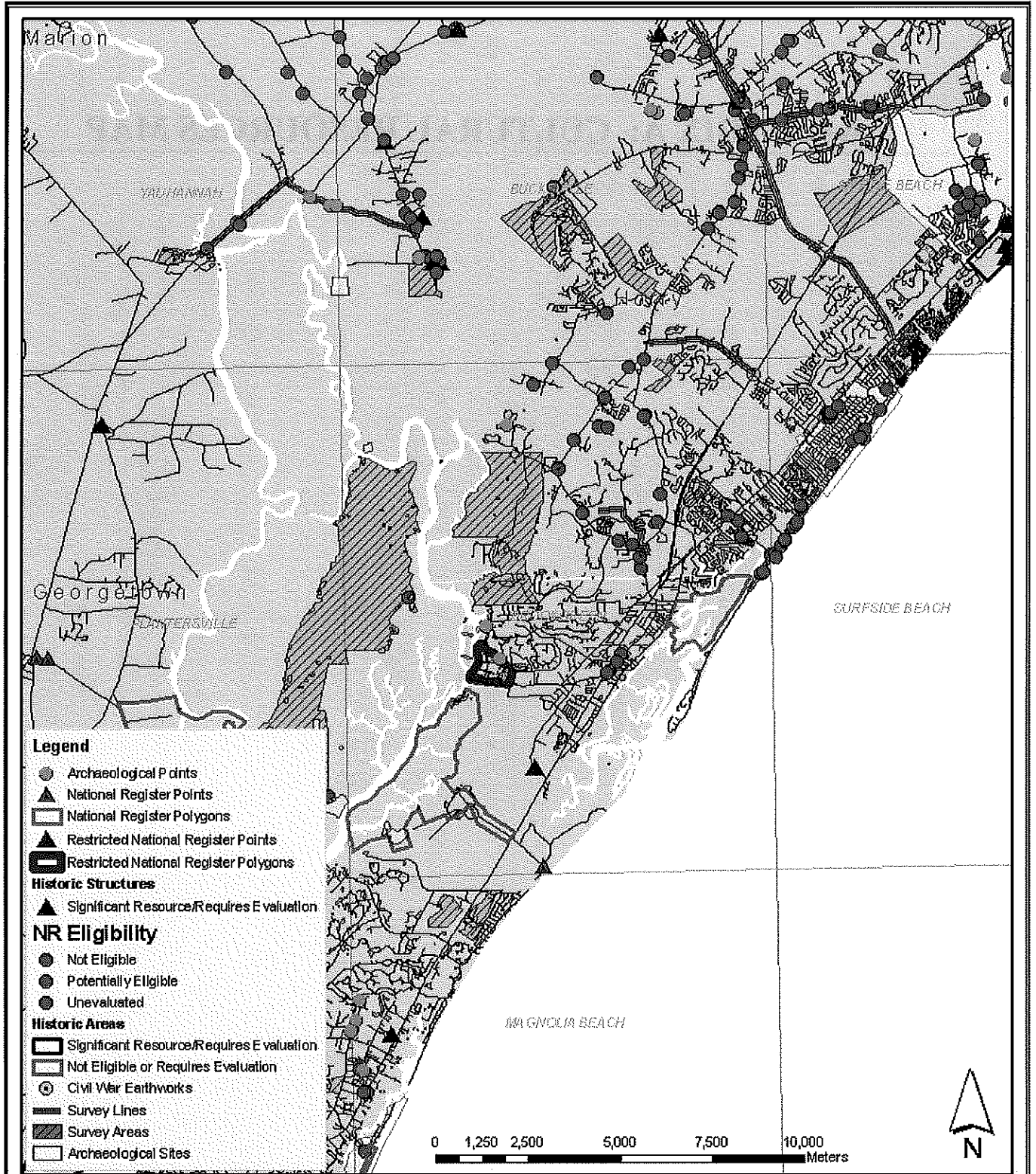
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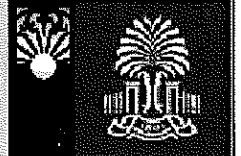
## **APPENDIX A: CULTURAL RESOURCES MAP**

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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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Acreage:  
 Sublots: 00  
 Intertidal: 1.2

## CULTURE PERMIT C356

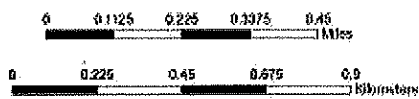
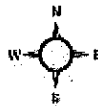
LOCATION: Unrained creek between Drunken Jacks Island, Oaks Creek, and the south jetty of Murrells Inlet.  
 COUNTY: Georgetown

C356 is located within  
 SCCHFC Shellfish  
 Management Area 4.  
 These areas are subject to  
 closure at any time. Please  
 call (803) 286-1418.



### Legend

- SHELLFISH HARVEST BOUNDARIES**
- AREA OF INTEREST
  - PERMIT BOUNDARIES
  - C000 = CONVENTIONAL CULTURE PERMIT
  - C001 = GRANT PERMIT
  - R000 = RECREATIONAL PERMIT
  - R000 = RECREATIONAL GROUND
  - S000 = STATE SHELLFISH FISHING
  - SHELLFISH MANAGEMENT AREAS (SCCHFC)
- 2018-19 SCCHFC SHELLFISH HARVEST CLASSIFICATIONS**
- PROHIBITED
  - RESTRICTED



PRODUCED BY  
 SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES  
 OFFICE OF FISHERIES MANAGEMENT  
 SHELLFISH MANAGEMENT SECTION  
 03/2018



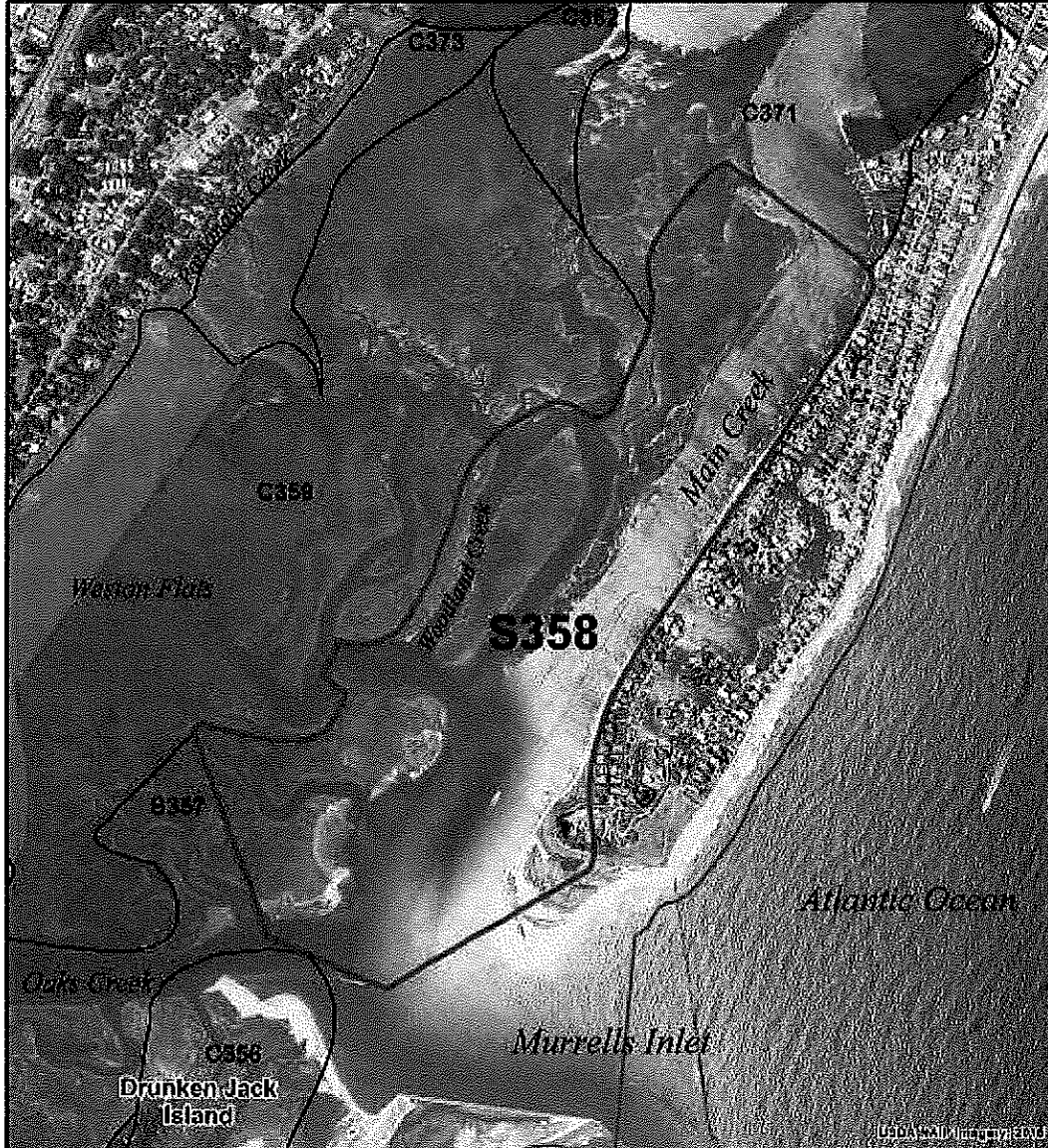
EQUIPMENT TYPE:  
Hand Tongs, Rakes and Forks

## Murrells Inlet S358

S358 is located within  
SCDHCR Shellfish  
Management Area 4.  
These areas are subject to  
closure at any time. Please  
call (803) 285-1818

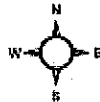
Clams - 01 October 2016 - 25 January 2017  
Oysters - RECREATIONAL HARVESTING ONLY

SHELLFISH SEASON  
2016 - 2017

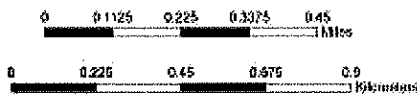


### Legend

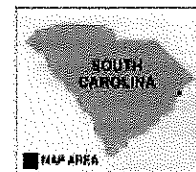
- SHELLFISH HARVEST BOUNDARIES**
- AREA OF INTEREST
  - NEIGHBORING AREAS
    - C000 = CONVENTIONAL OYSTER PERMIT
    - C001 = GRANT PERMIT
    - 0002 = MARICULTURE PERMIT
    - 0000 = RECREATIONAL GROUND
    - 2000 = STATE SHELLFISH GROUND
  - SHELLFISH MANAGEMENT AREA (SCDHCR)
- 2016-17 SCDHCR SHELLFISH HARVEST CLASSIFICATIONS**
- PROHIBITED
  - RESTRICTED



Location: Main Creek  
County: Georgetown



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OFFICE OF FISHERIES MANAGEMENT  
SHELLFISH MANAGEMENT SECTION  
03/2016



Acres: 0  
 Sublot: 0.0  
 Interid: 19.3

# CULTURE PERMIT C371

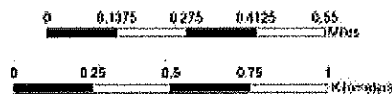
LOCATION: Forks of Main Creek  
 COUNTY: Georgetown

C371 is located within  
 SCOHFC Shellfish  
 Management Area 4.  
 These areas are subject to  
 closure at any time. Please  
 call (803) 285-1818



## Legend

- SHELLFISH HARVEST BOUNDARIES**
- AREA OF INTEREST
  - RESTRICTION AREAS
  - C371 = CONVENTIONAL CULTURE PERMIT
  - C372 = GRANT PERMIT
  - C373 = MARICULTURE PERMIT
  - R300 = RECREATIONAL GROUND
  - S368 = STATE SHELLFISH GROUND
  - SHELLFISH MANAGEMENT AREA (SCOHFC)
- 2018-19 SCOHFC SHELLFISH HARVEST CLASSIFICATIONS**
- PROHIBITED
  - RESTRICTED

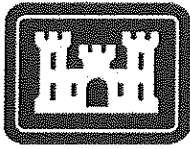


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 SHELLFISH MANAGEMENT SECTION  
 03/2018



## **APPENDIX C: 404(b) (1) ANALYSIS**

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**US Army Corps  
of Engineers**

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**(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 yd<sup>3</sup> 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 yd<sup>3</sup> 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 yd<sup>3</sup> 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 yd<sup>3</sup> 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.

3 Apr 17  
Date

  
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