EDISTO BEACH
COASTAL STORM DAMAGE REDUCTION
GENERAL INVESTIGATION STUDY

APPENDIX G

ESSENTIAL FISH HABITAT ASSESSMENT

US Army Corps
Of Engineers®
Charleston District

ESSENTIAL FISH HABITAT ASSESSMENT

COASTAL STORM DAMAGE REDUCTION

GENERAL INVESTIGATION STUDY

EDISTO BEACH, COLLETON COUNTY

SOUTH CAROLINA

August 2013

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1.0 INTRODUCTION

The purpose of this document is to present the findings of the Essential Fish Habitat (EFH) assessment conducted for the proposed Edisto Beach Shore Protection Project as required by the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended through 1996 (Magnuson-Stevens Act). The objectives of this EFH assessment are to describe how the actions proposed by the project may affect EFH designated by the National Marine Fisheries Service (NMFS) and the South Atlantic Fisheries Management Council.

The EFH assessment will include a description of the proposed action, an analysis of the direct, indirect, and cumulative effects on EFH for the managed fish species and their major food sources, and our views regarding the effects of the proposed action.

2.0 PROJECT DESCRIPTION

The proposed project (see Figures 1 thru 4) was determined after a detailed alternatives analysis documented within the Feasibility Study/Environmental Assessment. The project consists of the following elements: 1) A 15-foot high (elevation), 15-foot wide dune beginning at the northern end of the project (i.e., the southern end of the State Park) and extending southward along the beach for 16,530 feet. This dune would be fronted by a 7-foot high (elevation) berm. The first 7,740 feet of berm length would have a width of 75 feet. The width would then taper to a 50-foot width for the remaining length of the berm. The width of each end of the berm would taper to match the existing beach profile; 2) The dune would then transition into a 14-foot high (elevation), 15-foot wide dune that extends around the end of the island for 5,290 feet. No berm would be constructed in front of this dune because the existing beach profile provides an adequate berm; and 3) Approximately 1,130 ft of total groin lengthening across 23 of the existing groins (Figure 5 and Table 1). Results of a coastal engineering analysis determined that this minimal amount of lengthening will not have any downdrift impacts as the design is simply to stabilize the proposed berm width. Because the distance between the landward toe of the dune and the seaward edge of the berm for the beach design exceeds the existing condition distance between these same points along certain reaches within the project, the effective length of the groins in these areas will be reduced. Consequently, the length of some groins will need to be increased in order to create beach width necessary to maintain the design cross-section. The proposed groin lengthening is not provided as a means for trapping more sand and increasing beach width or significantly changing the rate of sand bypassing the groins. The renourishment interval for the proposed project has been estimated to occur every 8 years and is triggered by a mobilization threshold of 220,400 cubic yards of sand.

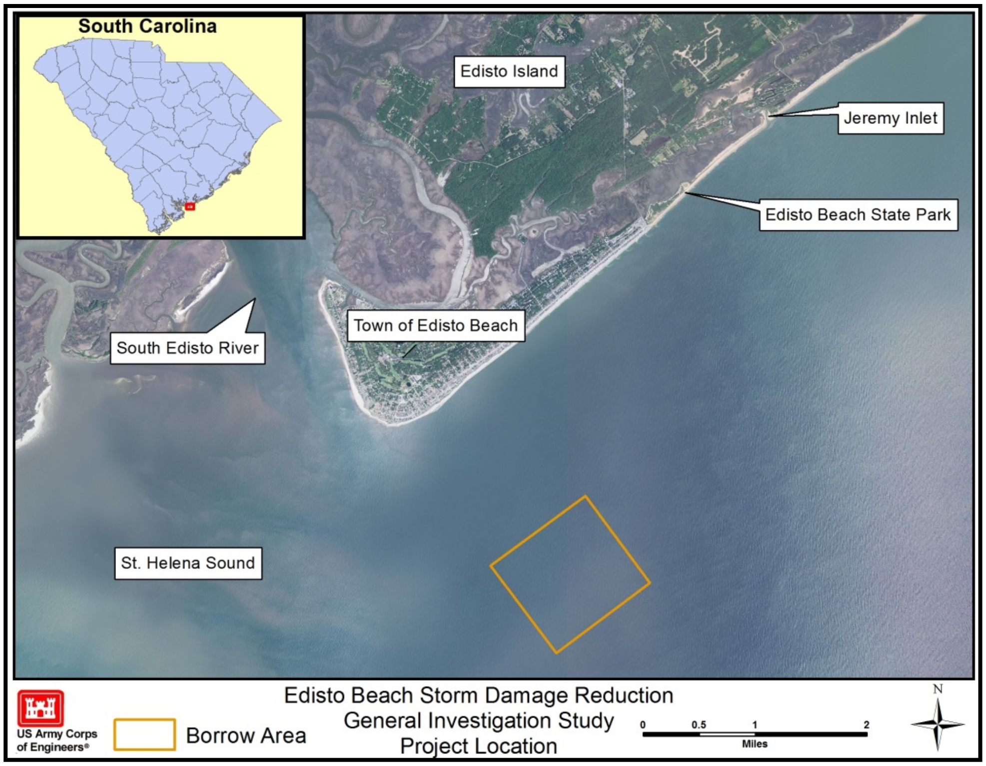

Figure 1. Location of Edisto Beach and proposed borrow site

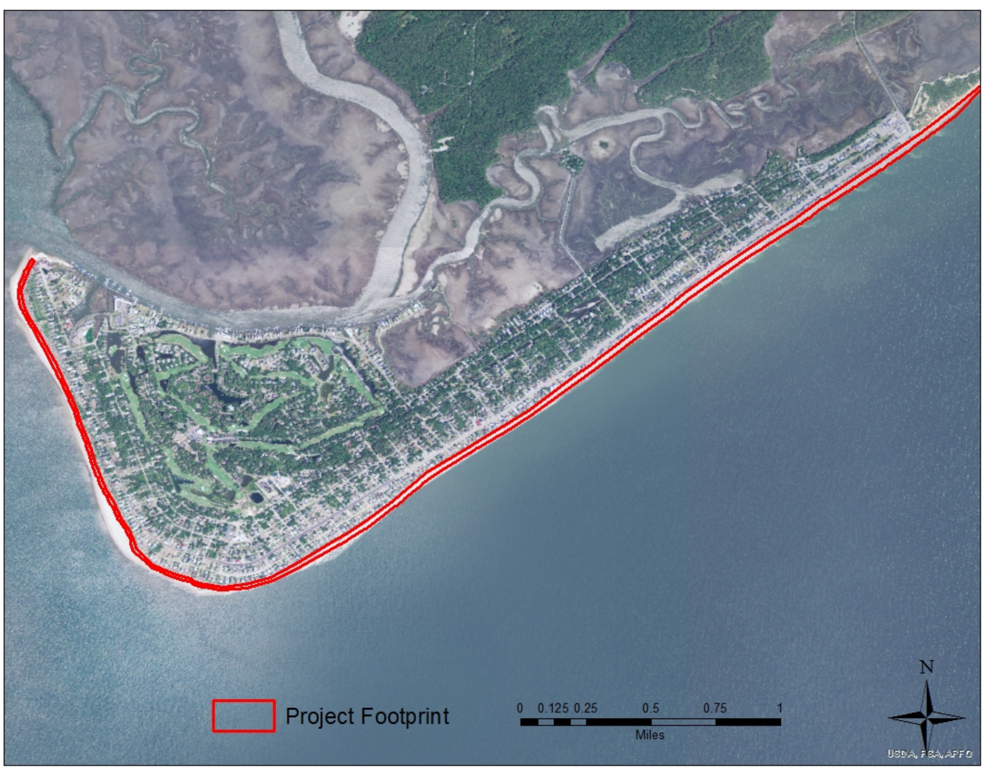

Figure 2. Project footprint from landward toe of dune to seaward berm crest

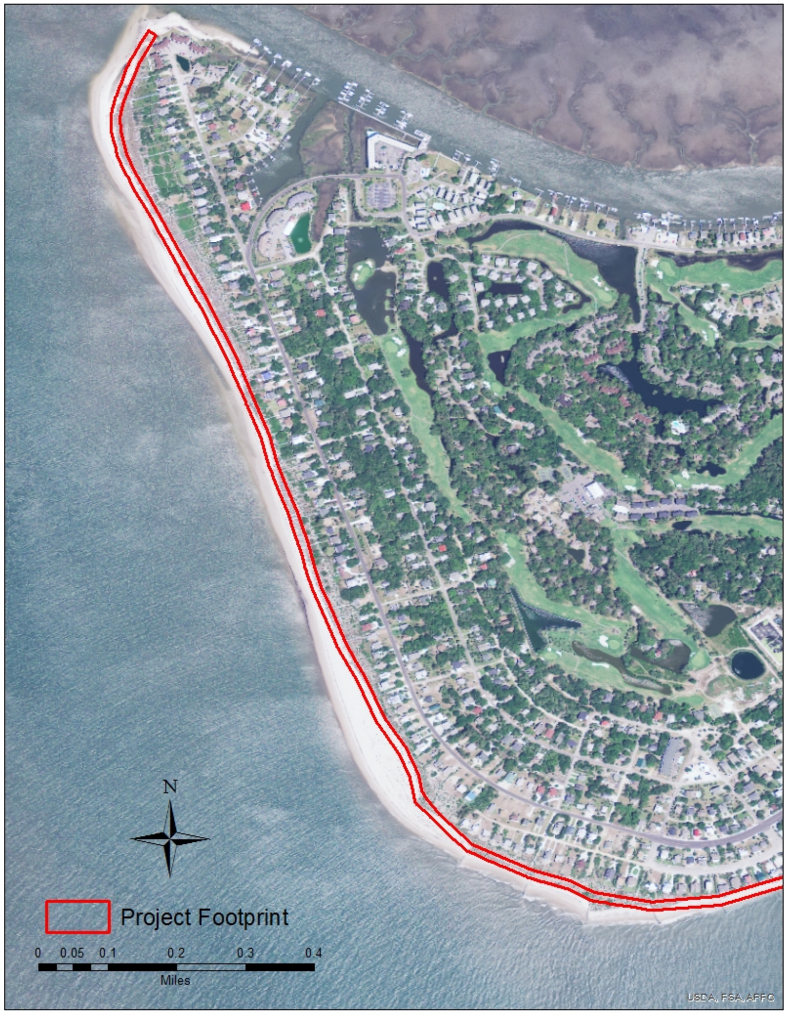

Figure 3. Project footprint along inlet reaches

Figure 4. Project footprint along Atlantic Ocean facing reaches

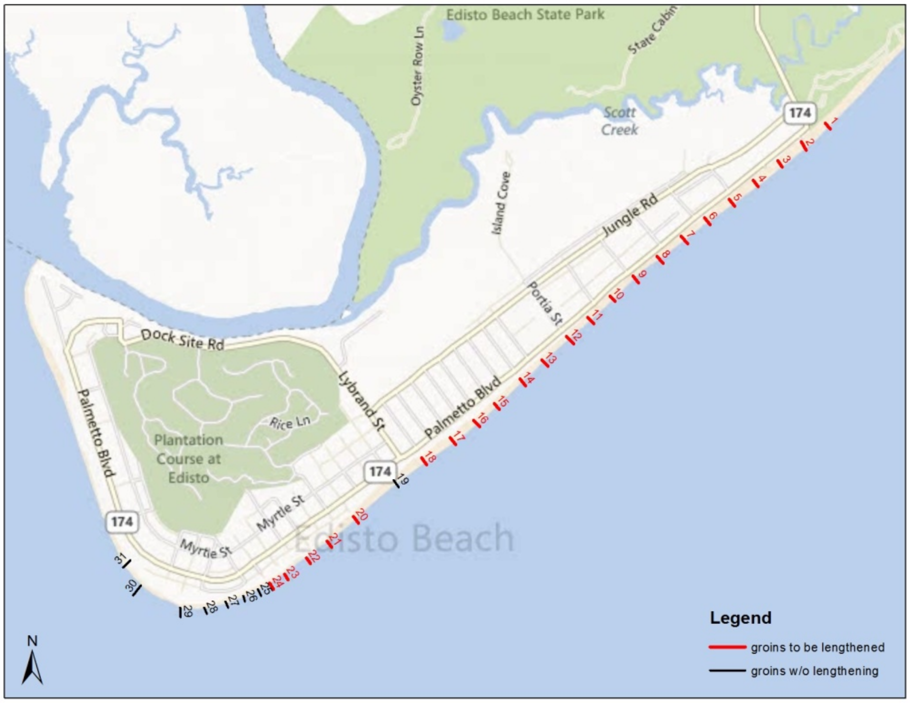

Figure 5. Spatial location of proposed groin lengthenings

Table 1. Proposed groin lengthening dimensions by groin number

Groin Extension Lengths			
Groin #	**Extension length (ft)**	**Groin #**	**Extension length (ft)**
1	80	13	40
2	80	14	30
3	90	15	20
4	90	16	20
5	100	17	20
6	100	18	20
7	80	20	20
8	60	21	30
9	50	22	30
10	50	23	20
11	40	24	20
12	40		
Total Groin Lengthening: 1,130 feet			

Construction will be by means of either a hydraulic cutterhead dredge or a hopper dredge that will transport the sand through a pipeline. The pipeline will run adjacent to the groins and parallel with the beach. Beach compatible material (sand) from an offshore source will be pumped along the 21,820 linear feet of the project and will be discharged as a slurry. During construction, temporary training dikes of sand will be used to contain the discharge and control the fill placement. Fill sections will be graded by land-based equipment, such as bulldozers, articulated front-end loaders, and other equipment as necessary to achieve the desired beach profile. Equipment will be selected based on whatever generates only minimal and acceptable temporary environmental impacts, as well as whatever proves to be the most advantageous economically. The sand will then be graded, raked, and tilled as necessary in coordination with recommendations and requirements from regulatory agencies. It is anticipated that construction will begin in late-2018 and will require approximately 4 to 5 months for completion. A construction window of November 1 through April 30 will minimize impacts to sea turtles, fish, shellfish, and infauna, and will be utilized whenever possible (see USFWS Construction Windows, Appendix A). The schedule could change due to congressional funding, contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow area for the proposed project occurs on an ebb-tidal shoal located approximately 1.5 miles to 2.5 miles southeast of the southern point of Edisto Beach and is approximately 649 acres in size (Figure 1). The site was determined from a larger search area and was narrowed down to include sands that most appropriately match the native beach sands on Edisto Beach. The borrow area contains approximately 7.2 million cubic yards of beach compatible sands. Native beach sands were determined based on beach samples collected at 34 stations along Edisto Beach and reflects conditions after the 2006 renourishment project (completed by Coastal Science and Engineering). Each station included four grab samples – one each from the toe of the dune, berm, beach face, and low tide swash zone. Results of this analysis determined that the beach sands have a mean phi size of 1.31, 0.1 % silt/clay mix, and 26.9% visual shell hash. These results compare favorably with the borrow area sands (Table 2).

Additionally, a cultural and hardbottom resources survey was completed at the borrow area in March 2013. The survey utilized three techniques: 1. Side scan sonar, 2. Sub-bottom profiling, and 3. Magnetometer. Results of this survey determined that there are no hardbottom resources within the proposed borrow area. The borrow area location has been shared with multiple resource agencies over the course of the study and no additional issues have been raised to date.

Table 2. Edisto Beach grain size comparison between borrow site and native beach sands

	MEAN (phi)	STD DEV (phi)	% PASSING #5	%PASSING #10	% PASSING #200	% PASSING #230	% VISUAL SHELL
Edisto Native Beach	**1.31**	**1.33**	**97.8**	**93.5**	**0.1**	**0.0**	**26.9**
Borrow - Scenario A	**1.73**	**1.31**	**94.7**	**90.0**	**0.4**	**0.2**	**18.8**
NOTE: The data comparison above is not a Federal requirement, but is provided to gain a perspective as to the quality of material in the borrow area which is proposed for placement as nourishment material on the beach.							

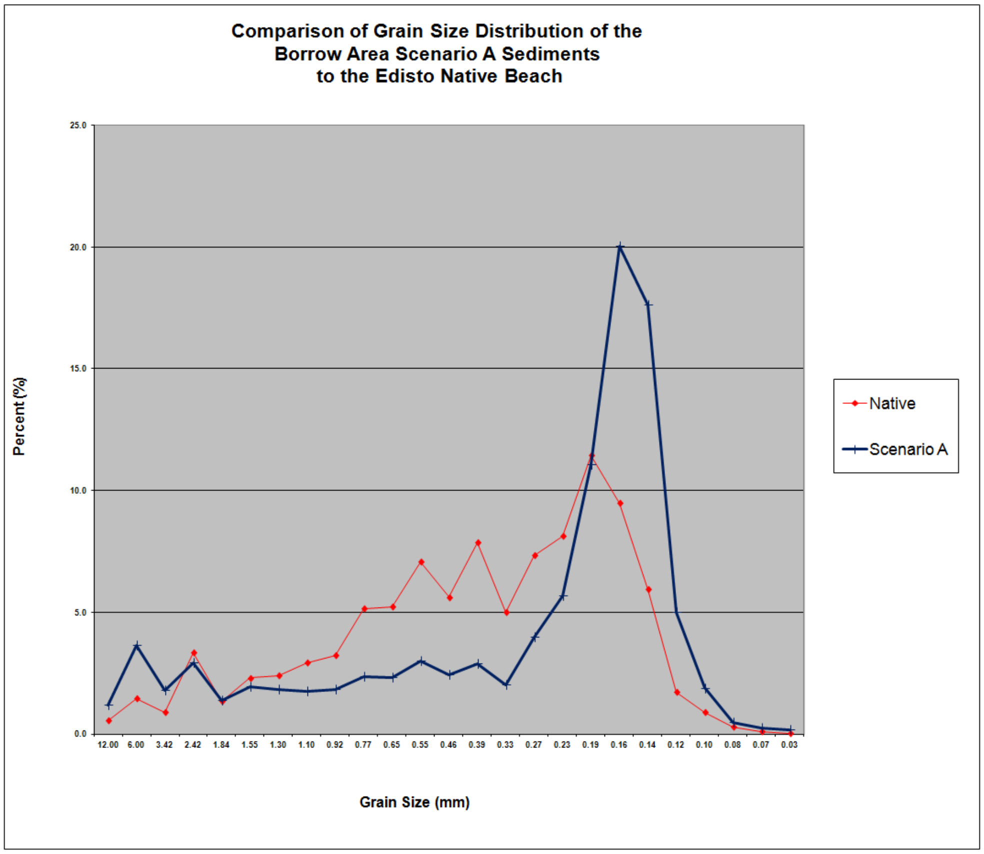

Figure 5. Histogram of native beach sands vs. proposed borrow site

Edisto Beach has very coarse sand and previous attempts at using fencing along a constructed berm to create an eolian transport driven dune have been unsuccessful. Therefore, the proposed project involves the creation of a 14 to 15 foot high dune at 15 feet width and a 3:1 slope. This dune feature may bury existing dune vegetation in some areas, especially along the inlet section of the beach. The proposed project consists of planting dune vegetation along the constructed dune including foreslope and backslope. The use of native vegetation will provide an environmental enhancement to the beach front while helping to stabilize the constructed dune. Plantings will be done in a matrix fashion and consist of native vegetation including but not limited to sea oats, Bitter panicum, and American beachgrass (Bogue variety). The total area of necessary dune planting is 29.68 acres.

3.0 ESSENTIAL FISH HABITAT

The 1996 amendments to the Magnuson-Stevens Act set forth a mandate for NOAA Fisheries, regional Fishery Management Councils, and other Federal agencies to identify and protect EFH of economically important marine and estuarine fisheries. To achieve this goal, suitable fishery habitats need to be maintained. In South Carolina waters, there are three federal entities that manage fish: the NMFS, the South Atlantic Fishery Management Council, and the Mid-Atlantic Fishery Management Council.

Edisto Beach supports significant fish and wildlife resources including many marine and estuarine species. The estuary supports large populations of penaeid shrimp and blue crabs which are economically important species. Demersal fish species include Atlantic croaker, bay anchovy, Atlantic menhaden, spotted hake, weakfish, spot, blackcheek tonguefish, white catfish, and silver perch. Other fish of commercial or recreational value are commonly found around Edisto Beach, including flounder, red drum, spotted seatrout, bluefish, spot, and black drum.

All of the tidally influenced reaches and adjacent wetlands are considered EFH, as well as coastal waters. Some of these areas include estuarine emergent wetlands, oyster reefs/shell banks, intertidal flats, aquatic beds, estuarine water column, and marine water column (Table 3).

Table 3. Essential Fish Habitat list and occurrence

Essential Fish Habitat List and Study Area Occurrence

Habitat Type	Habitat Name	Project Area
Estuarine	Estuarine Emergent Wetland (tidal marsh)	Yes
Estuarine	Estuarine Scrub/shurb mangroves	No
Estuarine	Sea grass	No
Estuarine	Oyster reefs and shell banks	Yes
Estuarine	Intertidal flats	Yes
Estuarine	Palustrine emergent and forested wetland	No
Estuarine	Aquatic beds	No
Estuarine	Estuarine Water Column	Yes
Estuarine	Unconsolidated Bottom	Yes
Marine	Live/Hard bottoms	No
Marine	Coral and coral reefs	No
Marine	Artificial/manmade reefs	No
Marine	Sargassum	No
Marine	Marine water column	Yes

3.1 Estuarine Emergent Wetland (tidal marsh)

Tidal marshes are one of the dominant features of the coastal plain in South Carolina. Tidal marshes serve many important functions. The basis of the importance of these marsh communities involves the basic high productivity of the marsh itself and its function of trapping nutrients. The dense plant growth in the marsh also provides excellent cover for many species of birds, aquatic and semi-aquatic mammals, reptiles and amphibians, and typically provides spawning grounds, nurseries, shelter, and food for many species of finfish, shellfish, birds, and other types of wildlife. Besides water quality and habitat benefits, marshes also serve to buffer storm waves and slow shoreline erosion.

3.2 Oyster Reefs and Shell Banks

Oyster reefs and shell banks are defined by SAFMC as being the, "natural structures founds between and beneath tide lines, that are composed of oyster shell, live oysters and other organisms". This habitat is usually found adjacent to emergent marsh vegetation and provides the other three-dimensional structural relief in soft-bottom, benthic habitat (Wenner et al., 1996). Optimal salinity for *Crassostrea virginica* ranges from 12ppt to 25ppt, and in South Carolina are 95% intertidal (Lunz 1952). Oyster reefs are extremely important to the aquatic ecosystem in South Carolina as they remove particulate matter, release inorganic and organic nutrients, stabilize sediments, provide habitat cover, etc.

3.3 Intertidal Flats

Intertidal flats serve various functions for many species' life stages. The estuarine flats serve as a foraging ground, refuge, and nursery area for many mobile species as well as the microalgal community, which can function as a nutrient (nitrogen and phosphorus) stabilizer between the substrate and water column. An intertidal flat's benthic community can include, but is not limited to, worms, bivalves, and gastropods. This tidally influenced, constantly changing EFH provides feeding grounds for predators, refuge and feeding grounds for juvenile and forage fish species, and nursery grounds for estuarine dependant benthic species (SAFMC 1998).

Animals that move from a pelagic larval to a benthic juvenile existence make use of these EFH flats for life stage development. These flats can provide a comparatively low energy area with tidal phases which allow species the use of shallow water habitat as well as relatively deeper water within small spatial areas. Species such as summer flounder (*Paralichthys dentatus*), red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), striped mullet (*Mugil cephalus*), gray snapper (*Lutjanus griseus*), blue crab (*Callinectes sapidus*), and shrimp use these EFHs as nurseries. These flats also serve as refuge areas for species avoiding predators, which use the tide cycles for access to estuarine feeding grounds(SAFMC 1998).

3.4 Estuarine Water Column

This habitat comprises multiple salinity regimes, the one most important to this study being euhaline waters (>30ppt) and to a lesser extent polyhaline waters (18-30ppt). The water column has both horizontal and vertical components that result in changing salinity, phytoplankton, oxygen content, nutrients, etc. This habitat provides a rich opportunity for biota to live within whichever parameters they are adapted to. Many marine-spawning species use the water column as larvae as they are transported through inlets.

3.5 Unconsolidated Bottom

This habitat type consists of soft sediments that are inhabitated by a diverse assemblage of macroinvertebrates that serve as prey to demersal fish species. They can be characterized by the lack of large stable surfaces for plant and animal attachment. These areas include all wetland and deepwater habitats with at least 25% cover of particles smaller than stones and a vegetative cover less than 30% (USGS, http://www.npwrc.usgs.gov/resource/wetlands/classwet/unconsol.htm).

3.6 Marine Water Column

The water column serves as EFH for all managed species and their prey, at various life stages, by providing habitat for spawning, breeding, feeding and growth. Species (and life stages) for which the column of seawater has been designated as EFH are discussed in the following section, Managed Fish Species.

4.0 HABITAT AREAS OF PARTICULAR CONCERN

4.1 Penaeid Shrimp

Areas which meet the criteria for HAPC for penaeid shrimp include all coastal inlets, all state-designated nursery habitats of particular importance to shrimp, and state-identified overwintering areas. In South Carolina, since there are no seagrass beds, nursery habitat of shrimp is the high marsh areas with shell hash and mud bottoms. Since there is seasonal movement out of the marsh and into deep water and creek channels during the winter months, the HAPC encompasses the entire estuarine system (Figure 6).

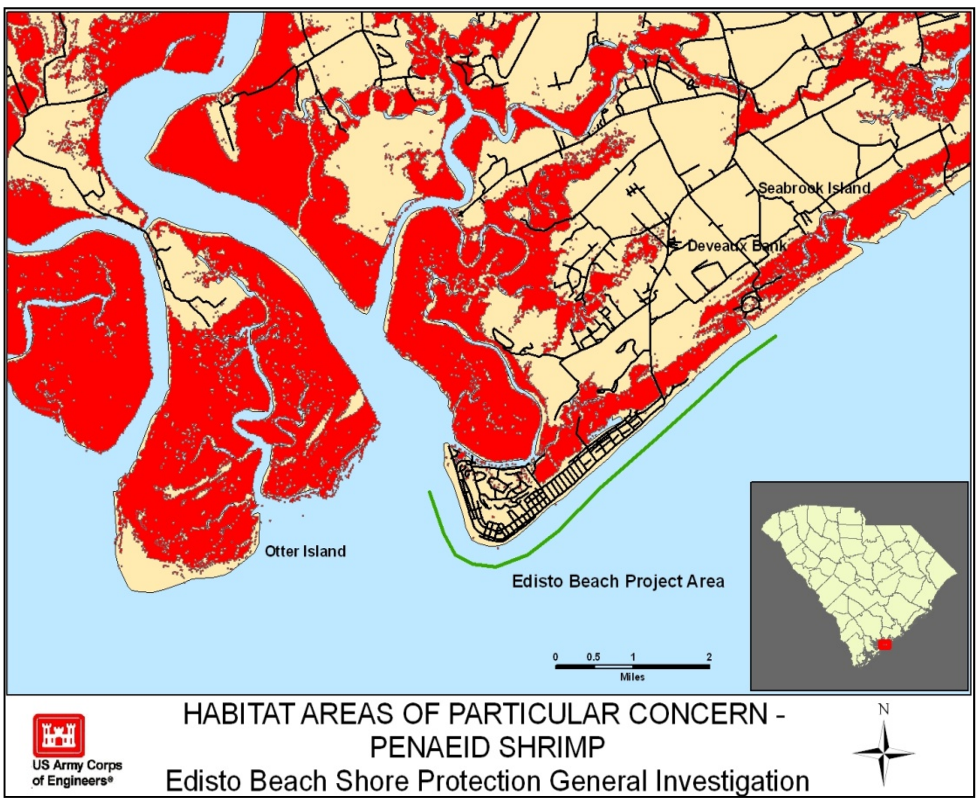

Figure 6. Penaeid Shrimp HAPC

4.2 Snapper-Grouper Complex

HAPC exists for the Snapper-Grouper complex in and around the Edisto Beach project area. These HAPC consist of coastal inlets, oyster/shell habitat, and Special Management Areas (Figure x). The closest Special Management Area is approximately 8 miles from the Edisto beachfront and will not be impacted by the project. Others areas of HAPC include medium to high profile hard bottom, localities of known or likely periodic spawning aggregations, and nearshore hard bottom areas. None of these are in the vicinity of the proposed project (Figure 7).

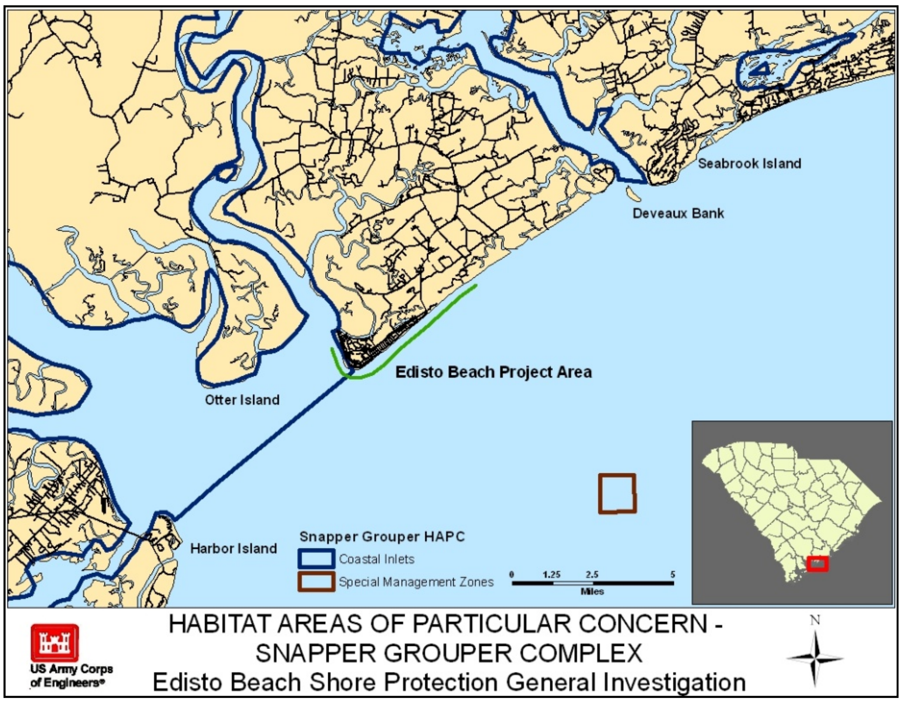

Figure 7. Snapper-Grouper complex HAPC

5.0 MANAGED FISH SPECIES

Table 4 lists the managed species that may occur in the project area.

5.1 Penaeid Shrimp

In the southeastern United States, the shrimp industry is based on the white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Farfantepenaeus duorarum*), and the deeper water rock shrimp (*Sicyonia brevirostri*). The royal red shrimp (*Pleoticus robustus*) also occurs in deeper water and sustains a limited harvest. For the above species, coastal inlets have been classified as HAPC. Within the project area, this includes the estuarine and marine water columns within the South Edisto River inlet. These areas are the

Table 4. Fishery Management Plans and managed species for the project area

Fishery Management Plans (FMPS) and Managed Species for the South Atlantic that may Occur in the Project Area	
Common Name	**Species**
Shrimp	
brown shrimp	*Farfantepenaeus aztecus*
pink shrimp	*Farfantepenaeus aduorarum*
rock shrimp	*Sicyonia brevirostris*
royal red shrimp	*Pleoticus robustus*
white shrimp	*Litopenaeus setiferus*
Snapper Grouper Complex	
Jack crevalle	*Caranx hippos*
gag grouper	*Mycteroperca microlepis*
black sea bass	*Centropristis striata*
mutton snapper	*Lutjanus analis*
red snapper	*Lutjanus campechanus*
lane snapper	*Lutjanus synagris*
gray snapper	*Lutjanus griseus*
yellowtail snapper	*Ocyurus chrysurus*
spadefish	*Chaetodipterus faber*
white grunt	*Haemulon plumieri*
sheepshead	*Archosargus probatocephalus*
hogfish	*Lachnolaimus maximus*
Coastal Migratory Pelagics	
king mackerel	*Scomberomorus cavalla*
Spanish Mackerel	*Scomberomorus maculatus*
cobia	*Rachycentron canadum*
Mid-Atlantic FMP species which occur in South Atlantic	
bluefish	*Pomatomus saltatrix*
summer flounder	*Paralichthys dentatus*
Federally Implemented FMP	
lemon shark	*Negaprion brevirostris*
bull shark	*Carcharhinus leucas*
blacknose shark	*Carcharhinus acronotus*
finetooth shark	*Aprionodon isodon*
dusky shark	*Carcharhinus obscurus*
bonnethead shark	*Sphyrna tiburo*
Atlantic sharpnose shark	*Rhizoprionodron terraenovae*

connecting waterbodies between inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity. Essential Fish Habitat for rock shrimp and royal red shrimp occurs in deeper offshore waters. None of these offshore areas occur within the study area.

5.1.1 White Shrimp

White shrimp are offshore and estuarine dwellers. They can be either pelagic or demersal depending on their life stage. They prefer muddy or peaty bottoms rich in organic matter and decaying vegetation when occupying inshore waters. When offshore, they are most abundant on soft muddy bottom sediments. Postlarval white shrimp are benthic dwellers when reaching their nursery areas in estuaries. The juveniles move from estuarine areas to coastal waters as they mature, and adults generally inhabit waters of 27 m or less. White shrimp have centers of abundance in South Carolina, Georgia, and northeast FL.

Spawning area: Most spawning in South Carolina occurs within about 4 miles of the coast, between April and October.

Nursery area: South Edisto River Inlet, Big Bay Creek and Scott Creek

5.1.2 Brown Shrimp

Brown shrimp prefer soft muddy bottom sediments when offshore, and as adults may be found in areas of mud, sand, and shell. They are more active at night and bury into the sediment during the day.

Spawning area: Most spawning in South Carolina occurs in relatively deep water. The season is uncertain, although mature females and males have been found off South Carolina during October and November.

Nursery area: South Edisto River Inlet, Big Bay Creek and Scott Creek

5.1.3 Pink Shrimp

Pink shrimp most commonly found on hard sand and calcareous shell bottom. Similar to brown shrimp, the pink shrimp is more active at night, and generally buries into the sediment during the day.

Spawning area: Most spawning in South Carolina occurs between 3.7 and 15.8 m starting in May.

Nursery area: South Edisto River Inlet, Big Bay Creek and Scott Creek

5.2 Snapper Grouper

The snapper grouper complex utilizes both pelagic and benthic habitats throughout their life cycles. Larvae are free swimming within the water column. During this stage they commonly feed on zooplankton. Juveniles and adults are frequently bottom dwellers that associate with hard structures with moderate to high relief. The principal fishing areas are located in live bottom and shelf-edge habitats in deeper waters. Several patterns are present: (1) for many groupers, spawning occurs over one or two winter months, (2) spawning occurs at low levels year-round with peaks during the warmer months, and (3). The species tend to form sizable spawning aggregations, but this might not be the case with all species.

Ten families of fish containing 73 species are managed by the South Atlantic Fishery Management Council (SAFMC). There is variation in specific life history patterns and habitat use among the snapper grouper species complex. Snapper grouper species utilize both benthic and pelagic habitats during their life cycle. They live in the water column and feed on zooplankton during their planktonic larval stage, while juveniles and adults are demersal and usually associate with hard structures with high relief. EFH for these species in SC includes estuarineemergent wetlands, estuarine scrub/shrub wetlands, unconsolidated bottom, live/hard bottom, and oyster beds. Coastal inlets, including those waters of the South Edisto River inlet are considered Habitat Areas of Particular Concern (HAPC), along with oyster beds. These areas are critical for spawning activity as well as feeding and daily movements.

5.3 Coastal Migratory Pelagics

King and Spanish mackerel and cobia are coastal migratory pelagic species managed by the SAFMC. EFH for these species include the South Edisto River inlet. Many coastal pelagic prey species are estuarine-dependant in that they spend all or a portion of their lives in estuaries. Accordingly, the coastal pelagic species, by virtue of their food source, are to some degree also dependent upon estuaries and, therefore, can be expected to be detrimentally affected if the productive capabilities of estuaries are greatly degraded.

5.4 Highly Migratory Pelagics

This category consists of Atlantic Bluefin Tuna, Atlantic Bigeye Tuna, Atlantic Yellowfin Tuna, Atlantic Albacore Tuna, Atlantic Skipjack Tuna, Swordfish, Blue Marlin, White Marlin, Sailfish, Longbill Spearfish, and Atlantic sharks. These species tend to occupy deep water and will not occur within the project area.

5.5 Spiny Lobster

The Spiny lobster occurs throughout the Caribbean Sea, and along the shelf waters of the southeastern United States north to North Carolina. They are primarily hard substrate dwellers and are not expected to be located in the project area.

5.6 Mid-Atlantic Species Which Occur in the South Atlantic

Bluefish and summer flounder are two species listed in the Mid-Atlantic Fisheries Management Plan that occur in the South Atlantic. Bluefish juveniles and adults are listed as using estuaries from North Carolina to Florida and are common around the project area.

6.0 ASSESSMENT OF IMPACTS AND MITIGATIVE MEASURES

In this section, potential impacts to managed species and EFH are examined. Impacts will occur as a result of two different actions: 1. the dredging of beach quality sand from an offshore borrow area, and 2. the placement of that sand onto the beachfront.

The borrow area for the proposed project is located between 1.5 and 2.5 miles offshore, and therefore the dredging of these sediments will have no impact on estuarine emergent wetlands, oyster reefs, nor intertidal flats. The borrow area consists of roughly 649 acres of soft sandy bottom habitat, which will be impacted by dredging operations. The post-dredge infilling rate and quality and type of the material are contributing factors to the recovery of the area dredged. A change in the hydrologic regime as a consequence of altered bathymetry may result in the deposition or scour of fine sediments, which may result in a layer of sediment that differs from the existing substrate. Benthic organisms within the defined borrow area dredged for construction and periodic nourishment would be lost. However, recolonization by opportunistic species would be expected to begin soon after the dredging activity stops. Because of the opportunistic nature of the species that inhabit the soft-bottom benthic habitats, recovery would be expected to occur within 1–2 years. Rapid recovery would be expected from recolonization from the migration of benthic organisms from adjacent areas and by larval transport. SCDNR has recommended the use of ebb-tidal shoal complexes on the downdrift end of beaches in order to assist in the faster recovery of the borrow area, and one of the factors in the selection of the proposed borrow area was the potential for faster recovery and possible re-use of the site. In addition, if a hopper dredge is used at the borrow area, impacts will likely be minimized (Bergquist et al., 2009).

Dredging in the selected borrow area would involve mechanical disturbance of the bottom substrate and subsequent redeposition of suspended sediment and turbidity generated during dredging. Factors that are known to influence sediment spread and water column turbidity are grain size, water currents and depths. During construction, there would be elevated turbidity and suspended solids in the immediate area of sand deposition when compared to the existing non-storm conditions of the surf zone. Significant increases in turbidity are not expected to occur outside the immediate construction/maintenance area (turbidity increases of 25 nephelometric turbidity units [NTUs]) or less are not considered significant). Turbid waters (increased turbidity relative to background levels but not necessarily above 25 NTUs) would hug the shore and be transported with waves either up-drift or down-drift depending on wind conditions. Because of the low percentage of silt and clay in the borrow areas (less than 10 percent), and the high shell content, turbidity impacts would not be expected to be greater than the natural increase in turbidity and suspended material that occurs during storm events. Any increases in turbidity in the borrow area during project construction and maintenance would be expected to be temporary and limited to the area surrounding the dredging. Turbidity levels would be expected to return to background levels in the surf zone when dredging ends. As a result of sediment suspension there is the potential for some change in local dissolved oxygen levels. However, if such a change were to occur it is anticipated it would be short term in nature and not appreciable.

Oceanic nekton are active swimmers, and are distributed in the relatively shallow oceanic zone. Any entrainment of adult fish, and other motile animals in the vicinity of the borrow area during dredging would be expected to be minor because of their ability to actively avoid the disturbed areas. Fish species are expected to leave the area temporarily during the dredging operations and return when dredging ceases (Pullen and Naqvi 1983). Impacts to the nekton community of the nearshore ocean will be temporary and minor.

Beach nourishment may have negative effects on intertidal macrofauna through direct burial, increased turbidity in the surf zone, or changes in the sand grain size or beach profile. While beach nourishment may produce negative effects on intertidal macrofauna, they would be localized in the vicinity of the nourishment operation. Construction and subsequent nourishments will occur during the winter months when possible. Because of this, beach nourishment would therefore be completed before the onshore recruitment of most surf zone fishes and invertebrate species. To assure compatibility of nourishment material with native sediment characteristics and minimize impacts to benthic invertebrates from the placement of incompatible sediment, all sediment identified for use for this project has gone through compatibility analysis to assure compatibility with the native sediment. In summary, only temporary effects on intertidal macrofauna in the immediate vicinity of the beach nourishment project would be expected as a result of discharges of nourishment material on the beach.

6.1 Species Impacts

The potential for adverse impact to fish with EFH designated in the project area is likely to differ from species to species, depending upon life history, habitat use (demersal vs. pelagic), and distribution and abundance. However, it is anticipated that short-term impacts to older life-stages of fish (both pelagic and demersal) will be limited to temporary displacement during initial dredging, and subsequently, during renourishment projects. There may be some entrainment of eggs and early larval stages of fish species during the dredging process. However, it is anticipated that this displacement will not be significant because pelagic larve and eggs will continue to be carried through the project area with prevailing tides, currents, and wave action and the effect would only be on demersal eggs/larvae.

7.0 CONSERVATION MEASURES

Although the dredging and disposal of sand resources at the Town of Edisto Beach is not likely to result in any adverse impacts to managed species, the following conservation measures are proposed to minimize or reduce the potential for adversely impacting managed species and other living marine resources:

- Use of a borrow area on an ebb-tidal shoal complex at the downdrift inlet of the barrier island
- Maintaining a 1’ vertical sand buffer in the borrow area should facilitate faster benthic recovery
- Potential use of a hopper dredge for borrow areas has been recommended in the past by SCDNR and will be implemented where possible
- Construction during the winter months should decrease short term impacts to managed fisheries

8.0 CONCLUSIONS

The proposed project will involve impacts to marine and estuarine water column and unconsolidated bottom (Table 5). The overall magnitude of these impacts is expected to be short term and minor under the dredging operations to be employed. Recolonization of both the borrow area and beach face are expected to occur within 1 to 2 years, or faster. The use of best management practices should limit the extent and duration of turbidity impacts, which will temporarily alter fish dynamics in the vicinity of the construction activities. Overall, the impacts to EFH and HAPC related to the proposed beach project at Edisto Beach will be temporary and will not result in significant effects on managed species.

Table 5. Potential EFH Impacts for Edisto Beach Storm Damage Reduction Project

Habitat Type	Habitat Name	Project Area	Potential Impacts	
			Dredging at borrow site	Beach Placement
Estuarine	Estuarine Emergent Wetland (tidal marsh)	Yes	No	No
Estuarine	Estuarine Scrub/shurb mangroves	No	No	No
Estuarine	Sea grass	No	No	No
Estuarine	Oyster reefs and shell banks	Yes	No	Yes
Estuarine	Intertidal flats	Yes	No	No
Estuarine	Palustrine emergent and forested wetland	No	No	No
Estuarine	Aquatic beds	No	No	No
Estuarine	Estuarine Water Column	Yes	No	Yes
Estuarine	Unconsolidated Bottom	Yes	Yes	Yes
Marine	Live/Hard bottoms	No	No	No
Marine	Coral and coral reefs	No	No	No
Marine	Artificial/manmade reefs	No	No	No
Marine	Sargassum	No	No	No
Marine	Marine water column	Yes	Yes	Yes

9.0 REFERENCES

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