Appendix 3

Final Environmental Assessment Folly Beach Shore Protection Project and Use of Outer Continental Shelf Sand, November 2013

US Army Corps of Engineers®

BOEM
Bureau of Ocean Energy Management

ENVIRONMENTAL ASSESSMENT

FOLLY BEACH SHORE PROTECTION PROJECT AND USE OF OUTER CONTINENTAL SHELF SAND

CHARLESTON COUNTY, SOUTH CAROLINA

November 2013

Environmental Assessment

Folly Beach Shore Protection Project and Use of Outer Continental Shelf Sand

1. Purpose and Need for this Document

This Environmental Assessment (EA) represents the position of the US Army Corps of Engineers, Charleston District (USACE) and the Bureau of Ocean Energy Management (BOEM) regarding the environmental impacts for the 2013/2014 re-nourishment of Folly Island as part of the existing shore protection project. Use of outer-continental shelf OCS sand requires a non-competitive negotiated agreement between the City of Folly Beach (i.e., the projects non-federal cost share sponsor) and BOEM.

The Folly Beach Shore Protection Project was authorized by Section 501 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, and modified by the Energy and Water Development Appropriations Act of 1992, Public Law 102-104. The purpose of the project is to reduce damage to structures and shorefront property related to erosion and storms. Initial construction was completed in 1993 and involved the placement of approximately 2.7 million cubic yards of sand on the beach. The shoreline was renourished in 2005 with approximately 2.3 million cubic yards of sand. A partial renourishment occurred in 2007 with approximately 490,000 cubic yards of sand being placed on the beach. The total renourishment effort includes the use of approximately 1.75 million cy of sand from offshore borrow areas (state and federal) to re-nourish Folly Beach and enhance storm damage protection. BOEM's proposed action is needed to authorize the use of up to 850,000 cubic yards of OCS sand from two borrow areas located in Federal waters (i.e., Borrow Areas C and D).

Pursuant to the National Environmental Policy Act of 1969 (NEPA), this EA describes the affected environment, evaluated potential environmental effects resulting from a similar action, and addressed alternatives to the action in previous NEPA documents. A final Environmental Impact Statement for Beach Erosion Control and Hurricane Protection for Folly Beach, S.C. was filed with CEQ on July 11, 1980. Supplemental information concerning the environmental impacts of Shoreline Protection on Folly Beach was included in additional documents that tiered from this EIS: Folly Beach, South Carolina, Special PED Report to Reevaluate Federal Justification for Storm Damage Reduction; U.S. Army Corps of Engineers, Charleston District, South Carolina, August 1988 and Final Detailed Project Report, Charleston Harbor, Folly Beach, South Carolina; U.S. Army Corps of Engineers, Charleston District, South Carolina, August 1987. The initial nourishment of the Folly Beach, South Carolina Shore Protection Project performed by USACE was supported by an EA in April 1991. Renourishment efforts performed by USACE in 2005 and 2007 were supported by a January 2005 EA. Both the 1991 and the 2005 EAs are incorporated in this document by reference and can be found in their entirety in Appendices 1 and 2. This EA supplements these existing environmental analyses and presents new information on the Borrow Areas C and D. Its purpose is to update potential environmental effects resulting from the issuance of a new negotiated lease for Borrow Areas C

and D, and to determine if the proposed action, in light of new information, would have a significant effect on the human environment and whether an EIS must be prepared. Only the subjects of the 1991 and 2005 EAs that need to be updated or are no longer valid and information obtained from cultural resource and hardbottom surveys of Borrow Areas C and D are included in this document. All other findings from the 1991 and 2005 EAs are still valid.

The USACE, in cooperation with BOEM, identified and reviewed new information to determine if any resources should be re-evaluated or if the new information would alter effects determinations. While this EA further supports and elaborates on the analyses and information presented in existing NEPA documents, it does not change the conclusions of any of those prior NEPA analyses. Pursuant to 43 Code of Federal Regulations (CFR) 46, the analyses are still deemed valid and are incorporated by reference. No new information was identified that would lead to a determination of significantly different impacts or would necessitate a major revision of the impacts analyses previously prepared or related to the Folly Beach Shore Protection Project and required preparation of an EIS.

The USACE and BOEM have integrated the process of NEPA compliance with other environmental requirements, including the Coastal Zone Management Act (CZMA), Endangered Species Act (ESA), Magnuson-Stevens Fishery Management and Conservation Act (FCMA), and National Historic Preservation Act (NHPA). The USACE has served in the role of lead federal agency for environmental compliance activities, while BOEM has acted in a cooperating role.

2. Project Description

This is a periodic re-nourishment of an existing project utilizing previously analyzed state borrow areas and new federal borrow areas. The current re-nourishment project provides for re-nourishment of approximately 26,000 linear feet (~4.9 linear miles) of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 8.0 feet national geodetic vertical datum (NGVD). The project extends from just below the U.S. Coast Guard Base on the east end of Folly Island to just above the Charleston County Park on the west end of Folly Island (See Figure 1). The exact quantity of sand that will be placed on the beach during re-nourishment will be dependent on the existing beach profile at the time of construction; however, based on present conditions, it is estimated that approximately 1.4 million cubic yards of beach quality sand, from state and federal borrow sites, will be placed on the beach seaward of existing dunes, sea walls, and revetments. Note that due to losses during placement of the sand on the beach, it is estimated that approximately 1.75 million cubic yards of sand will need to be dredged from the borrow areas.

Construction will be by means of a hydraulic cutter head dredge that will transport the sand through a pipeline. The pipeline will run from the offshore borrow areas onto the beach and then run parallel with the beach. Beach compatible material from the offshore source will be pumped along the roughly 26,000 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 proves to be the most advantageous economically, as well as what generates only minimal and acceptable temporary environmental impacts. It is anticipated construction will begin in January 2014 and will require approximately 6 months for completion. This schedule could change due to contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow areas being used for beach compatible sand are shown in Figure 1. These areas total approximately 550 acres; however, over half of Borrow Area A and approximately a third of Borrow Area B have been used during previous re-nourishment projects. The borrow areas are located approximately three miles offshore of the northern end of the island. None of the four borrow areas are inside any CBRA zones. Borrow areas C and D are both in federal waters requiring authorization from BOEM for their use. Borrow areas A and B are within State waters and do not require BOEM authorization.

Site A (state) – This site is approximately 310 acres and has 490,000 cubic yards of beach compatible sand available in 3 to 7 foot depths. There were a total of 19 vibracores done in this area in 2003 and 2004, 2 of which are shared with the Site B border.

Site B (state) – This site is approximately 210 acres and has 780,000 cubic yards of beach compatible sand available in 3 to 8 foot depths with one small area that is 10 feet deep. There were a total of 41 vibracores done in this area in 2003 and 2004, 2 of which are shared with the Site A border.

Site C (federal) – This site is approximately 30 acres and has 310,000 cubic yards of beach compatible sand available in 5 to 7 foot depths. There were a total of 5 vibracores done in this area in 2003 and 2004.

Site D (federal) – This site is approximately 70 acres and has 370,000 cubic yards of beach compatible sand available in approximately 4 foot depths. There were a total of 7 vibracores done in this area in 2003 and 2004.

Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers evaluation process. The volume of beach compatible sand, the area, and the water depths in each borrow area are shown in Table 1. The volumes listed are based on removing all the available beach quality sand to the depths shown on Figure 2, down to the maximum depth of the beach compatible sand.

The four borrow areas have also been surveyed by side-scan sonar and magnetometers. Borrow Areas C and D were also surveyed by sub-bottom profile. This survey work was performed in order to avoid hard/live bottom areas and any submerged cultural resources during dredging.

3. Alternatives Analysis

The 1987 Final Detailed Project Report evaluated a total of 6 nonstructural and 6 structural alternatives and the no action alternative. Based upon a combination of economic,

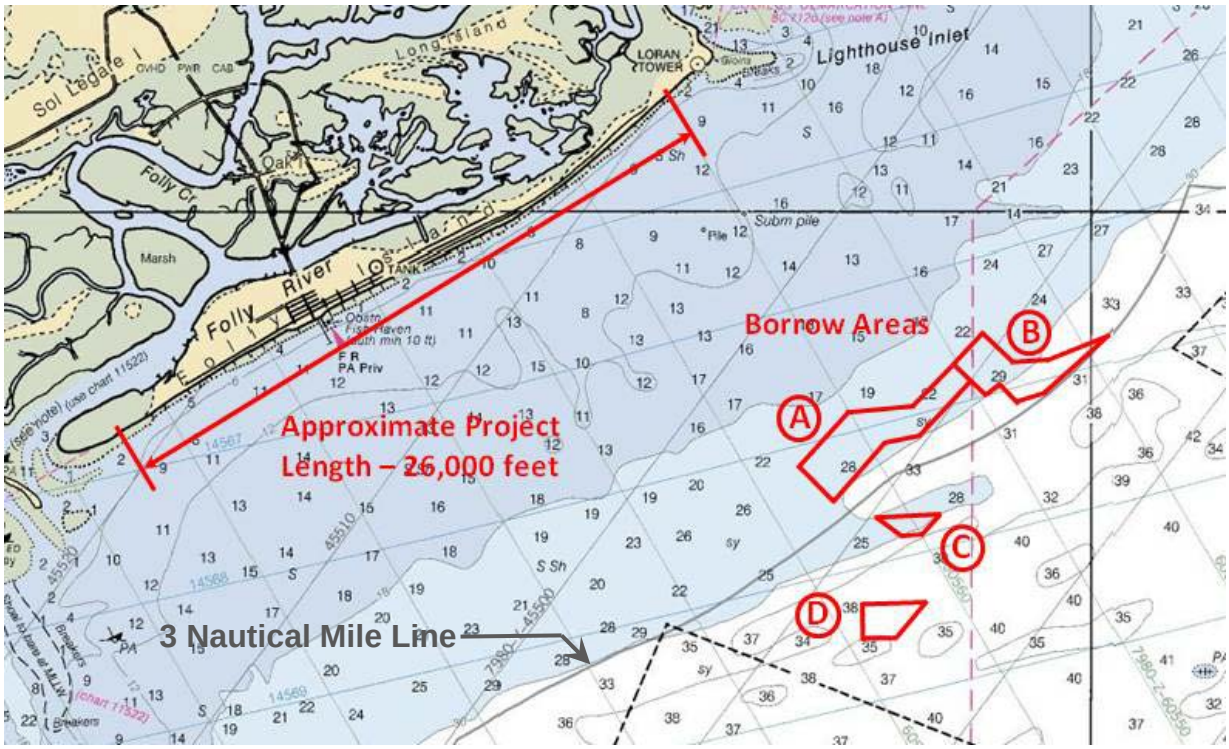

Image source: MyTopo.com

FIGURE 1: LOCATION OF NOURISHMENT AND BORROW AREAS

TABLE 1: BORROW AREA CHARACTERISTICS

Borrow Area	Approximate Borrow Area Size (acres)	Approximate Area Available for this Renourishment (acres)	Approximate Sand Volume Available for this Renourishment (yd^3)	Water Depth (feet)
A (state)	310	80	490,000	30 to 36
B (state)	210	120	780,000	29 to 39
C (federal)	30	30	310,000	30 to 35
D (federal)	70	70	370,000	40 to 44

engineering, and environmental factors, the USACE selected beach nourishment as alternative that would best meet its needs for the Folly Beach Project. Therefore, the focus of this EA is to evaluate potential environmental impacts from returning the Folly Beach shoreline to the condition described in the 1987 analysis preferred alternative and further outlined in the 1991 and 2005 EAs along with the use of the two new borrow areas. Due to the severe erosion that has occurred at Folly Beach and because of the Federal Government's commitment to renourish the beach when necessary over the life of the project, the No Action alternative was rejected.

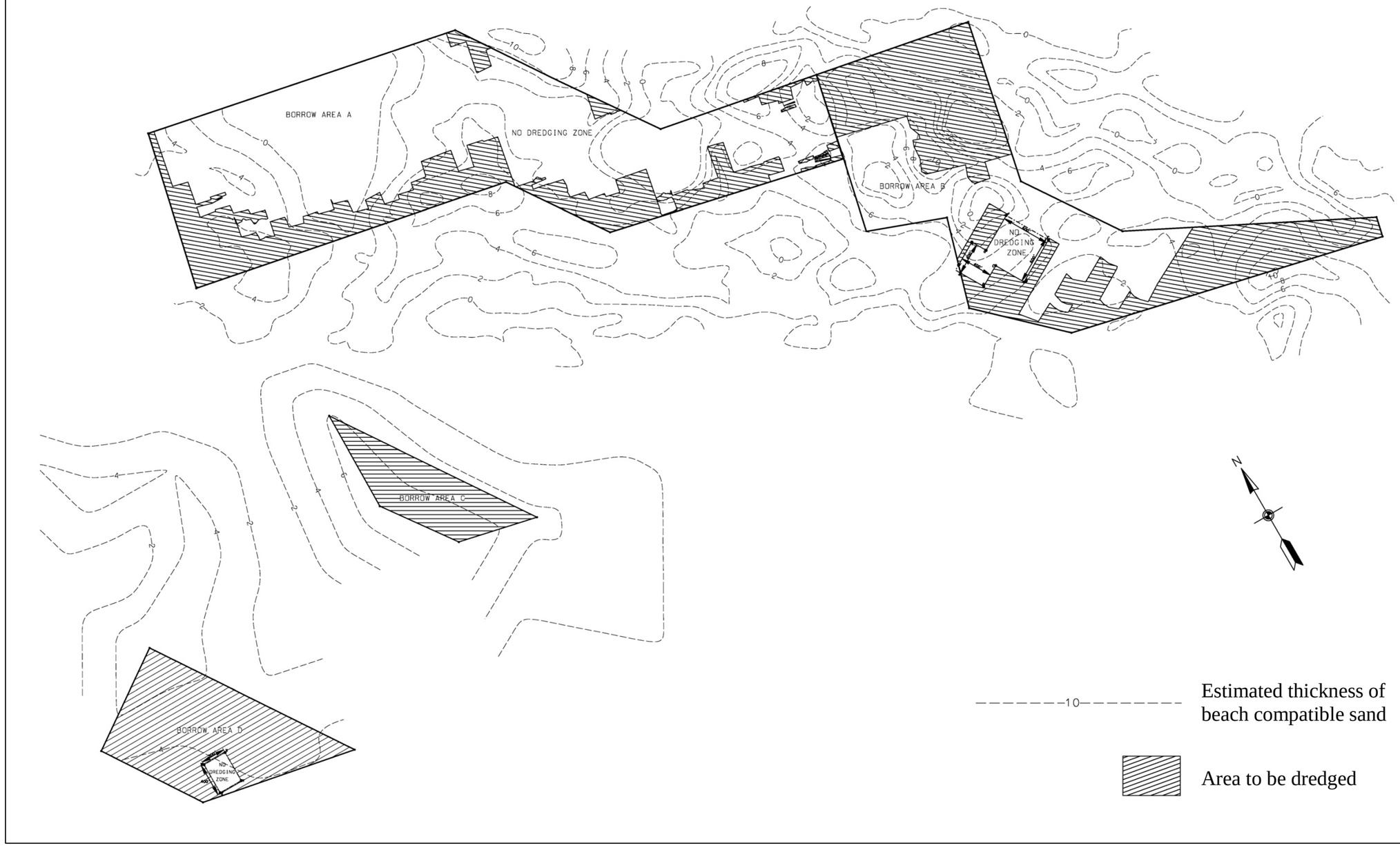

FIGURE 2: BEACH COMPATIBLE SAND THICKNESS ISOPACHS IN BORROW AREAS

Concerning the use of other sources of sand instead of OCS sand, no other viable sand sources are currently known in the vicinity of Folly Beach. Borrow Areas A, B, C, and D were identified prior to the 2005 renourishment project after an extensive investigation of the area off-shore of Folly Beach. Borrow Areas A and B were used during the 2005 and 2007 renourishment efforts and there is insufficient sand in these areas to fully perform this renourishment project. Therefore, the only viable alternative is to use additional OCS sand from Borrow Areas C and D. During the initial nourishment effort in 1993, sand was borrowed from the Folly River. However, the borrow area had to be 'mined' too deep, which resulted in the borrow area initially filling in with silty material instead of sand. Because of this, large scale borrowing from the Folly River is no longer an acceptable alternative.

4. Environmental Consequences

Pursuant to the NEPA, the proposed action is being evaluated to determine the potential environmental impacts that may result from this renourishment cycle and issuing a noncompetitive agreement to authorize use of OCS sand resources for beach nourishment. As previously stated, this EA supplements the EAs prepared by the USACE in 1991 and 2005 which analyzed the use of the two state borrow areas, A and B. This EA also reviews two additional borrow areas, C and D, which were not previously considered. The EA provides additional information on the status of and potential impacts in selected affected environments for borrow areas A and B and reviews all identified potential impacts for C and D. The reasons for providing this additional evaluation include the following: 1) addition of new borrow areas; 2) sea turtle nesting data since the 2007 renourishment; 3) listing of and adoption of measures to protect the atlantic sturgeon and proposed loggerhead critical habitat; 4) updated information about noise produced dredging operations and potential impacts to marine mammals; and 5) new hard bottom and cultural resource surveys for borrow areas C and D.

Previous NEPA documents (USACE 1991; USACE 2005) evaluated impacts to other resources including aesthetics, recreation and tourism, and cumulative impacts. These evaluations have been determined to remain valid since the project limits and construction methodologies. Any new information or additional information on borrow areas C and D are presented here: water quality, threatened and endangered species, non-threatened marine mammals, benthic resources, essential fish habitat, cultural resources and coastal consistency.

Coastal Barrier Resources System (CBRS): There are no areas within the project boundaries that coincide with the designated Coastal Barrier Resources System.

Water Quality: Temporary degradation of water quality will occur at both the dredging site (i.e., offshore impacts) and the nourishment site (i.e., onshore impacts) due to re-suspension of silt material.

Onshore Impacts: Multiple studies have been conducted on past beach nourishment projects to determine the extent and duration of elevated suspended solids levels downcurrent of a dredge's discharge pipe. In general, elevated concentrations were limited to within an area 1,300 feet to 1,650 feet of the discharge pipe in the swash zone. Given that the beach fill material proposed for the Folly Beach shoreline has a low amount of fine-grained sediment, it is

expected that the turbidity plume generated at the placement site would be comparable to those reported in similar projects: concentrated within the swash zone, dissipating between 1,000-2,000 ft alongshore; and short term, only lasting several hours.

Offshore Impacts: Studies of past hopper dredge projects indicate that the extent of the sediment plume is generally limited to between 1,650 feet to 4,000 feet from the dredge and that elevated turbidity levels are generally short-lived, on the order of an hour or less. The length and shape of the plume depend on the hydrodynamics of the water column and the sediment grain size. This plume was the mostly the result of overflow of the hopper bin and not at the suction end of the dredges drag arm. Given that the dredge being used for the Folly Beach project is a hydraulic cutter head dredge that does not have a hopper bin and given the dominant substrate at the borrow sites is sand, it is expected any disturbed sediment would settle rapidly and cause less turbidity and oxygen demand than finer-grained sediments. No appreciable effects on dissolved oxygen, pH, or temperature are anticipated because the dredged material has low levels of organics and low biological oxygen demand. Additionally, dredging activities would occur within the open ocean where the hydrodynamics of the water column are subject to mixing and exchange with oxygen rich surface waters. Any resultant water column turbidity would be short term (i.e., present for approximately an hour) and would not be expected to extend more than several thousand feet from the dredging operation. Accordingly, it is anticipated that the project would have only minor impacts on marine waters at the offshore borrow areas.

The original nourishment project was granted a water quality certification South Carolina Department of Health and Environmental Control (SCDHEC) on May 28, 1991, and was subsequently re-validated on February 4, 2005. SCDHEC has temporarily waived the requirement for water quality certification for beach nourishment projects (see Appendix 3); therefore, a new/updated water quality certification is not needed for this renourishment project.

Endangered Species: Table 2 contains a list of threatened and endangered species that have been listed by the U.S. Fish and Wildlife Service as occurring or possibly occurring in Charleston County. Table 3 contains a list of threatened and endangered species in South Carolina under the jurisdiction of NOAA Fisheries. The only changes in listings since the 2005 EA are the designation of proposed critical habitat for the loggerhead sea turtle and the listing of the Atlantic sturgeon.

Since all aspects of the proposed work will occur either in the ocean or on the ocean beach, the project will not affect any listed species occurring in forested or freshwater habitats. Thus, species such as the bald eagle, red-cockaded woodpecker, wood stork, Bachman's warbler, flatwoods salamander, Canby's dropwort, Pondberry, American chaffseed, and bog asphodel will not be affected by the proposed action.

Species that could be present in the project area during the proposed action are the blue, finback, humpback, right, sei, and sperm whales; the hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtles; the West Indian manatee; the shortnose and Atlantic sturgeons; and the piping plover. Potential impacts to whales would be due to the operation of the dredge; however, since the work will be performed by a hydraulic cutterhead dredge, the impacts to these

TABLE 2: U.S. FISH &WILDLIFE SERVICE THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY			
CATEGORY	**COMMON NAME**	**SCIENTIFIC NAME**	**STATUS**
Amphibian	Frosted flatwoods salamander	*Ambystoma cingulatum*	T, CH
Bird	Bachman's warbler	*Vermivora bachmanii*	E
Bird	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
Bird	Piping plover	*Charadrius melodus*	T, CH
Bird	Red-cockaded woodpecker	*Picoides borealis*	E
Bird	Wood stork	*Mycteria americana*	E
Bird	Red knot	*Calidris canutus rufa*	P
Fish	Atlantic Sturgeon*	*Acipenser oxyrinchus**	E
Fish	Shortnose sturgeon*	*Acipenser brevirostrum**	E
Mammal	Finback whale*	*Balaenoptera physalus**	E
Mammal	Humpback whale*	*Megaptera novaengliae**	E
Mammal	Right whale*	*Balaena glacialis**	E
Mammal	West Indian manatee	*Trichechus manatus*	E
Plant	American chaffseed	*Schwalbea americana*	E
Plant	Canby's dropwort	*Oxypolis canbyi*	E
Plant	Pondberry	*Lindera melissifolia*	E
Plant	Seabeach amaranth	*Amaranthus pumilus*	T
Reptile	Green sea turtle**	*Chelonia mydas***	T
Reptile	Kemp's ridley sea turtle**	*Lepidochelys kempii***	E
Reptile	Leatherback sea turtle**	*Dermochelys coriacea***	E
Reptile	Loggerhead sea turtle**	*Caretta caretta***	T, PCH,
Plant	Bog asphodel	*Narthecium americanum*	C

NOTES:

* Contact NOAA Fisheries for more information on this species
** The U.S. Fish and Wildlife Service (FWS) and NOAA Fisheries share jurisdiction of this species

E - Federally Endangered T - Federally Threatened P - Proposed CH - Critical Habitat PCH - Proposed Critical Habitat
BGEPA - Federally protected under the Bald and Golden Eagle Protection Act
C - Candidate Species. FWS has sufficient information on biological vulnerability and threat(s) to support proposals to list these species.

species will be minimal. Effects on sturgeon could include entrainment in the dredge, interaction with the sediment plume, reduction in available forage, and disturbance due to vessel created sounds. However, given the limited number of sturgeon expected to use the borrow area as habitat, the use of a hydraulic cutterhead suction dredge, and the limited portion of available habitat that would be affected, the potential for interaction is limited. Dredging operations have also been known to negatively impact sea turtles; however, these effects are the result of hopper dredges and not hydraulic cutterhead dredges. The Florida manatee rarely visits the area but they do pass through when moving up the coast where they have been seen in various locations

TABLE 3: NOAA FISHERIES THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA			
Species	**Scientific Name**	**Status**	**Date Listed**
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	E	12/2/70
Finback whale	*Balaenoptera physalus*	E	12/2/70
Humpback whale	*Megaptera novaeangliae*	E	12/2/70
Right whale	*Eubaleana glacialis*	E	12/2/70
Sei whale	*Balaenoptera borealis*	E	12/2/70
Sperm whale	*Physeter macrocephalus*	E	12/2/70
Listed Sea Turtles			
Green sea turtle*	*Chelonia mydas*	T	7/28/78
Hawksbill sea turtle*	*Eretmochelys imbricata*	E	6/2/70
Kemp's ridley sea turtle*	*Lepidochelys kempii*	E	12/2/70
Leatherback sea turtle*	*Dermochelys coriacea*	E	6/2/70
Loggerhead sea turtle*	*Caretta caretta*	T, PCH	7/28/78
Listed Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	E	3/11/67
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*	E	2/6/12

NOTES:

* The U.S. Fish and Wildlife Service (FWS) and NOAA Fisheries share jurisdiction of this species

E - Federally Endangered T - Federally Threatened PCH - Proposed Critical Habitat

throughout South Carolina. The piping plover is an occasional visitor and winters adjacent to the area. There is no designated piping plover critical habitat within the project area; however, there is piping plover critical habitat on Bird Key Stono in Stono Inlet immediately south of Folly Island. The southern terminus of sea-beach amaranth range is Folly Island. However, there are currently no known populations that occur on the island. The main impact of the project on threatened and endangered species will be to sea turtles nesting on the beach and emerging hatchlings. Loggerheads are the primary sea turtle nesters.

Consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the effects of the proposed project on threatened and endangered species is ongoing. The Corps has determined that the proposed project is not likely to adversely affect any listed species or critical habitat except for the loggerhead sea turtle. Because of the potential effect of the proposed project on nesting sea turtles and/or hatchlings, the Corps has determined that there may be adverse affects to loggerhead sea turtles as a result of this project; however, the proposed project is not expected to jeopardize the continued existence of the species. The Corps has also determined that the proposed project will not destroy or adversely modify any proposed critical habitat for loggerhead sea turtles.

The following precautions will be taken to minimize the effects to sea turtles and their habitat:

- During the sea turtle nesting season, the dredging contractor will provide nighttime monitoring along the beach where construction is taking place to ensure the safety of female turtles attempting to nest. A buffer zone around the female will be imposed in the event of an attempt to nest.

- If any construction of the project occurs during the period between April 15 and October 15, daily nesting surveys will be conducted starting either May 1 or 65 days prior to the start of construction, whichever is later. These surveys will be performed between sunrise and 9:00 A.M. and will continue until the end of the project, or September 30, whichever is earlier. Any nests found in the area that will be impacted by construction activities will be moved to a safe location. The nesting surveys and nest relocations will only be performed by people with a valid South Carolina DNR permit.

- If any construction of the project occurs during the period October 16 to April 14, no nesting surveys will be performed.

- For construction activities occurring during the period April 15 through October 15, staging areas for equipment and supplies will be located off of the beach to the maximum extent possible.

- For construction activities occurring during the period April 15 through October 15, all on-beach lighting associated with the project will be limited to the minimum amount necessary around active construction areas to satisfy Occupational Safety and Health Administration (OSHA) requirements.

Immediately after completion of the project, the Corps of Engineers will till the newly constructed sand berm. The Corps of Engineers will also perform cone penetrometer testing of the nourished beach for 3 subsequent years, prior to May 1 of each year. If compaction testing shows sand compaction to be greater than 500 pounds per square inch (p.s.i.), the sand placed on the beach will be tilled.

Visual surveys for escarpments along the Project area will be made continuously during project performance. Any escarpments greater than 18 inches in height extending for greater than 100 feet will be leveled. Inspection for escarpments will be repeated prior to May 1 for 3 subsequent years. Results of the surveys will be submitted to the USFWS prior to any action being taken. The USFWS will be contacted immediately if subsequent reformation of escarpments exceeding 18 inches in height for a distance of 100 feet occurs during nesting and hatching season. This coordination will determine what appropriate action must be taken. An annual summary of escarpment surveys and action taken will be submitted to the USFWS.

Lighting surveys will be conducted prior to and after the nourishment project in order to document both direct and indirect lighting that is observable from the beach. This survey will identify lights that could interfere with nesting sea turtles or emerging hatchlings. The results of the lighting surveys will be provided to the City of Folly Beach for investigation of possible violations of the City lighting ordnance.

Adherence to the above precautions should minimize the effects to nesting loggerhead sea turtles and emerging loggerhead sea turtle hatchlings. The monitoring and relocation program will minimize potential adverse affects to nesting sea turtles. Completion of the project will recreate lost habitat and protect existing turtle nesting habitat as well as the structures on the island. Sea turtle nesting numbers have continually increased since the 2007 renourishment (see Figure 3). Total nests recorded in 2007 were 20 with 21 false crawls (http://seaturtle.org) and total nests in 2013 were 108 with 70 false crawls.

Non-threatened Marine Mammals: The most common species of marine mammals found in the project area are bottlenose dophins. Other dolphin species and non-listed marine mammals typically observed in deeper waters of the Atlantic rarely occur in waters less than 100 m deep unless stranded. Marine mammals generally exhibit avoidance behavior in the presence of slow-moving dredge vessels and no collision fatalities are expected and any animal avoidance of vessels is not expected to rise to the level of harassment as defined by the Marine Mammal Protection Act (MMPA). Another impact-producing factor potentially affecting marine mammals includes noise from dredge operation or service vessels. Dredge noise may be audible up to several kilometers from the source, depending on dredge characteristics and environmental

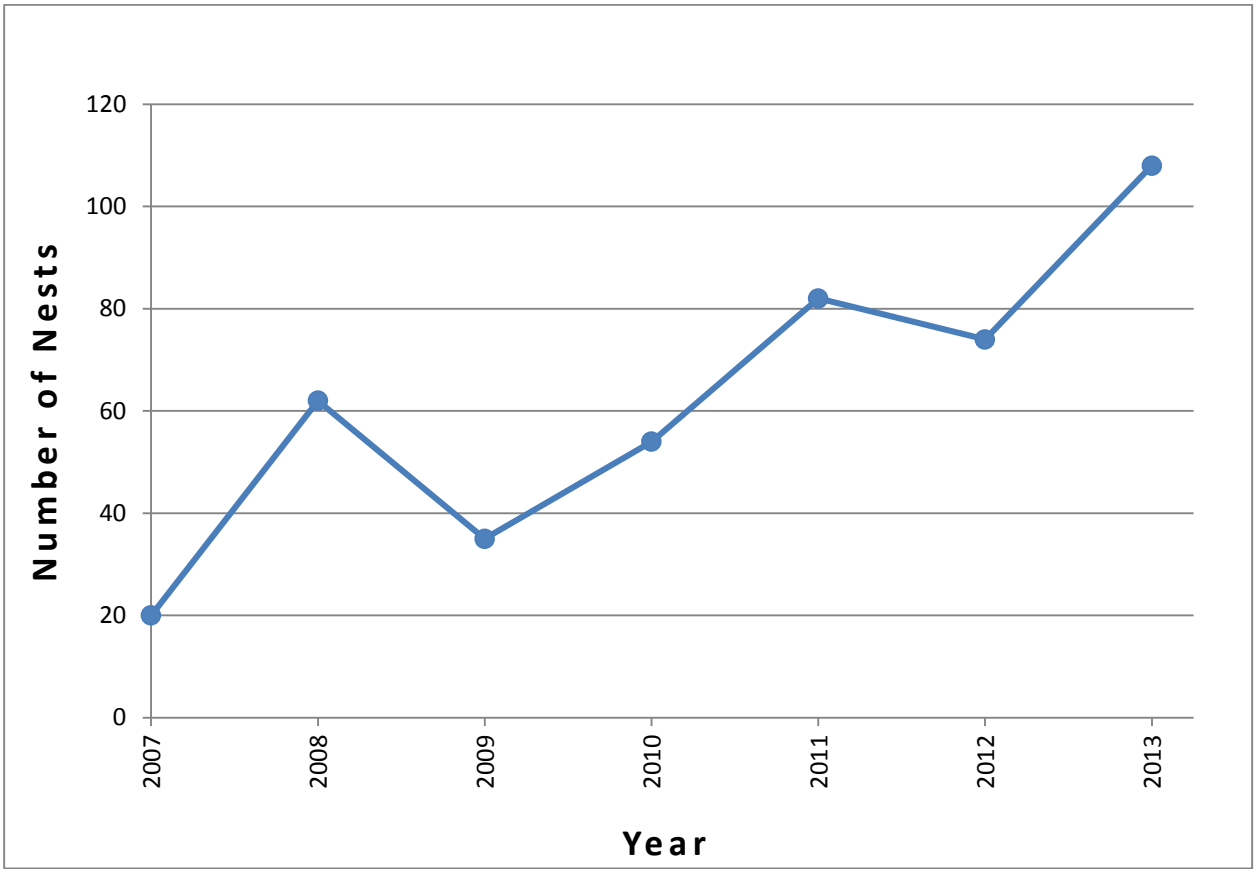

FIGURE 3: FOLLY BEACH SEA TURTLE NESTS 2007-2013

conditions (Thomsen et al. 2009; Reine et al. in preparation). It is anticipated that the peak frequency of electromechanical sound sources on the dredge plant, support vessels, and survey vessels will be outside the hearing range of even high-frequency cetaceans. Despite the overlap in low-frequency broadband vessel and dredge plant noise and marine mammal hearing, the potential injury of marine mammals due to noise is considered low since source levels generally do not exceed 180-190 dB and sound levels rapidly dissipate (Thomsen et al. 2009; Reine et al. in preparation). Some short-term, intermittent behavioral impacts may occur as a result of continuous sound sources if feeding/foraging/resting is interrupted when marine mammals cannot otherwise avoid the project area. However, potential impacts on marine mammals would be localized and temporary in nature.

Benthic Resources

Onshore Impacts: Due to the handling and pumping activities, the dredged sand would likely be devoid of live benthos. As a result, the recovery of benthos at the placement area would rely on immigration of adult organisms from adjacent undisturbed areas, as well as larval colonization from the water column. However, raising the elevation of the existing beach from intertidal to dry beach would effectively limit the landward extent of water driven organismal transport. In the longer term, the re-establishment of an elevated beach berm would reduce the extent of the more biologically diverse intertidal zone.

Recovery time of benthos within the surf zone is expected to be more rapid than the offshore borrow area given the dynamic conditions within the nearshore and surf zones. Studies have shown that the recovery time for benthos ranged from approximately 2 to 6 months when there is a good match between the fill material and the natural beach sediment. In the case of the Proposed Action, the fill material would not be substantially different (though slightly coarser) than native material; therefore, it is expected that recovery time would be similar.

Placement of beach fill and construction would also bury existing benthic communities and inhibit the ongoing recovery of the existing beach; however, the extent of the affected area would be limited and organisms from adjacent areas would recolonize the new beach in relatively short time (i.e., on the order of 6-12 months post-project).

Offshore Impacts: Recovery of infaunal communities after dredging has been shown to occur through larval transport, along with juvenile and adult settlement, but can vary based on several factors including seasonality, habitat type, size of disturbance, and species' life history characteristics (*e.g.*, larval development mode, sediment depth distribution). Although studies have shown that while recovery rates are variable, the abundance and diversity of benthic fauna within the borrow areas frequently returns to pre-nourishment levels relatively quickly, often within 1-2 year post-dredging recovery periods. Most studies indicate that dredging had only temporary effects on the infaunal community, and in some studies, differences in infaunal communities were attributed to seasonal variability or to hurricanes rather than to dredging. In studies performed following both the 2005 and 2007 nourishment projects, the borrow areas did not follow the recovery reported for other borrow areas. While the areas were repopulated by benthic organisms relatively quickly, the recovered benthic community was different from the

pre-dredging community. This difference was attributed to differences in the sediment characteristics in the borrow area after dredging occurred. The borrow areas filled in with siltier sediment (i.e., 20% to 30% silts and clays post-dredging compared to ~5% silts and clays pre-dredging). Dredging depths were mostly 3 to 6 feet deeper during the previous nourishment projects than the depths that will be dredged during the currently proposed project; therefore, the impacts to the sediment characteristics and benthic community are not expected to be as significant. Monitoring of the borrow areas will be performed to determine impacts to the borrow areas.

Essential Fish Habitat: USACE and BOEM's current determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the NOAA Fisheries.

EFH Assessment

1) Description of the site: Folly Island is a coastal barrier island, characteristic of the sea island coastal region of South Carolina and Georgia, and is surrounded by sensitive coastal marine and estuarine habitats. Coastal barrier beaches, near-shore waters, inlets, and associated estuarine tidal wetlands provide high quality feeding, cover, spawning, and maturation sites for a variety of living marine resources. As such any component of the project that may directly or indirectly reduce the quality, aerial extent, or natural character of the habitats involved should be identified. The project site is located in areas identified as Essential Fish Habitat (EFH) in the 1998 Amendment to Fishery Management Plans (FMP) that was prepared by the South Atlantic Fishery Management Council (SAFMC). This Amendment was prepared in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) of 1996 (P.L. 94-265) and was approved by the Secretary of Commerce on June 3, 1999. Detailed information regarding EFH and species managed by the SAFMC can be found in the amended FMPs. EFH at the project site includes coastal marine unconsolidated sand/mud bottoms. (This description was furnished by NMFS)

2) Description of Borrow Areas: There are four borrow areas for this project (Areas A, B, C, & D – see Figure 1). Borrow Area A encompasses a total area of approximately 310 acres; however, because of its use during previous renourishment projects, beach compatible sand remains in only approximately 80 acres. Borrow Area B encompasses a total area of approximately 210 acres; however, because of its use during previous renourishment projects, beach compatible sand remains in only approximately 120 acres. Borrow Areas C and D encompass approximately 30 acres and 70 acres, respectively. Neither of these borrow areas have been used in the past, so their entire area is available for use during this renourishment project. The borrow areas will be monitored pre- and post-dredging to determine sand recovery rates and changes in ecological characteristics.

3) Analysis of individual and cumulative effects on EFH: Federally managed species associated with the above-mentioned habitats found at the project site include post-larval, juvenile, and adult red drum (Sciaenops ocellata), white shrimp (Litopenaeus setiferus), and brown shrimp (Farfantepenaeus aztecus). Species under jurisdiction of the Mid Atlantic Fishery Management Council also occur in the project area. These species and

their associated EFH include juvenile and adult summer flounder (Paralichthys dentatus) which occur on submerged estuarine bottom and in the water column, and juvenile and adult bluefish (Pomatomus saltatrix) which occur in the water column. The project area also provides nursery and forage habitat for other species including black drum (Pogonias cromis), Atlantic menhaden (Brevoortia tyrannus), and blue crab (Callinectes sapidus) which serve as prey for other species (e.g., mackerels, snappers, and groupers) that are managed by the SAFMC, and for highly migratory species (e.g. billfishes and sharks) that are managed by the NMFS.

Macro invertebrate inhabitants of the near shore coastal zone are important components of coastal marine food webs and serve as prey for the aforementioned federally managed fishes. Characteristic benthic fauna of southeastern beaches is diverse, including tropically important representatives such as haustoriid amphipods, polychaete worms, isopods, and ghost crab (Ocypode quadrata).

4) USACE and BOEM's views regarding effects: Significant long-term harm to the ecologically diverse aquatic habitats, such as "live rock" and other stable bottoms are not anticipated. Although non-motile benthic animals on the beach will be adversely affected by placement of sand, re-colonization is expected to be relatively rapid, with re-establishment of the beach zone community within 1-2 years in affected areas.

Areas to be affected by excavation of beach quality sand include up to approximately 300 acres. Within sand borrow areas; benthic epifauna and infauna will be impacted by excavation and temporary turbidity that may extend beyond the excavation areas. Sand will be removed to depths of approximately 5 to 7 feet, with some shallower areas of excavation and two small areas of Borrow Area B with potential excavation to 10 feet. Live/hard bottom areas will be avoided, and no deep depressions will be created in the borrow areas. Upon completion of the work, inter-tidal and sub-tidal zones on the beach will be covered with sand. Materials used for beach nourishment may also be transported by natural processes onto other areas that support benthic communities; however, no hard bottoms or vegetated wetlands will be affected. Other potential impacts include localized turbidity elevation and possible reduction of dissolved oxygen in the surrounding water column. Elevated turbidity can reduce photosynthesis activity of pelagic and benthic algae. Suspended sediments can cause physical damage to respiratory structures of early life history stages of fishes and invertebrates.

5) Proposed mitigation, if applicable: Not applicable in this case.

Cultural Resources: A previous cultural resource survey of Borrow Areas A and B revealed a shipwreck in Borrow Area B. Both the South Carolina Institute of Archaeology and Anthropology (SCIAA) and the State Historic Preservation Office (SHPO) concurred with a recommended buffer zone around the shipwreck and a secondary 'target' in the vicinity of the shipwreck. These buffer zones have been established as "no dredging zones". Cultural resource surveys of Borrow Areas C and D were recently completed (copy available upon request). No cultural resources were found in either borrow area, and both SCIAA and SHPO have concurred with unrestricted dredging of these two borrow areas (see Appendix 4).

Onshore Prehistoric or Historic Resources: If the USACE discovers any previously unknown historic or archeological resources while accomplishing the activity on Folly Beach, the USACE will notify SHPO, SCIAA, and BOEM of any finding. The USACE will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Offshore Prehistoric or Historic Resources: In the event that the parties and/or dredge operators discover any archaeological resources prior dredging operations in Borrow Areas C and/or D, the USACE will report the discovery to SHPO, SCIAA, and BOEM (Chief, Leasing Division) electronically in a timely manner. The Corps Planning Division will coordinate with BOEM on the measures needed to evaluate, avoid, protect, and, if needed, mitigate adverse impacts from an unanticipated discovery. If investigations determine that the resource is significant, the parties will together determine how best to protect it.

If any archaeological resources are discovered while conducting dredging operations, the USACE will require that dredge and/or pump-out operations be halted immediately and avoid the resource per the requirements of the USACE specifications for unanticipated finds. The USACE will then immediately report the discovery to SHPO, SCIAA, and BOEM (Chief, Division of Environmental Assessment) electronically in a timely manner. The Corps Planning Division will coordinate with BOEM on the measures needed to evaluate, avoid, protect, and, if needed, mitigate adverse impacts from an unanticipated discovery. If investigations determine that the resource is significant, the parties will together determine the necessary further action required and how to best to protect the resource.

Coastal Consistency: The South Carolina Department of Environmental Health and Control Office of Ocean and Coastal Resource Management (OCRM) has previously concurred that the Folly Beach Shore Protection Project was consistent with the South Carolina Coastal Zone Management Act (CZMA). USACE and BOEM have concluded that the currently planned renourishment project is consistent with the CZMA. Coordination with OCRM is ongoing.

Air Quality: The ambient air quality for all of Charleston County and the surrounding counties has been determined to be in compliance with the National Ambient Air Quality Standards. All of Charleston County and the surrounding counties are designated as attainment areas and do not require conformity determinations. The proposed project is not anticipated to create any adverse effect on air quality. South Carolina DHEC, Bureau of Air Quality did not have any concerns about the projects impacts to air quality.

5. Public Coordination

The project is designed to be fully compliant with all environmental requirements including NEPA, the Endangered Species Act, Sections 404 and 401 of the Clean Water Act, Coastal Zone Management Act, National Historic Preservation Act, etc. The Corps of Engineers point of contact for the proposed project is Mr. Alan Shirey, 69A Hagood Ave, Charleston, SC 29403-5107, (843) 329-8166, email Alan.D.Shirey@usace.army.mil. Copies of the Draft Environmental Assessment and Draft Finding of No Significant Impact were sent to

approximately 33 agencies/organizations/tribes/individuals for coordination and consultation. The list of addressees and the comments that were received from these addressees are provided in Appendix 4.

6. Conclusions

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.

Appendix 1

Folly Beach Storm Damage Reduction Project Environmental Assessment
April 1991

Appendix 2

Folly Beach Storm Damage Reduction Project Environmental Assessment January 2005

Appendix 3

South Carolina DHEC Waiver of 401 Water Quality Certification for Beach Nourishment Projects

Appendix 4

Resource Agency/Public Coordination and Comments Received

State and Federal Natural Resource Agencies

US Department of Agriculture, Natural Resources Conservation Service
South Carolina Department of Health and Environmental Control, Bureau of Air Quality
South Carolina Department of Health and Environmental Control, Bureau of Water
US Fish and Wildlife Service
South Carolina Department of Natural Resources
South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management
National Marine Fisheries Services
South Carolina Department of Archives & History
US Environmental Protection Agency, Region 4
South Carolina Institute of Archaeology & Anthropology
South Carolina Department of Commerce
South Carolina Department of Transportation

Non-Profit Organizations

South Carolina Nature Conservancy
Audubon South Carolina
South Carolina Wildlife Federation
Sierra Club, South Carolina Chapter
Coastal Conservation League

Native American Tribes

The Eastern Band of the Cherokee Nation
Alabama-Quassarte Tribal Town
Eastern Shawnee Tribe
Kialegee Tribal Town
Choctaw Nation of Oklahoma
Muscogee (Creek) Nation
Poarch Band of Creek Indians
Seminole Tribe of Florida
Absentee-Shawnee Tribe of Indians of Oklahoma
Shawnee Tribe
Thlopthlocco Tribal Town
Tuscarora Nation of New York
United Keetoowah Band of Cherokee Indians
Catawba Indian Nation
Cherokee Nation
The Chickasaw Nation
Delaware Tribe of Indians