FINDING OF NO SIGNIFICANT IMPACT

Issuance of a Negotiated Agreement for Use of Outer Continental Shelf Sand from Borrow Areas C and D in the Folly Beach (SC) Hurricane and Storm Damage Reduction Project

Pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508) and Department of the Interior (DOI) regulations implementing NEPA (43 CFR 46), the U.S. Army Corps of Engineers (USACE), Charleston District and the Bureau of Ocean Energy Management (BOEM) prepared an environmental assessment (EA) to determine whether the issuance of a negotiated agreement authorizing the use of up to 850,000 cubic yards of sand from Outer Continental Shelf (OCS) borrow areas C and D in the Folly Beach (SC) Hurricane and Storm Damage Reduction Project would have a significant effect on the human environment and whether an environmental impact statement (EIS) should be prepared. BOEM independently reviewed the EA and determined that the potential impacts of the proposed action were adequately addressed.

Proposed Action

BOEM's proposed action is the issuance of a negotiated agreement so that the project proponents, the USACE and local sponsor the City of Folly Beach, can obtain the necessary sand resources to undertake the beach nourishment project. The project is needed to address shoreline erosion and protect valuable property along Folly Island in Charleston County, South Carolina.

The legal authority granted to BOEM for the issuance of negotiated noncompetitive leases for OCS sand and gravel is provided by OCSLA (43 U.S.C. 1337(k)(2)). The Folly Beach Hurricane and Storm Damage Reduction Project was authorized by Section 501 of the Water Resources Development Act of 1986 (Public Law 99-662) and was modified by the Energy and Water Development Appropriations Act of 1992 (Public Law 102-104).

Alternatives to the Proposed Action

Pursuant to NEPA, the USACE described the affected environment, evaluated potential environmental impacts from the proposed action, and developed and described alternatives to the proposed action for the initial nourishment of the Folly Beach, South Carolina Hurricane and Storm Damage Reduction Project in the *Final Environmental Impact Statement for Beach Erosion Control and Hurricane Protection for Folly Beach, S.C.* (1980). Supplemental information concerning environmental impacts was included in the *Folly Beach, South Carolina, Special Preconstruction Engineering and Design 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 Corps considered six nonstructural and six structural alternatives. Given economic, engineering, and environmental considerations, the USACE selected beach nourishment as the alternative that would best meet its needs. The USACE prepared an EA (April 1991), which tiered from the 1980 EIS, to support initial construction of the project in 1993 (EA, Appendix 1). The USACE prepared another EA in 2005 to update the effects analysis following initial construction (EA, Appendix 2). Renourishment efforts were performed by USACE in 2005 and 2007.

BOEM considered not authorizing use of borrow areas C and D. The project proponents could either (a) re-evaluate the project and choose another alternative method or sand source to restore Folly Beach, or (b) locate an onshore source of comparable high-quality sand. The USACE has exhausted remaining beach quality sand within state water borrow areas, and no other alternative state water sources have been identified at this time. Option B is not considered to be viable as sources of approved onshore sand are limited and cost prohibitive. Alternatively, the USACE and City of Folly Beach could not undertake the project at this time. In the case of the no project option, coastal erosion would continue, sea turtle and shorebird nesting habitat would deteriorate, the recreational amenity associated with the public beach would be severely affected, and the likelihood and frequency of property and storm damage would increase.

Environmental Effects

This EA evaluates the impacts from the proposed action, including connected actions of conveyance and placement of the sand. The EA incorporates by reference the previous effects analyses that have been determined to still be valid and augments a subset of analyses in light of new information. The USACE and BOEM identified and reviewed new information to determine if the project would result in significantly different effects. New information was identified, but that information only further supports or elaborates on the analyses or information presented in existing NEPA documents. No new significant impacts were identified, nor was it necessary to change the conclusions of the types, levels, or locations of impacts described in previous documents. The EA and FONSI identify all mitigation, monitoring, and reporting requirements necessary to avoid, minimize, and/or reduce and track any foreseeable adverse impacts that may result from all phases of construction. A subset of mitigation, monitoring, and reporting requirements, specific to activities under BOEM jurisdiction, will be incorporated into the negotiated agreement to avoid, minimize, and/or reduce and track any foreseeable adverse impacts (Attachment 1).

Significance Review

Pursuant to 40 CFR 1508.27, BOEM evaluated the significance of potential environmental effects considering both CEQ context and intensity factors. The potential significance of environmental effects has been analyzed in both spatial and temporal context. Potential effects are generally considered reversible because they will be minor to moderate, localized, and short-lived. No long-term significant or cumulatively significant adverse effects were identified. The ten intensity factors were considered in the EA and are specifically addressed below:

1. Impacts that may be both beneficial and adverse.

Potential impacts to physical, biological, cultural, and socioeconomic resources have been considered. A temporary reduction of water quality is expected due to turbidity during dredging and placement operations. Small, localized, temporary increases in concentrations of air emissions are also expected. A temporary increase in noise level and a temporary reduction in the aesthetic value offshore during construction in the vicinity of the dredging would occur. Adverse effects to benthic habitat and communities in the borrow areas are expected to be reversible. No impacts to hardbottom communities are expected from dredging or related sedimentation, or from beach fill equilibration or alongshore spreading. Potential impacts to nearshore hardbottom and benthic communities will be minimized by using pipeline corridors in areas devoid of hardbottom and by monitoring benthic recovery. Temporary displacement of

birds near the borrow area or beach placement could occur. Birds may be attracted to feeding near discharge pipelines on the beach. Impacts would be short-term, localized and temporary and should have no lasting effects on bird populations in the area. Other effects to sensitive biological resources are discussed below. There are no archaeological resource within the borrow areas. GPS-positioning equipment will be used to ensure the dredge is operating in the authorized location. An unexpected finds clause would be implemented in the case an archaeological resource is discovered during operations. For safety reasons, navigational and recreational resources located in the vicinity of the dredging operation would temporarily be unavailable for public use.

2. *The degree to which the proposed action affects public health or safety.*

The proposed activities are not expected to significantly affect public health. Construction noise will temporarily increase ambient noise levels and equipment emissions would decrease air quality in the immediate vicinity of placement activities. The public is typically prevented from entering the segment of beach under construction, so recreational activities will not be occurring in close proximity to operations. Dredging operations will be performed in accordance with an environmental protection plan, addressing marine pollution, waste disposal, and air pollution. The USACE will be conducting inspections to ensure compliance with the plan.

3. *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*

No prime or unique farmland, designated Wild and Scenic reaches, or wetlands would be impacted by implementation of this project. Loggerhead sea turtle and red knot critical habitat have been proposed in the project area. The proposed renourishment effort is not likely to adversely affect these habitats. The South Atlantic Fishery Management Council (SAFMC) has designated borrow areas C and D as Essential Fish Habitat (EFH). Dredging may affect feeding success of EFH species due to turbidity and loss of benthic organisms. Impacts to EFH would occur in areas C and D, but the limited spatial and temporal extent of dredging suggests these impacts will not adversely affect EFH on a broad scale. The borrow areas being used represent less than 5% of the offshore sand habitat area (within 4 miles of the shoreline) offshore of Folly Beach.

4. *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

No effects are expected that are scientifically controversial. Effects from beach nourishment projects, including dredging on the OCS, are well studied. The effects analyses in the EA has relied on the best available scientific information, including information collected from previous dredging and nourishment activities in and adjacent to the project area. Numerous studies and monitoring efforts have been undertaken along the southeast Atlantic coast evaluating the effects of dredging and beach nourishment on shoreline change, benthic communities, nesting and swimming sea turtles, and shorebirds. Additional project monitoring is proposed.

5. *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

Beach nourishment is a common solution to coastal erosion problems along the south Atlantic coast. Federally-authorized beach nourishment at Folly Beach has been occurring since the 1990's using nearshore sand resources. No significant adverse effects have been documented during or as a result of past operations. There was no documented take during previous Folly Beach renourishment efforts. This current effort, like all previous efforts at Folly Beach, will use a cutterhead suction dredge which has a very limited potential for entrainment-related impacts. The effects of the proposed action are not expected to be highly uncertain, and the proposed activities do not involve any unique or unknown risks.

6. *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*

No precedent for future action or decision in principle for future consideration is being made with BOEM's decision to authorize use of borrow areas C and D for this construction cycle. BOEM considers each use of a borrow area on the OCS as a new federal action. The Bureau's authorization of the use of the borrow area does not dictate the outcome of future leasing decisions. Future actions will also be subject to the requirements of NEPA and other applicable environmental laws.

7. *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.*

Significance may exist if it is reasonable to anticipate cumulatively significant impacts that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. The EA and previous NEPA documents conclude that the activities related to the proposed action are not reasonably anticipated to incrementally add to the effects of other activities to the extent of producing significant effects. The proposed project provides an incremental, but localized effect on the reduction of offshore sand resources. Although there will be a short-term and local decline in benthic habitat and populations, both are expected to recover within a few years. Monitoring of benthic recovery in the near shore and offshore borrow areas will begin with sampling immediately prior to dredging and 6 months and 1 year post-dredging. No significant cumulative impacts to benthic habitat are expected from the use of the borrow site.

8. *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

The proposed action is not expected to adversely affect historic resources. Seafloor-disturbing activities (e.g., dredging, anchoring, pipeline emplacement and relocation) may occur during proposed construction activities. An archaeological clearance survey was performed in the borrow areas, and no cultural resources were identified. The USACE will ensure a marine remote sensing survey is performed at the site of any booster pump and/or submerged pipeline in advance of any operations along the OCS. If potential prehistoric or historic resources are identified during the survey, a minimum of a 100-ft buffer will be established around potential resources. All bottom disturbing activities, including anchoring or spudding, in the vicinity of any such historic resource will be avoided.

The USACE and BOEM will work with the SC State Historic Preservation Officer (SHPO) should shipwreck or other culturally important remains be unexpectedly discovered. No significant impacts to cultural resources are anticipated with implementation of the measures to avoid any identified resources, cease work if an unexpected discovery occurs, and immediately notify the SC SHPO upon discovery so they can determine if the resource is significant or not and make the determination of the best means to protect the resource. The project is in compliance with the National Historic Preservation Act (NHPA), as amended; the Archeological and Historic Preservation Act (AHPA), as amended; and Executive Order 11593.

9. *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*

Marine mammal species that could be present in the project area are the blue, finback, humpback, North Atlantic right, sei, sperm whales, as well as the West Indian manatee. Hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtles could also occur in the project area. North Atlantic right whales, humpback whales, sei whales, blue whales, sperm whales, kemps ridley and hawksbill sea turtles are rarely present in the project area, and therefore, the likelihood of adverse impacts are very low and discountable given the use of a cutterhead dredge. Strike risk for whales and manatees is limited in a number of ways, including observer monitoring during transit and dredging operations, mandatory 500 yard separation distance during transit and survey operations, and mandatory participation in the Early Warning System. Placement operations may affect, but are unlikely to adversely affect nesting sea turtles provided implementation of mitigation measures such as nighttime monitoring, nest relocation, and lighting limitations. The USACE have determined that the proposed action is not likely to adversely affect the Atlantic sturgeon due to the location of the project, the species' mobility, and the use of a cutterhead dredge. The piping plover is an occasional visitor and winters adjacent to the project area; however, there is no designated piping plover critical habitat or known nesting habitat within the project area. The red knot is a generally a migrant visitor with a few birds wintering in the area. The southern terminus of sea-beach amaranth range is Folly Island; however, there are currently no known populations of sea-beach amaranth that occur on the island.

The USACE will comply with all requirements of biological opinions associated with this project including the 1995/1997 South Atlantic Regional Biological Opinion (SARBO) (http://el.erdc.usace.army.mil/seaturtles/index.cfm) and pending FWS Biological Opinion. The USACE notified the National Marine Fisheries Service (NMFS) on December 17, 2013 of their intent to use the SARBO and BOEM's involvement in the proposed action. The USACE determined that due to the use of the cutterhead dredge there were no anticipated effects on the Atlantic Sturgeon (EA, Appendix 5). The USACE initiated formal consultation for nesting sea turtles with the U.S. Fish and Wildlife Service (FWS) on December 4, 2013 for nesting sea turtles. Similar mitigation and monitoring efforts are proposed as undertaken for past projects, (e.g., see 2005 FWS Biological Opinion).

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The USACE and the City of Folly Beach must comply with all applicable Federal, State, and local laws and requirements. The dredging contractor will be required to provide an environmental protection plan that verifies compliance with these environmental requirements. BOEM and the USACE have undertaken the necessary consultations with NMFS, FWS, and relevant state agencies. A consistency concurrence from the South Carolina Department of Environmental Health and Control (SCDHEC), Office Ocean and Coastal Resource Management (OCRM) has been issued for the proposed action (EA, Appendix 6). SCDHEC has waived the requirement for water quality certification for beach nourishment projects in SC (EA Appendix 3); therefore, a new/updated water quality certification is not needed for this renourishment project. The proposed action is in compliance with the Marine Mammal Protection Act. Marine mammals are not likely to be adversely affected by the project and incorporation of safeguards to protect threatened and endangered species during project construction would also protect marine mammals in the area. Migratory birds are not likely to be adversely affected by the proposed action. No recent nesting of migratory birds has been reported on Folly Island.

Consultations and Public Involvement

The USACE, serving as the lead Federal agency, and BOEM, in a consulting role, has coordinated with NMFS, FWS, SCDHEC, and SC SHPO. Pertinent correspondence are provided in Appendix 6 of the EA. After signature of this Finding of No Significant Impact (FONSI), a Notice of Availability of the FONSI and EA will be prepared and published by BOEM in the Federal Register or by other appropriate means. The EA and FONSI will be posted to BOEM web site [http://www.boem.gov/Non-Energy-Minerals/Marine-Minerals-Program.aspx].

Conclusion

BOEM has considered the consequences of issuing a negotiated agreement to authorize use of OCS sand from borrow areas C and D in the Folly Beach Hurricane and Storm Damage Reduction Project. BOEM prepared the attached EA (Attachment 2) and finds that it complies with the relevant provisions of the CEQ regulations implementing NEPA, DOI regulations implementing NEPA, and other Marine Mineral Program requirements. Appropriate terms and conditions enforceable by BOEM will be incorporated into the negotiated agreement to avoid, minimize, and/or mitigate any foreseeable adverse impacts.

Based on the evaluation of potential impacts and mitigating measures discussed in the EA, BOEM finds that entering into a negotiated agreement, with the implementation of the mitigating measures, does not constitute a major Federal action significantly affecting the quality of the human environment, in the sense of NEPA Section 102(2)(C), and will not require preparation of an EIS.

James F. Bennett
Chief, Division of Environmental Assessment

3/26/14
Date

Attachment 1

Mitigation, Monitoring, and Reporting Requirements

The following mitigation measures, monitoring requirements, and reporting requirements are proposed by BOEM to avoid, minimize, reduce, or eliminate environmental impacts associated with the Proposed Action (herein referred to as the "Project"). Mitigation measures, monitoring requirements, and reporting requirements in the form of terms and conditions are added to the negotiated agreement and are considered enforceable as part of the agreement.

Plans and Performance Requirements

USACE will include this MOA as a reference document in the "Construction Solicitation and Specifications Plan" (hereinafter referred to as the "Plan") when advertised, as well as any terms and conditions identified in any Biological Opinions (BOs) resulting from consultation related to the Project, consistent with Paragraph 2 "Environmental Responsibilities and Environmental Compliance" below. USACE will ensure that all operations at Folly Beach Borrow Areas C and D are conducted in accordance with the final approved Plan and all terms and conditions in this MOA, as well as all applicable statutes, regulations, orders and any guidelines or directives specified or referenced herein. USACE will provide BOEM a copy of the final plans prior to construction and as soon as available. Construction may not commence until consultation is completed pursuant to Paragraph 2 and until BOEM has an opportunity to review the Plan for consistency with any terms and conditions identified in any BOs resulting from consultation. USACE will also allow BOEM to review and comment on any modifications to the Plan that may affect the borrow area or pipeline corridors on the OCS, including the use of submerged or floated pipelines to directly convey sediment from the borrow area to the placement site. The above-referenced comments, if any, will be delivered in a timely fashion so as to not unnecessarily delay USACE's construction contract or schedule.

The dredging method for removing sand from Folly Beach Borrow Areas C and D must be consistent with those analyzed or identified in the NEPA and other authorizing environmental documents, as well as any relevant project permits. Dredging depths will not exceed any specifications identified in the Plan.

If dredging and/or conveyance methods are not wholly consistent with those evaluated in relevant NEPA documents and environmental and cultural resource consultations, and those authorized by relevant project permits, additional environmental review may be necessary. If the additional NEPA review, consultations, or permit modifications would impact or otherwise require supplementation of the provisions of the MOA, an amendment may be required.

Prior to the commencement of construction, USACE will provide BOEM with an electronic copy of the summary of the construction schedule. USACE, at the reasonable request of BOEM or the Bureau of Safety and Environmental Enforcement (BSEE), will allow access at the site of any operation, subject to safety regulations, to any authorized Federal inspector and will provide BOEM or BSEE any documents and records that are pertinent to occupational or public health, safety, environmental protection, conservation of natural resources, or other use of the OCS, as may be requested.

Environmental Responsibilities and Environmental Compliance

USACE is the Federal Government's lead agency and will ensure the Project complies with applicable environmental laws, including, but not limited to, the ESA, MSA, NHPA, and CZMA, and any consultations or limitations imposed thereunder. The City is responsible for compliance with any applicable permits and requirements of law.

Pursuant to 50 CFR §402.07, USACE is designated as the lead Federal agency for ESA Section 7 consultation concerning protected species under the purview of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). USACE will require its contractor(s) to implement the mitigation terms, conditions, and measures required by FWS, NMFS, SCDHEC, and BOEM pursuant to applicable Federal and State laws and regulations prior to commencement of activities authorized under this MOA, including extraction, transportation and placement of sand resources from Borrow Areas C and D. The required mitigation terms, conditions, and measures are reflected in the relevant BOs, Conservation Recommendations, Consistency Determinations, and applicable state or local permits. Based on the outcome of ESA Section 7 consultation, BOEM reserves the right to amend this MOA, as necessary, if additional and/or different mitigation and minimization measures are required by FWS. Furthermore, BOEM reserves the right to review the Plan and participate in the preconstruction meetings as discussed in Paragraphs 1 and 3, respectively, to ensure compliance with all terms and conditions in any BOs issued as a result of consultation, prior to initiation of construction activities. If the incidental take of sea turtles or other endangered species within federal waters by USACE or its authorized contractor(s) is not covered by an incidental take statement (ITS), BOEM may require suspension of activities authorized in the MOA and reinitiation of the consultation may be warranted. The type, amount and severity of incidental take, not covered by an ITS, that will trigger suspension, and the need for any such suspension or reinitiated consultation, will be determined by BOEM and USACE jointly. Depending on the results of an assessment of any incidental take not covered by an ITS or any reinitiated consultation, BOEM expressly reserves the right to lift the suspension, revoke and terminate the MOA, negotiate with the Parties on an amendment to the existing MOA or enter into a new MOA with additional terms and conditions to protect threatened or endangered species. BOEM shall provide prompt written notice to the Parties of any such suspension of the MOA and activities authorized herein, and request that consultation be reinitiated with FWS or NMFS, as applicable and as described herein.

Electronic copies of all relevant correspondence, monitoring data, and reports related to the activities covered by this MOA, will be provided to BOEM within 14 days of issuance (including observer, and dredging reports), unless an earlier timetable is provided in any applicable Biological Opinion, permit or other authorization for the Project. The City is responsible for compliance with all applicable laws, permits and authorizations. Construction may not commence until the pre-construction requirements have been completed, including, but not limited to, completion of consultation as described herein.

Pre-Construction Notification of Activity in or near the Borrow Area

USACE will invite BOEM to attend a pre-construction meeting that describes USACE's and/or its agents' plan and schedule to construct the Project.

USACE will send electronic notification to BOEM at least 72 hours prior to the commencement, and within 24 hours after termination, of operations at Folly Beach Borrow Areas C and D. BOEM will electronically notify USACE in a timely manner of any OCS activity within the jurisdiction of the DOI that may adversely affect USACE's ability to use OCS sand for the Project.

Dredge Positioning

During all phases of the Project, USACE will ensure that the dredge and any bottom disturbing equipment is outfitted with an onboard global positioning system (GPS) capable of maintaining and recording location within an accuracy range of no more than plus or minus 3 meters. The GPS must be installed as close to the cutterhead dredging device as practicable. During dredging operations, USACE will immediately notify BOEM electronically if dredging occurs outside of the approved borrow area. Such notification will be made as soon as possible after USACE becomes aware of dredging outside of the approved borrow area.

Anchoring, spudding, or other bottom disturbing activities are not authorized outside of the approved borrow area on the OCS except for immediate concerns of safety, navigation risks or emergency situations.

USACE will provide BOEM, electronically, with all appropriate Dredging Quality Management (DQM) data or other equivalent dredging data, acquired during the Project. USACE will submit the DQM or other equivalent plant positioning data, including cutterhead dredging device depth biweekly. A summary dataset will be submitted within 90 days of completion of the Project. If available, USACE will also submit Automatic Identification System (AIS) data for vessels qualifying under the International Maritime Organization's (IMO) International Convention for the Safety of Life at Sea.

Dredge Operation

Dredging will occur preferentially in naturally accreting areas of Folly Beach Borrow areas C and D and dredging will be avoided in erosional areas of the shoal to the extent possible. USACE will use the methods necessary to maintain the relative profile and shape of the sand shoal complex to the extent practicable, as determined by USACE, to avoid creating deep depressions or pits

Submittal of Production and Volume Information

USACE, in cooperation with the dredge operator, will submit to BOEM a summary of the dredge track lines, outlining any deviations from the original Plan on a biweekly basis. A color-coded plot of the cutterhead, dredging device will be submitted, showing any horizontal or vertical

dredge violations. The dredge track lines must show dredge status: hotelling, dredging, transiting, or unloading. This map will be provided in PDF format.

USACE will provide at least a biweekly update, electronically, of the construction progress including volumetric production rates to BOEM. The project completion report, as described below, will also include production and volume information.

Local Notice to Mariners

USACE will require its contractor(s) for the Project to place a notice in the U.S. Coast Guard Local Notice to Mariners regarding the timeframe and location of dredging and construction operations in advance of commencement of dredging.

Marine Pollution Control and Contingency Plan

USACE will require its contractor(s) and subcontractor(s) to prepare for and take all necessary precautions to prevent discharges of oil and releases of waste or hazardous materials that may impair water quality. In the event of such an occurrence, notification and response will be in accordance with applicable requirements of 40 C.F.R. Part 300. All dredging and support operations must be compliant with U.S. Coast Guard regulations and the U.S. Environmental Protection Agency's Vessel General Permit, as applicable. USACE will notify BOEM of any noncompliant discharges and remedial actions taken, and will provide copies of reports of the incident and resultant actions electronically.

Encounter of Ordnance

If any ordnance is encountered while conducting dredging activities at Borrow Areas C and D, the USACE will report the discovery within 24 hours to: Chief, BOEM Leasing Division, at (703) 787-1215 and dredgeinfo@boem.gov.

Bathymetric Surveys

USACE will provide the BOEM with pre- and post-dredging bathymetric surveys of Folly Beach Borrow Areas C and D. The pre-dredging survey will be conducted within the area(s) intended to be dredged within 60 days prior to dredging. The post-dredging survey will be conducted within 60 days after the completion of dredging within the area(s) dredged. An additional bathymetric survey is recommended within one (1) year and three (3) years following the completion of dredging. Hydrographic surveys will be performed in accordance with the USACE Hydrographic Surveying Manual, EM 1110-2-1003. All bathymetric data will be roll, pitch, heave, and tide corrected using accepted practices. Survey lines of the specific dredge area, within Folly Beach Borrow Areas C and D, will be established at intervals necessary to provide 100 percent coverage. Three equidistant cross-tie lines will be established parallel to the principal survey baseline. All survey lines will extend at least 100 meters beyond the edge of the dredge areas. All data will be collected in such a manner that post-dredging bathymetry survey data is compatible with the pre-dredging bathymetric survey data to enable the latter to be

subtracted from the former to calculate the volume of sand removed, the shape of the excavation, and nature of post-dredging bathymetric change.

Copies of pre-dredging and post-dredging hydrographic data will be submitted electronically to the BOEM within ninety (90) days after each survey is completed. The delivery format for data submission is an ASCII file containing corrected x, y, z data. The horizontal data will be provided in the North American Datum of 1983 (NAD '83) South Carolina State Plane South, U.S. survey feet unless otherwise specified. Vertical data will be provided in the North American Vertical Datum of 1988 (NAVD '88), U.S. survey feet, unless otherwise specified. An 8.5x11 inch plan view plot of the pre- and post-construction data will be provided showing the individual survey points, as well as contour lines at appropriate elevation intervals. These plots will be provided in PDF format. Survey metadata will also be provided.

Archaeological Resources

Onshore Prehistoric or Historic Resources

If USACE discovers any previously unknown historic or archeological resources while accomplishing the activity on the City of Folly Beach restoration project, USACE will notify BOEM of any finding. 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

USACE will ensure a marine remote sensing survey is performed at the site of any booster pump and/or submerged pipeline locations in advance of operations in or along the OCS. USACE will review the results of the survey prior to laying the pipeline and will provide the results of the survey to BOEM for review. If markers indicative of prehistoric or historic resources are identified during the survey, a minimum of a 100-ft buffer will be established around each potential prehistoric or historic resource. All bottom disturbing activities, including anchoring or spudding, in the vicinity of any such historic resource will be avoided and the buffer will be strictly maintained. To minimize the risk of inadvertent damage to undiscovered archeological or historic resources, USACE will ensure that the dredge contractor does not drag equipment outside the borrow area.

In the event that the Parties and/or dredge operators discover any archaeological resources prior to dredging operations in Folly Beach Borrow Areas C and D, USACE will report the discovery to the Chief, Leasing Division, BOEM, electronically in a timely manner. USACE will coordinate with BOEM on the measures needed to evaluate, avoid, protect, and, if needed, mitigate adverse impacts from an unanticipated discovery. If the resource is determined to be significant, the Parties will jointly determine how best to protect it.

If the Parties and/or dredge operators discover any archaeological resources while conducting dredging operations, USACE will require that dredge and/or pump-out operations be halted immediately and avoid the resource per the requirements of USACE specifications for

unanticipated finds. USACE will then immediately report the discovery to Chief, Division of Environmental Assessment, BOEM, electronically in a timely manner. USACE will coordinate with BOEM on the measures needed to evaluate, avoid, protect, and, if needed, mitigate adverse impacts from an unanticipated discovery. If the resource is determined to be significant, the Parties will jointly determine the actions necessary to best protect the resource.

Responsibilities

BOEM does not warrant that the OCS sand resources used in this project are suitable for the purpose for which they are intended by USACE and the City. BOEM's responsibility under this Project is limited to the authorization of access to OCS sand resources from Folly Beach Borrow Areas C and D, as described in this MOA, and therefore BOEM disclaims any and all liability for the physical and financial activities undertaken by other Parties in pursuit of the Project.

Project Completion Report

USACE will submit a project completion report to BOEM within 120 days following completion of the activities authorized under this MOA. This report and supporting materials will be sent in writing and electronically. The report must contain, at a minimum, the following information:

- the names and titles of the project managers overseeing the effort (for USACE, the engineering firm (if applicable), and the contractor), including contact information (phone numbers, mailing addresses, and email addresses);
- the location and description of the project, including the final total volume of material extracted from the borrow area and the volume of material actually placed on the beach or shoreline (including a description of the volume calculation method used to determine these volumes);
- DQM (or other equivalent) data, in ASCII files, containing the x, y, z and time stamp of the cutterhead or drag arm locations;
- a narrative describing the final, as-built features, boundaries, and acreage, including the restored beach width and length;
- a table, an example of which is illustrated below, showing the various key project cost elements;

	Cost Incurred as of Construction Completion ($)
Construction	
Engineering and Design	
Pre- and Post-Dredging Bathymetric Surveys	
Compilation of Project Completion Report	
Total	

- a table showing the various phases of the project construction, the types of construction equipment used, and the number of times and length of time each piece of construction

equipment was utilized. A listing of construction and construction oversight information, including the prime and subcontractor(s), contract costs, etc.;

- a list of all major equipment used to construct the project;
- a narrative discussing the construction sequences and activities, and, if applicable, any problems encountered and solutions;
- a list and description of any construction change orders issued, if applicable;
- a list and description of any safety-related issues or accidents reported during the life of the project;
- a narrative and any appropriate tables describing any environmental surveys or efforts associated with the project and costs associated with these surveys or efforts;
- a table listing significant construction dates beginning with bid opening and ending with final acceptance of the project by USACE;
- digital appendices containing the as-built surveys, beach-fill cross-sections, and survey data; and
- any additional pertinent comments.

Attachment 2

Final Environmental Assessment with Appendices

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
Revised March 2014

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,

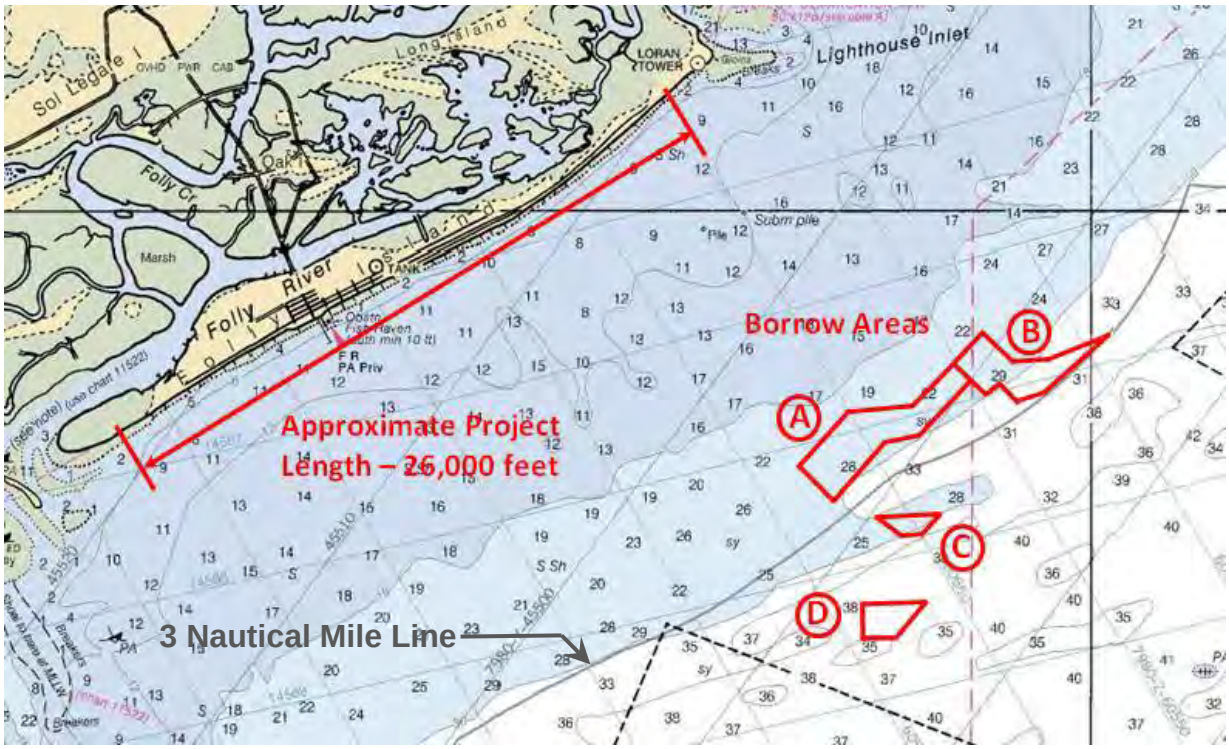


Image source: MyTopo.com

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.

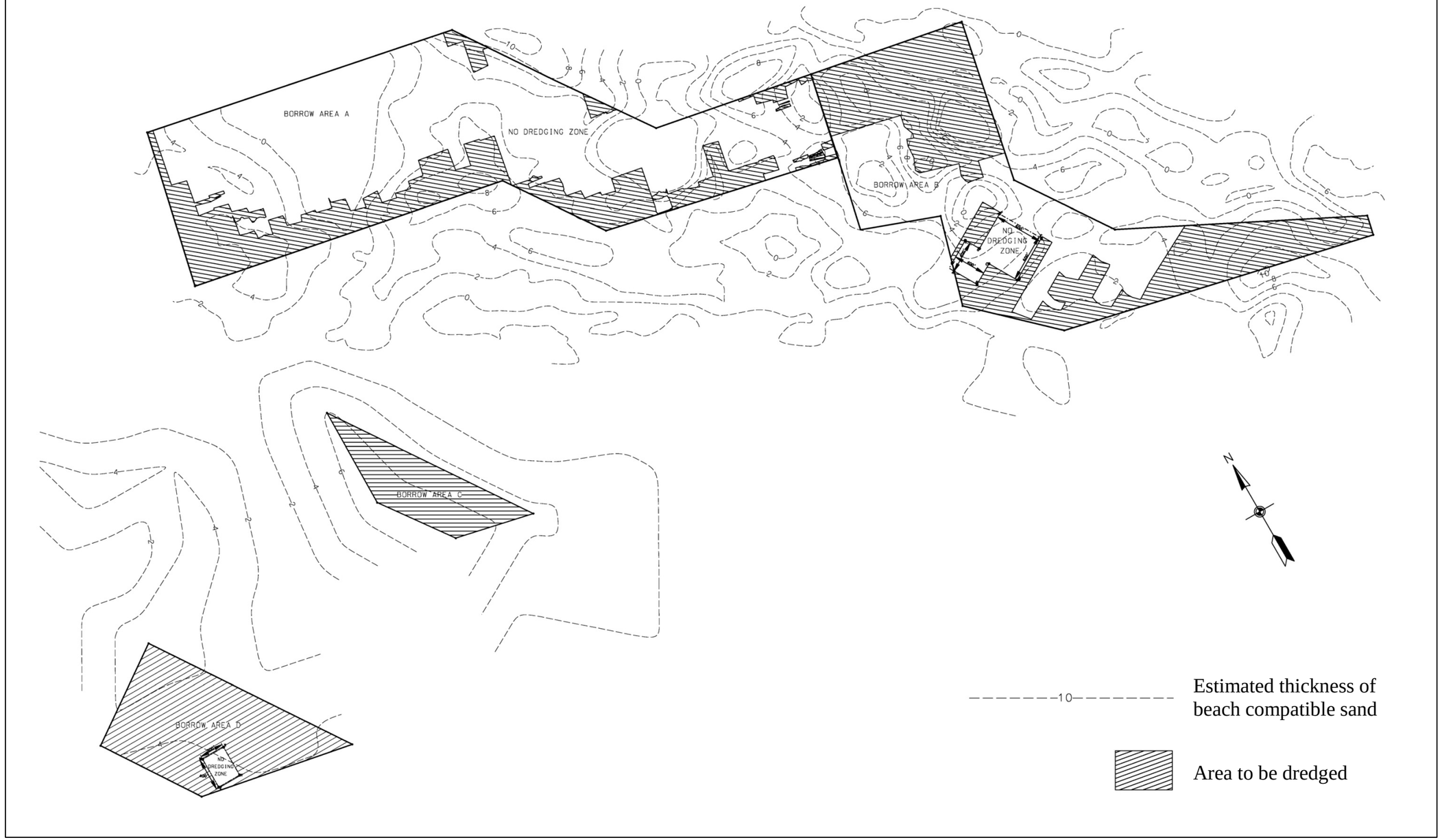


FIGURE 2: BEACH COMPATIBLE SAND THICKNESS ISOPACHS IN BORROW AREAS

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, proposed listing of the red knot, and proposed loggerhead critical habitat; 4) updated information about noise produced by 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 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, the proposed listing of the red knot, 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;

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.

however, since the work will be performed by a hydraulic cutterhead dredge, the impacts to these 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

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

do pass through when moving up the coast where they have been seen in various locations 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 and consultation with NOAA Fisheries is limited to the effect of the dredge operations on listed species, which is covered by the 29 October 1997 "National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast". 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. See Appendix 5 for the Biological Assessment.

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 newly constructed sand berm will be tilled to minimize problems with overly compact sand that might hinder sea turtle nesting.

- 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, while false crawls have increased significantly the past several years as erosion of the beach has progressively gotten worse (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

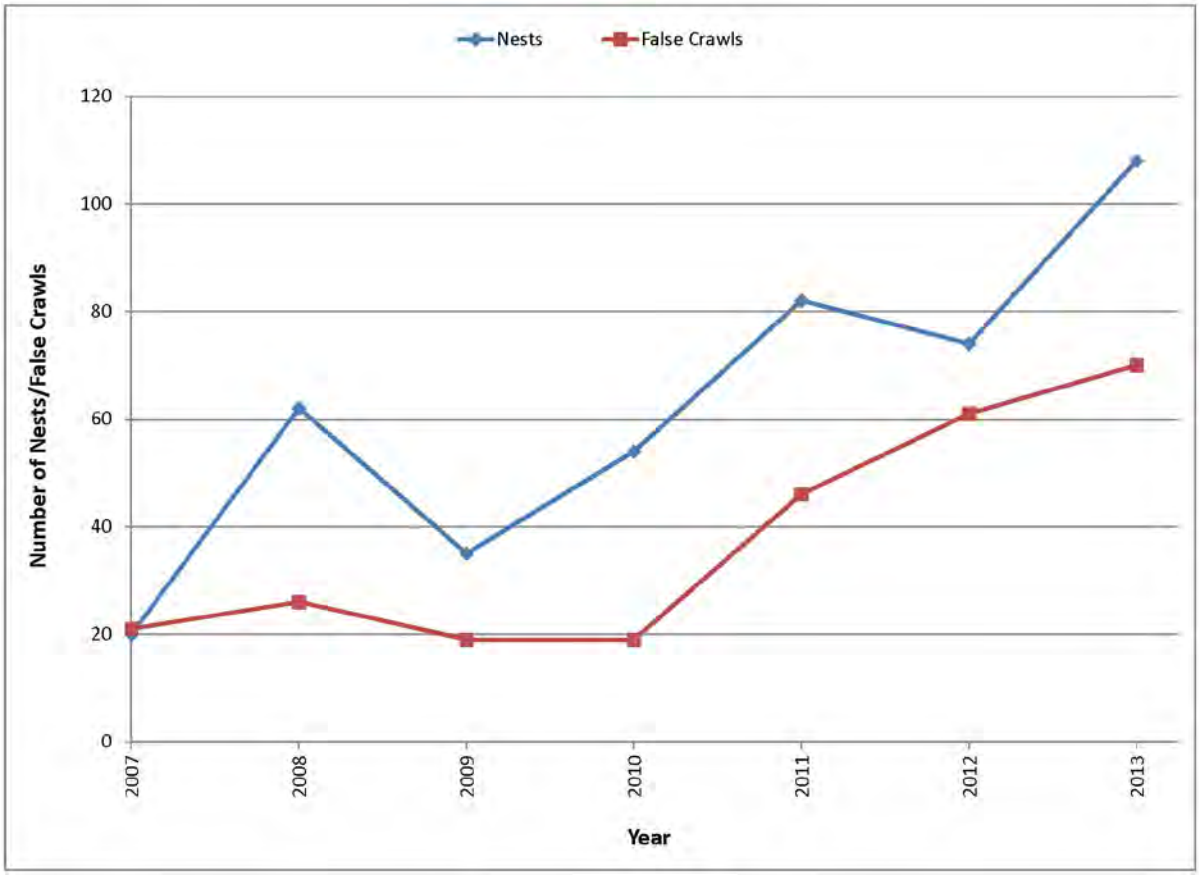


FIGURE 3: FOLLY BEACH SEA TURTLE NESTS AND FALSE CRAWLS 2007-2013

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 conditions. 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. 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. No hard bottom has been found within the borrow areas. One area of scattered surface rock (not considered hardbottom) was located within Borrow Area D and will be avoided. 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) NOAA Fisheries recommendations:

- Dredging depths within the borrow areas should be limited to a depth that, based on modeling and empirical studies, will fill with beach compatible material.

- No dredging shall occur within 400 feet of hardbottom habitat.
- To the maximum extent practical, all work should be conducted during the months of October through March.

6) USACE and BOEM's response to NOAA Fisheries recommendations:
- Physical modeling of the borrow site is not practical. Information is not available on the offshore transport of sediment. Dredging depth within the borrow areas is shallower than dredging depths from previous renourishment projects when the sediment deposited in the borrow area had a higher silt content than desired (i.e., 20% to 30% silt filled in compared to the desired <10% silt content). Post dredging monitoring of the borrow areas will determine if the shallower dredging depth results in less silt infilling.
- No hardbottom habitat was found in the borrow areas. However, an area of surface rock was found in Borrow Area D, which provides some fish habitat. This area will be avoided during dredging operations.
- The original schedule for the project called for work to start in October; however, lack of funding delayed start of the work until January.

7) 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). Additional cultural resource surveys of pipeline placement areas for use of the offshore borrow sites will be completed by the contractor and reviewed for potential targets prior to pipeline placement.

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. OCRM has concurred with this determination (see Appendix 6).

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. Cumulative Impacts

The Council on Environmental Quality (CEQ) defines cumulative impact as:

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable 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 (40 CFR 1508.7). This analysis follows the 11-step process outlined by the CEQ in their 1997 publication Considering Cumulative Effects Under the National Environmental Policy Act.

A. Cumulative Effects Issues

This assessment of cumulative impacts will focus on impacts of dredging from the proposed ocean borrow sites, and impacts of placement of sand material on the beach (whether for beach nourishment or disposal of dredge maintenance material) on significant coastal shoreline resources. In discussing the potential cumulative impacts of offshore borrow area dredging and beach nourishment, we consider time crowded perturbations, and space crowded perturbations, as defined below, to be pertinent to this action.

Time crowded perturbations *– repeated occurrence of one type of impact in the same area.*

Space crowded perturbations *– a concentration of a number of different impacts in the same area.*

B. Geographic Scope

This analysis will focus on cumulative impacts within the project area since portions of affected beaches under the current proposal have received fill in the past. Additionally, this analysis will study the cumulative impacts, within the project area, of increased offshore borrow area use. The proposed project represents a new impact to the offshore benthic resources in the Borrow Areas C and D. However, cumulative impacts of beach nourishment/disposal and offshore borrow area used on a statewide scale will also be assessed herein.

C. Time Frame

This analysis considers known, past, present and reasonably foreseeable future sand placement and offshore borrow activities on a statewide scale and within the project vicinity. Projections were extended to the end of the current project life, as that date represents a reasonably foreseeable future, and the majority of remaining ocean beach that could reasonably be expected to have federal projects implemented is currently under study and included in this analysis. This assessment assumes continued periodic construction of the proposed project.

D. Actions Affecting Resources of Concern

Cumulative effects of the proposed action will focus on the impacts of dredging from the proposed ocean borrow sites and placement of sand material on the beach.

D.1. Actions Affecting Benthic Resources

Dredging: As a result of dredging areas for beach nourishment sand, there is concern for potential cumulative impacts due to repeated dredging in a borrow area within short periods of time such that the benthic community may not have time to recover. Dredging in subsequent areas close to one another may result in impacts to potential adult organism recruitment to the dredged areas, further lengthening the time for recovery in an area.

Other factors affecting Benthic Resources: Many factors unrelated to dredging of sand from borrow areas may affect benthic resources including, beach resources and ocean fish stocks. The factors can be a result of natural events such as population cycles or as a result of favorable or negative weather conditions including La Niña, El Niño, and major storms or hurricanes as examples. These global events have far greater impacts on these resources at the population level than relatively local activities such as removal of sand from a given area of ocean bottom. Primary human-induced factors affecting fish stocks are over fishing and degradation of water quality due to pollution. When examining the cumulative effect of space

crowded perturbations, these other factors far outweigh the potential incremental effects of borrow dredging of sand on benthic or fish populations.

D.2. Actions Affecting Beach Resources

The major anthropogenic sources of beach impacts are local beach maintenance activities (which include local beach nourishment), disposal of dredged material from maintenance of navigation channels, and full-scale beach nourishment (berm and dune construction with long-term periodic maintenance). Of particular concern are macroinvertebrates, fisheries, shorebirds, and sea turtle species that utilize or occur on or adjacent to ocean beaches. These resources are also impacted by natural events and anthropomorphic activities that are unrelated to disposal of sand on the beach as discussed below.

Dredging: The physical effects of offshore sand mining on the incident wave field and associated sediment transport regime may alter local shoreline change.

Local Maintenance Activity: Under the existing condition beaches may be subjected to repeated and frequent maintenance disturbance by individual homeowners and local communities following major storm events. These efforts are primarily made to protect adjacent shoreline property. Such repairs consist of dune rebuilding using sand from beach scraping. Limited fill and sandbags are generally used to the extent allowable by OCRM permit. Such frequent maintenance efforts could keep the natural resources of the barrier island ecosystems from reestablishing a natural equilibrium with the dynamic coastal forces of the area.

Permitted Beach Nourishment: Local efforts can also include beach nourishment. While locally funded beach nourishment activities are not wide spread, they also occur along other developed South Carolina beaches. These infrequent maintenance efforts could keep the natural resources of the barrier island ecosystems from reestablishing a natural equilibrium with the dynamic coastal forces of the area.

USACE Beach Disposal: Beach quality sand is a valuable resource that is highly sought by beach communities to provide wide beaches for recreation and tourism, as well as to provide hurricane and wave protection for public and private property in these communities. When beach quality sand is dredged from navigation projects, it has become common practice of the USACE to make this resource available to beach communities, to the maximum extent practicable. Placement of this sand on beaches merely represents return of material, which eroded from these beaches, and is, therefore, replenishment with native material. The design of beach placement sites is very simple; generally it extends the elevation of the natural berm seaward. Widths of beach placement zones generally reflect the wishes of the local government relative to the choice between a long, narrow beach, or a shorter, wider beach.

USACE Beach Nourishment: Beach nourishment activities typically include the construction and long-term (50-year) maintenance of a berm and dune. The degree of cumulative impact would increase proportionally with the total length of beach nourishment project constructed.

Other factors affecting Beach Resources: Many factors unrelated to placement of sand on the beach may affect beach resources including, benthic resources, shorebird populations and ocean fish stocks. The factors can be a result of natural events such as natural population cycles or as a result of favorable or negative weather conditions including droughts, floods, La Niña, El Niño, and major storms or hurricanes to name a few. In terms of scale, the primary disturbance to beach ecosystems is the natural erosion and deposition of

material via wave and wind action. A primary anthropogenic factor affecting shorebird populations is beach development resulting in a loss or disturbance of nesting habitat and invasion of domestic predators. Primary man-induced factors affecting fish stocks are over fishing and degradation of water quality due to pollution. Sediment sources have also been disrupted by dams, estuarine dredging and hard structures such as jetties and groins.

E. Significant Resources

Based on scoping comments from resource agencies and others, the primary concerns with the proposed beach disposal are direct and indirect impacts to macroinvertebrates, fish, shorebirds, and sea turtles. Federally listed threatened or endangered species which could be present along the South Carolina coast are the blue whale, finback whale, humpback whale, right whale, sei whale, sperm whale, West Indian manatee, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, shortnose sturgeon, Atlantic sturgeon, seabeach amaranth, and piping plover. The benefits of periodic renourishment are enhancement of nesting habitat for sea turtles and provision of additional habitat for sea beach amaranth. In relation to dredging of offshore sites for material, the primary concerns are the potential impacts to benthic organisms, fish species and hardbottom habitat areas.

Beach and Dune: Terrestrial habitat types within these areas include sandy or sparsely vegetated beaches and vegetated dune communities. Mammals occurring within this environment are opossums, cottontails, gray foxes, raccoons, feral house cats, shrews, moles, voles, and house mice. Common vegetation of the upper beach includes beach spurge, sea rocket and pennywort. The dunes are more heavily vegetated, and common species include American beach grass, panic grass, sea oats, broom straw, seashore elder, and salt meadow hay. Seabeach amaranth, a federally listed threatened species, may be present in some of the project area, but has not been documented as such. Ghost crabs are important invertebrates of the beach/dune community. The beach and dune also provide important nesting habitat for loggerhead sea turtles as well as habitat for a number of shorebirds and many other birds, including resident and migratory songbirds. Placement of material along the ocean beach enhances and improves important habitat for a variety of plants and animals, and restores lost habitat in the areas of most severe erosion. This is especially important for nesting loggerhead sea turtles (although lighting

issues often inhibit nesting activities). Individually and cumulatively, in addition to providing important habitat, beach nourishment projects protect public infrastructure, public and private property, and human lives.

Marine Waters: Along the coast of South Carolina, marine waters provide habitat for a variety of ocean fish and are important commercial and recreational fishing grounds. Kingfish, spot, bluefish, weakfish, spotted seatrout, flounder, red drum, king mackerel, and Spanish mackerel are actively fished from boats, the beach, and local piers. Offshore marine waters serve as habitat for the spawning of many estuarine dependent species. Oceanic large nekton located offshore of South Carolina are composed of a wide variety of bony fishes, sharks, and rays, as well as fewer numbers of marine mammals and reptiles. Marine mammals and reptiles that may be present in the offshore borrow sites are addressed in the Biological Assessment. Dredging and placement of beach fill may create impacts in the marine water column in the immediate vicinity of the activity, potentially affecting the surf zone and nearshore ocean. These impacts may include minor and short-term suspended sediment plumes and related turbidity, as well as the release of soluble trace constituents from the sediment. Overall water quality impacts for any given project are expected to be short-term and minor. Cumulative effects of multiple simultaneous beach nourishment operations could be potentially harmful to fishes of the surf zone. However, the high quality of the sediment selected for beach fill and the small amount of beach affected at any point in time would not suggest that this activity poses a significant threat.

Inter-tidal and Surf Zones: The inter-tidal zone within the proposed beach nourishment areas serves as habitat for invertebrates including mole crabs, coquina clams, amphipods, isopods, and polychaetes, which are adapted to the high energy, sandy beach environment. These species are not commercially important; however, they provide an important food source for surf-feeding fish and shore birds. The surf zone is suggested to be an important migratory area for larval/juvenile fish moving in and out of inlets and estuarine nurseries. Disposal operations along the beach can result in increased turbidity and mortality of intertidal macrofauna, which serves as food sources for various fish and bird species. Therefore, feeding activities of these species may be interrupted in the immediate area of beach sand placement. These mobile species are expected to temporarily relocate to other areas as the project proceeds along the beach. Though a short-term reduction in prey availability may occur in the immediate disposal area, only a small area is impacted at any given time, and once complete, organisms can recruit into the nourished area. To summarize, the impacts of beach renourishment projects on the intertidal and nearshore zones are considered temporary, minor and reversible. Cumulative effects of multiple simultaneous beach nourishment operations could be potentially harmful to fishes of the surf zone; however, the high quality of the sediment selected for beach fill and the small amount of beach affected at any point in time would suggest that this activity would not pose a significant threat.

Hardbottoms: Hardbottoms are also called "live-bottoms" because they support a rich diversity of invertebrates such as corals, anemones, and sponges, which are refuges and food sources for fish and other marine life. They provide valuable habitat for reef fish such as black sea bass, red porgy, and groupers. Hardbottoms are also attractive to pelagic species such as king mackerel, amberjack, and cobia. While hardbottoms are most abundant in northern portions of South Carolina, they are located along the entire coast. Though the potential for sedimentation exists with any storm damage reduction project, the effects on low lying

ephemeral hardbottom communities and high relief hardbottom are not expected to be significant. In addition, there are no known hardbottom habitat in the immediate area of Folly Beach; therefore, cumulative effects are expected to be minimal.

Nearshore Zone: Beach nourishment projects introduce fill into nearshore waters out to a specified depth of closure, usually from about -10 to -15 feet. Benthic organisms, phytoplankton, and seaweeds are the major primary producers in this community with species of *Ulva* (sea lettuce), *Fucus*, and *Cladocera* (water fleas) being fairly common where suitable habitat occurs. Many species of fish-eating birds are typically found in this area including gulls, terns, cormorants, loons, and grebes.

Borrow Areas: Polychaetes, amphipods, oliogchaetes, pelecycpods, and decapods are major infaunal assemblages inhabiting the borrow areas. The loss of benthic marine invertebrates may occur as organisms pass through the dredge. Sessile benthic organisms may be buried by resuspended and redeposited sediments.

Incident Wave Conditions: The potential impacts of local deepening of the offshore borrow areas has not been analyzed. However, the potential impacts of the Folly Beach sand removal activities were compared to borrow area impact study reports for seven different states (on the East and Gulf Coasts) and nine different sets of borrow areas. Most of these reports were prepared for and in conjunction with BOEM and generally contained information on 1)the character of the offshore borrow areas; 2)circulation, wave, and sediment transport modeling and/or calculations; 3)potential impacts; and 4)conclusions. Table 4 summarizes the relevant parameters from each of the study reports. Though the inclusion of all the parameters in Table 4 was not consistent in each report, enough information was provided in order to draw reasonable comparisons to the Folly Beach project.

The Folly Beach borrow areas are smaller in size (i.e., total of 620 acres) than most of the borrow areas in the previous studies, have comparable water depths, and are a similar distance from shore to many of them. The studies in North Carolina are the most natural comparisons to Folly Beach in this regard. Only one of these eleven sites (S1, Dare County B in North Carolina) received a questionable rating with regard to adverse impacts. That sand resource area, S1 in Dare County, is generally closer to the shoreline than the Folly Beach areas and has a deeper average sand layer thickness than will be dredged from the Folly Beach areas. Therefore, sand resource area S1 would create a deeper seabed depression closer to the shore than any of the Folly Beach borrow areas.

In addition, there have been previous removal of material from Borrow Areas A and B with no noticeable change to the beach erosion rate.

Based on the above, it is assumed that the proposed action will have a minimal effect on incident wave conditions.

Longshore Sand Transport and Shoreline Change: On a regional basis, renourishment projects add material to the longshore transport system, providing increased sand supply. Although a regional sediment budget analysis has not been

completed, it is assumed that the proposed action and the combined effects of all other existing and proposed beach projects will have a minimal effect on shoreline and sand transport.

E.1. Other Resources

Air Quality: The ambient air quality for all of coastal South Carolina has been determined to be in compliance with the National Ambient Air Quality Standards. All coastal counties in South Carolina are designated as attainment areas and do not require conformity determinations. Although ozone is not a significant problem in the coastal counties,

Table 4: Summary of Previous Borrow Source Impact Analyses

Study	Sand Resource Area	Distance Offshore (miles)	Water Depth (feet)	Surface Area (sq. mi.)	Sand Layer Thickness (feet)	Sand Volume Est (cu. yd)	Dredging Depth for Modeling (ft)	Dredging Needs (cu. yd)	Mean Wave Height (ft)	Mean Wave Period (sec)	Dominant Wave Direction	Modeling Conclusion
Alabama	1	3.4 - 7.5	28 - 48	16.0	3 - 14	170,000,000	9.8	7,590,000	-	-	150 - 175	Acceptable
	2	3.4 - 9.6	33 - 60	28.5	6.5	248,500,000	9.8	2,220,000	-	-	150 - 175	Acceptable
	3	3.1 - 7.5	28 - 60	26.0	12 - 15	320,500,000	13.1	6,150,000	-	-	150 - 175	Acceptable
	4	5.3 - 9.9	39 - 53	30	10	15,700,000	9.8	10,990,000	-	-	125 - 150	Acceptable
North Carolina	1	> 3	32 - 66	0.93	9.8	173,500,000	9.8	9,400,000	4.92	8.3	E-NE	Acceptable
Dare County A	2	> 3	32 - 66	0.75	9.8	44,900,000	9.8	7,590,000	4.92	8.3	E-NE	Acceptable
	3 (west)	> 3	32 - 66	0.32	9.8	64,700,000	6.6	3,270,000	4.92	8.3	E-NE	Acceptable
	3 (east)	> 3	32 - 66	0.27	6.6	64,700,000	9.8	1,800,000	4.92	8.3	E-NE	Acceptable
	4	> 3	32 - 66	0.45	6.6	23,200,000	6.6	3,000,000	4.92	8.3	E-NE	Acceptable
Dare County B	N1	0.5 - 2.0	35 - 45		8 - 10	5,192,000	8 - 10	4,300,000	-	-	E-NE	Acceptable
	S1	1.0 - 3.0	35 - 45		8 - 10	104,454,000	8 - 10	70,280,000	-	-	E-NE	Questionable
New Jersey	A-1	-	-	0.85	6.5 - 19	-	13.1	11,500,000	3.94	7.7	E-NE	Acceptable
	A-2	-	-	1.0	6.5 - 19	-	9.8	10,200,000	3.94	7.7	E-NE	Acceptable
	M8	-	-	1.5	6.5 - 19	-	6.5	10,500,000	3.94	7.7	E-NE	Acceptable
Virginia, SE	A	-	26 - 42	0.69	19.7	-	9.8	6,930,000	3.94	8.7	E-NE	Acceptable
	B	-	26 - 42	0.89	19.7	-	9.8	9,020,000	3.94	8.7	E-NE	Acceptable
Florida Cape Canaveral	2	9.3 - 12.4	23 - 46	1.9	10 - 16	-	17.1	34,000,000	4.27	9.3	E-NE	N/A
Florida	A1	7.5 - 9.3	26 - 46	2.1	10 - 14	-	-	17,800,000	4.27	9.3	E-NE	Questionable
Central East Coast	B1	7.5 - 9.3	26 - 46	1.8	6 - 8	-	-	14,400,000	4.27	9.3	60 - 90 deg	Acceptable
	B2	7.5 - 9.3	26 - 46	1.3	6 - 8	-	-	9,940,000	4.27	9.3	60 - 90 deg	Acceptable
	C1 (north)	7.5 - 9.3	26 - 46	2.0	10 - 22	-	-	7,590,000	3.94	9.1	30 - 60 deg	Questionable
	C1 (south)	7.5 - 9.3	26 - 46	1.8	6.6	-	-	11,500,000	3.94	9.1	30 - 60 deg	Questionable
	D2	7.5 - 9.3	26 - 46	0.87	-	-	-	5,360,000	3.61	8.8	30 - 60 deg	Acceptable
New York/New Jersey	H1	-	46 - 66	1.3	6.5 - 16.4	6,300,000	4.9	-	3.1	4.2	S	Acceptable
	H2	-	49 - 66	5.1	6.5 - 16.4	12,400,000	2.3	-	3.1	4.2	S	Acceptable
	3	-	62	3.6	5.9 - 10.5	14,700,000	3.9	-	3.2	4.3	S	Acceptable
	4W	-	52 - 66	4.7	5.9 - 10.5	25,900,000	5.2	-	3.2	4.3	S	Acceptable
	4E	-	52 - 66	3.6	6.2 - 15.1	21,800,000	5.9	-	3.2	4.3	S	Acceptable
South Carolina	Little River	1.5 - 3.9	32 - 39	10.4	2 - 4	11,800,000	≈3	2,170,000	3.08	5.25	SE	Acceptable
Myrtle Beach	Cane South	1.7 - 4.2	30 - 39	3.0	1 - 10	11,300,000	≈6	3,310,000	3.44	5.75	ESE	Acceptable
	Surfside	2.2 - 5.0	29 - 39	6.3	1 - 9	16,700,000	≈6	2,300,000	3.44	5.75	ESE	Acceptable

ozone is South Carolina's most widespread air quality problem, particularly during the warmer months. High ozone levels generally occur on hot sunny days with little wind, when pollutants such as nitrogen oxides and hydrocarbons react in the air. The proposed project and all other existing similar projects along the South Carolina coast are not anticipated to create any adverse effect on air quality from April through October.

Social and Economic: The coastal areas of South Carolina will continue to grow and expand both with and without beach nourishment projects. Therefore, the economic benefit analysis for the proposed project claims no increase in benefits or hurricane and storm damage due to induced development. Development of vacant lots is limited to lots buildable under the regulations set forth by OCRM, flood plain regulations, State and local ordinances, and applicable requirements of the Federal Flood Insurance Program. IWR Report 96-PS-1, FINAL REPORT: An Analysis of the U.S. Army Corps of Engineers Shore Protection Program, June

1996 states: "Corps projects have been found to have no measurable effect on development, and it appears that Corps activity has little effect on the relocation and/or construction decisions of developers, homeowners, or housing investors."

F. Resource Capacity to Withstand Stress and Regulatory Thresholds

There are no known thresholds relating to the extent of ocean bottom that can be disturbed without significant population level impacts to fisheries and benthic species. Therefore, a comparison of cumulative impacts to established thresholds is not made. It is expected that there is a low risk that the direct and cumulative impacts of the proposed action and other known similar activities would reach a threshold with potential for population level impacts on important commercial fish stocks. In regard to physical habitat alterations it is expected that alterations in depths and bottom sediment may occur and be persistent. However, site modifications would be within the range of tolerance by these species and, although man-altered, consistent with natural variations in depth and sediment within the geographic range of EFH for local commercial fish species.

During both the 2005 and 2007 renourishment projects, benthic infaunal and sediment samples were collected from the borrow area and an undredged reference area. Sediment composition at the borrow area underwent significant changes following dredging activity. Sediment in the borrow area shifted from a 95% sand and 5% silt/clay mixture prior to dredging to a 70%-80% sand and 20% - 30% silt/clay mixture after dredging. Biological effects at the dredged site, based on temporal and spatial comparisons, included shifts in general taxonomic composition, and changes in numerically dominant species. While these impacts seem significant, the borrow areas being used represent less than 5% of the offshore sand habitat area (within 4 miles of the shoreline) offshore of Folly Beach. Therefore the total impact to benthic organisms is small.

Benthic organisms living in beach habitats are adapted to living in high energy environments; they are able to quickly recover to original levels following beach nourishment events; sometimes in as little as three months. This is again attributed to the fact that intertidal organisms are living in high energy habitats where disturbances are common. Because of a lower diversity of species compared to other intertidal and shallow subtidal habitats, the vast majority of beach habitats are recolonized by the same species that existed before nourishment. While the proposed beach disposal may adversely impact intertidal macrofauna, these organisms are highly resilient and any effects will be localized, short-term, and reversible.

G. Baseline Conditions

It is assumed that the current condition of the project area is that of a healthy, functioning ecosystem. Monitoring efforts within the borrow areas will establish the baseline conditions of these area of the project.

H. Cause and Effect Relationships

The following section describes impacts of the proposed action on significant resources. Cause and effect relationships described in the EA are consistent with those that would be expected for other similar projects that are pertinent to this analysis.

Magnitude and Significance of Resource Impacts

I. Offshore Borrow Areas

Site Specific Impacts: The project borrow areas, as defined in the project description, would be the extent of site specific impacts.

II. Beach Areas

Project Level Impacts: The entire 26,000-foot length of the project will be impacted.

a. Existing Local Maintenance:

Minimal local maintenance (e.g., beach scraping, bulldozing, etc.) is expected to occur in the project area.

b. Existing Disposal Activities:

The western end of Folly Beach at the location of the county park has received dredged material in the past; however, this has not occurred since 2003 and no dredged material disposal is planned in the near future.

c. Existing Beach Nourishment:

This re-nourishment is a portion of an existing Federal project.

d. Proposed Beach Nourishment:

The western end of Folly Beach at the location of the county park has been nourished in the recent past

e. Cumulative Impacts:

Because of the limited local maintenance activities and because of the exclusion of the county park from the present renourishment project, it is unlikely that the proposed action will impact beach invertebrates in areas that have not fully recovered from past sand deposition, extending recovery time.

I. Mitigative Actions to Reduce Cumulative Impacts

Activities undertaken as a result of coordination with the Fish and Wildlife Service, the National Marine Fisheries Service and the South Carolina Department of Natural Resources will result in the reduction of cumulative impacts (see Table 5).

Table 5: Summary of Mitigative Actions		
Mitigative Action	**Resource Protected/Monitored**	**Effect of Mitigative Action**
Nighttime sea turtle monitoring	Nesting sea turtles	Protects nesting sea turtles from being injured by construction equipment.
Morning sea turtle nest monitoring	Sea turtle nests and emerging sea turtle hatchlings	Protects sea turtle nests and emerging sea turtle hatchlings from being covered by sand placement.
Nighttime beach lighting monitoring	Emerging sea turtle hatchlings	Protects emerging sea turtle hatchlings from being disoriented from artificial light shining on the beach.
Underwater remote sensing of borrow areas and pipeline corridors	Cultural resources (e.g., shipwrecks, etc.) and areas of live bottom habitat	Protects cultural resources (e.g., shipwrecks, etc.) and areas of live bottom habitat. Areas of live bottom and cultural resources are being avoided.
Borrow area monitoring	Physical characteristics of borrow area and benthic invertebrates	Documents impacts to physical characteristics of borrow area and recovery rate of benthic invertebrates. Provides information for better design of beach nourishment projects.
Beach tilling	Nesting sea turtles	Reduces compaction of the beach that could hinder sea turtle nesting.

J. Cumulative Impacts Conclusion

A relatively small segment of the South Carolina coastline and nearshore, including the borrow areas, are likely to be affected by the proposed action. The impact area would not increase significantly since portions of the areas proposed for dredging and fill have previously been dredged or had sand deposition. On a statewide scale, the existing and approved placement sites are well distributed in northern, central and southern parts of the state. It is unlikely that cumulative impacts from space crowded perturbation are occurring or will occur due to the construction of this project. The analysis suggests that the potential impact area from the proposed and existing actions is small relative to the area of available similar habitat on a vicinity, statewide, and basin basis. Also, for some species, such as sea turtles and seabeach amaranth, beach projects may provide additional habitat or improve existing habitat by replacing beach material lost to erosion. Invertebrates are expected to recover in and adjacent to the borrow areas.

6. 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. The Bureau of Ocean Energy Management point of contact is Ms. Jennifer Culbertson, 381 Elden Street, Herndon, VA 20170-4817, (703) 787-1742, email Jennifer.Culbertson@boem.gov. 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 6.

7. 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

South Carolina State Historic Preservation Office and South Carolina Institute for Archaeology and Anthropology Concurrence Letters for Borrow Areas C and D

Appendix 5

Biological Assessment for 2013 Folly Beach Renourishment Projects

Appendix 6

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

Appendix 1

Folly Beach Storm Damage Reduction Project Environmental Assessment April 1991

APPENDIX 4
ENVIRONMENTAL ASSESSMENT
404 (b) EVALUATION
401 WATER QUALITY CERTIFICATION

FOLLY BEACH, SOUTH CAROLINA
SHORE PROTECTION PROJECT
GENERAL DESIGN MEMORANDUM

ENVIRONMENTAL ASSESSMENT

Shoreline Protection
Folly Beach, South Carolina

1. Introduction. This environmental assessment addresses an extension and modifications to the authorized shoreline protection project at Folly Beach, S.C. 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, coordinated with other agencies, and circulated for public review and comment. The 1980 authorized Folly Beach protection plan recommended nourishment of 16,860 feet of beach with five year periodic renourishments. A 25 foot wide berm would be constructed four feet NGVD and fronted by a beach with a face slope of 30' horizontal to 1' vertical. Near shore sand borrow sites were located adjacent to the lighthouse and bird key inlets. The 1991 Folly Beach General Design Memorandum provides for extending the Folly Beach shoreline protection project approximately 3,000 feet north and 8,000 feet south. This environmental assessment addresses in detail the extended portions of the project, modifications to the proposed beach profile along the entire reach of the project, relocation of the borrow sites and addresses the impact of new environmental laws and regulations on the entire project since filing of the Environmental Impact Statement in 1980.

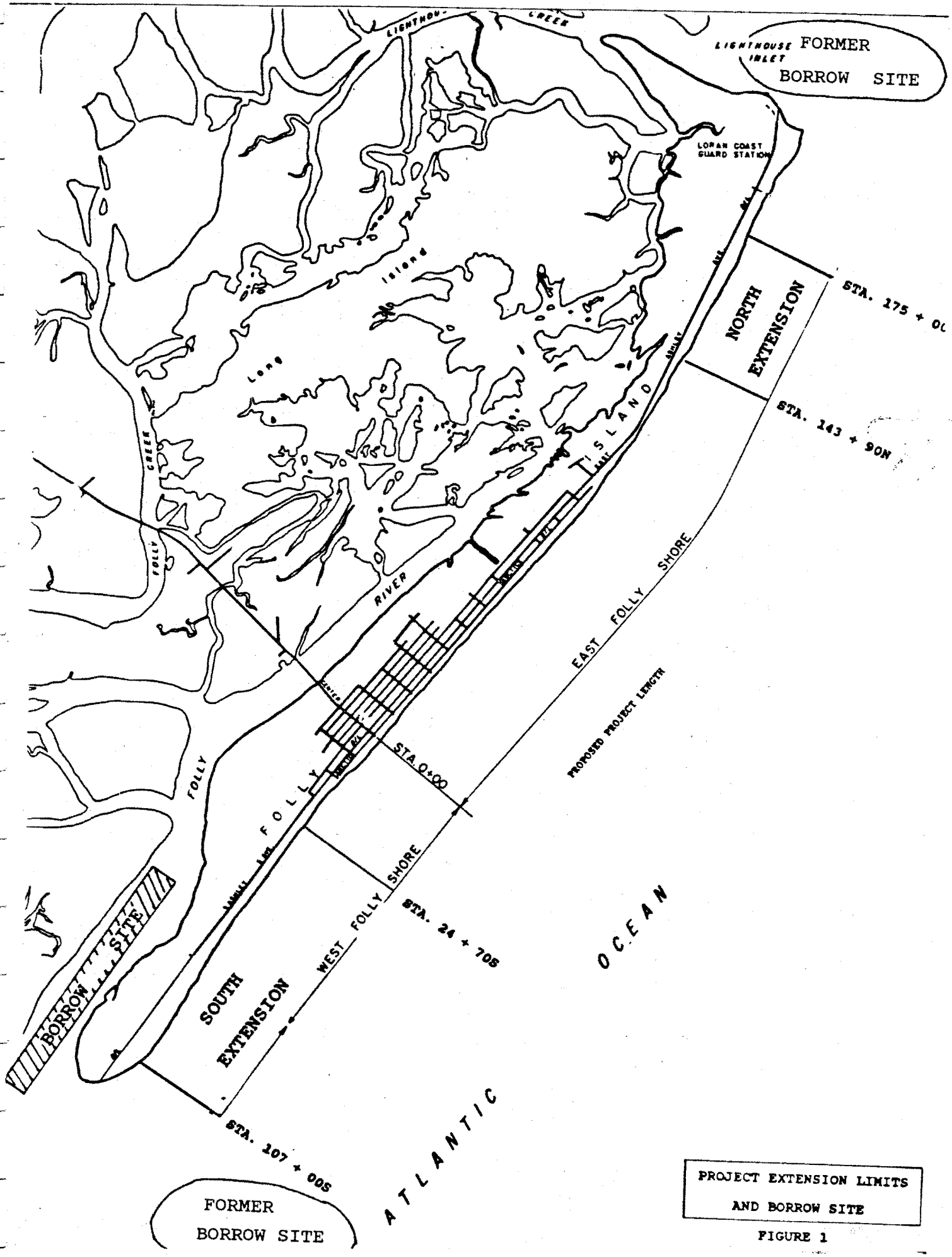
Supplemental information concerning the environmental impacts of Shoreline Protection on Folly Beach may be found in:

a. 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.

b. Final Detailed Project Report, Charleston Harbor, Folly Beach, South Carolina; U.S. Army Corps of Engineers, Charleston District, South Carolina, August 1987.

2. Project Description.

a. Location. Folly Beach is located on Folly Island about six miles South of the Charleston Harbor Entrance (Figure 1). The island is six miles long, one-half mile wide, and is oriented northeast to southwest. The Town of Folly Beach lies in the middle of the island between the former U.S. Coast Guard Loran Station to the northeast and the Charleston County Park to the southwest. South Carolina Route 171 crosses the marsh between James Island and Folly Island and provides the only highway access to Folly Beach.



PROJECT EXTENSION LIMITS AND BORROW SITE

FIGURE 1

b. Proposed Action. The modified plan of improvement provides for extending the shoreline protection northeastward from Station 143+90N to Station 175+00N and southwestward from Station 24+70S to Station 107+00S (Figure 1). Total project length would be 28,200 feet or 5.34 linear miles of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 9.0 feet NGVD. The project extends from just below the former U.S. Coast Guard base (station 175+00 north), and includes the Charleston County Park on the west end of Folly Island (station 107+00 south). 2.5 million cubic yards of beach quality material will be placed during the initial effort. This material will be placed seaward of existing revetments.

Periodic nourishment will require 1.7 million cubic yards of material every eight years with one periodic nourishment effort occurring at the last 10 year interval. This last periodic nourishment will require 2.1 million cubic yards of material. Actual quantities of periodic nourishment will be based on a monitoring plan which will be implemented immediately upon completion of initial construction.

The Corps of Engineers', Coastal Enginering Research Center determined that the nine groins immediately north of the Holiday Inn (meeting a 90 percent impermeability criteria) would substantially reduce the quanitity of sand required for shoreline protection. As a part of the recommended plan these nine groins will be rehabilitated to meet this criteria. The groin design is explained in detail in the Engineering Design and Cost Estimates appendix of the General Design Memorandum.

Adequate quantities of sandy borrow material exist in the borrow site located in lower Folly River which is designated for the total project length. Core borings of the insitu material within the borrow area characterize the material as a fine sand classification under the Unified Soils Classification system. Grain size for the sand samples varied from 0.10 millimeters (3.39 phi) to 0.28 millimeters (1.85 phi) with a composite mean grain size of 0.15 millimeters (2.75 phi).The initial 1980 approved near shore borrow sites (located adjacent to Stono Inlet and Lighthouse Inlet) were eliminated based on environmental concerns and the potential diversion of sand from Bird Key and Kiawah Island.

Construction would be by means of a pipeline dredge. The pipeline would run adjacent to and parallel with revetments on the beach. Navigation on Folly River would be minimally affected by the presence of the dredge. Sand would be pumped along the 28,200 linear feet reach of the project. Sand would be discharged as a slurry to a design elevation of +9.0 feet NGVD. Temporary training dikes of sand would be used to contain the discharge and control the fill placement. Fill sections

will be graded by landbase equipment. Scraps and any hardpan that may develop during or after project completion will be graded and raked as necessary in coordination with recommendations and requirements from regulatory agencies. All work will be performed between October 15 and May 15 to minimize impacts to sea turtles, fish, shellfish and infauna. It is anticipated construction will take 5 to 6 months including mobilization.

3 Topography and Soils. Folly Beach lies on the lower coastal plain which was once a submerged portion of the continental shelf. The island is fronted by gently sloping beaches on the seaward side and backed by productive salt marshes. Elevations of the developed section of the island range from 5 to 14 feet NGVD. Soils are white, medium-to fine-grained siliceous sands with some sea shells and shell fragments. The soils have alkaline tendencies and low fertility due to excessive nutrient leaching.

4 Surface Waters - The principal surface waters in the planning area are the Folly River and Stono River and the Atlantic Ocean. The Folly and Stono Rivers are classified by the State of South Carolina as SA or waters suitable for shellfishing for market purposes and other uses requiring waters of lesser quality.

5 Biotic Communities - A detailed description of the individual biotic communities and fish and wildlife resources is found in the final EIS.

6 Other Environmental Factors:

7 Endangered Species - Comprehensive coverage of Endangered Species which may occur in the Folly Beach Project area was discussed in the 1980 EIS. However, following is the most current list of endangered or threatened species which may be present in the Folly Beach area:

West Indian manatee (Trichechus manatus) - E
Bald eagle (Haliaeetus leucocephalus) - E
Bachman's warbler (Vermivora bachmanii) - E
Wood stork (Mycteria americana) - E
Red-cockaded woodpecker (Picoides borealis) - E
Arctic peregrine falcon (Falco peregrinus tundrius) - T
Piping plover (Charadrius melodus) - T
Kemp's ridley sea turtle (Lepidochelys kempii) - E
Loggerhead sea turtle (Caretta caretta) - T
Shortnose sturgeon (Acipenser brevirostrum) - E
Canby's dropwort (Oxypolis canbyi) - E
Pondberry (Lindera melissifolia) - E

Seven species are currently listed which are under status review.

American swallow-tailed kite (Elanoides forficatus forficatus) - SR
Bachman's sparrow (Aimophila aestivalis) - SR
Flatwoods salamander (Ambystoma cingulatum) - SR
Incised groovebur (Agrimonia incisa) - SR
Sea-beach pigweed (Amaranthus pumilus) - SR
Cypress knee sedge (Carex decomposita) - SR
Chaff-seed (Schwalbea americana) - SR

Recent coordination with the U.S. Fish and Wildlife Service (USFWS) and S.C. Wildlife and Marine Resources Department (SCWMRD) has shown that the loggerhead sea turtle nests on Folly Beach adjacent the project zone on the north and south ends of the island where high tide beach exists.

8 Cultural Resources - A review of the National Historical Register indicates no known historical or archeological sites are located within the proposed project zone. The nearest identified site adjacent to the project is a civil war encampment located at the northeast end of Folly Island within the former Coast Guard compound. The Folly Beach project will have no impact on the site.

9 Coastal Barrier Resources System (CBRS) - The lower reach of Folly River lies within the Bird Key Complex, M07, of the CBRS. Approximately 30% of the designated borrow site falls within the Bird Key Complex. Formal consultation with the USFWS (October 1, 1990) has determined that the proposed project is consistent with purposes of the CBRA. However, the USFWS stipulated that the Corps 1) implement a monitoring plan to assess the integrity of Bird Key; 2) make a concerted effort to perform beach nourishment outside turtle nesting season; and 3) maintain coordination with the Service and SCWMRD throughout the life of the project.

10 Other Environmental Factors - There are no wildlife preserves, important agricultural lands, wild and scenic rivers, natural landmarks, recognized scenic areas, or any other environments of special interest located where they could be impacted by the proposed project.

Existing Beach Conditions - Folly Beach has and continues to experience severe erosion problems. The historic shoreline erosion rate for Folly Island was 4.2 feet per year before the construction of revetments and bulkheads. Groin fields and an array of hard shore protection devices constructed by local property owners have afforded only a limited level of protection of shoreline recession. The mean tidal range is 5.3 feet with a significant wave height of about 4.2 feet. Hardened shoreline

protection coupled with continued erosion have almost eliminated a high tide beach area over most of the island except the extreme north and south ends of the beach.

12 Need for Proposed Actions - The recommended project provides for beach restoration and periodic nourishment of 28,200 feet of beach at Folly Island. The beach fill section would provide an average usable width above mean high water of 90 feet, which would provide shore protection as well as wildlife and recreational usage., Advance nourishment would proivde an additional sacrifical usable beach approximately 110 feet wide.

13 Alternative Analysis - The Final Detailed Project Report, Charleston Harbor, Folly Beach, S.C., 1987, evaluated a total of 6 nonstructural and 6 structural alternatives and the no action alternative. The extension of the beach nourishment lengths was addressed in the initial alternative analysis.

14 Environmental Consequences - Mitigative Measures

The proposed project will immediately benefit the environment by providing shore line protection benefits and land loss prevention. A beach will be maintained which will provide a diverse habitat for wildife and benthic populations, enhance aesthetic beauty and add to recreational enjoyment.

Temporary degradation of water quality will occur at both the dredging and the nourishment sites due to the re-suspension of silty material. A temporary reduction of benthic populations in the borrow and beach fill areas will likely occur as well as a corresponding decline in photosynthesis.

During dredging and filling operations, motile members of the invertebrate and fish communities can be expected to avoid the area. Re-colonization of disturbed areas of benthic organisms can be expected to occur once dredging and beach nourishment operations are completed.

Even though sea turtle nesting habitat does not currently exist in the proposed nourishment project zone, turtle nesting activity could be expected to occur after the beach has been nourished. The proposed project will provide more than five miles of beach habitat suitable for turtle nesting. All construction activities will be restricted during the active turtle nesting season.

15 Alternatives To Proposed Action.

Alternatives to the proposed project were identified and discussed in detail in the FEIS and Final Detailed Project Report, Folly Beach, August 1987.

Conclusion

The proposed action has been thoroughly assessed and coordinated and will not significantly affect the environment, therefore, the Corps of Engineers issues a Finding of No Significant Impact (FONSI).

404(b) EVALUATION FOR THE SHORELINE PROTECTION OF FOLLY BEACH, SOUTH CAROLINA

1. Project Description.

a. Description of the proposed discharge of dredged or fill materials.

(1) General: This 404(b) Evaluation addresses an extension and modifications to the authorized shoreline protection project at Folly Beach, South Carolina. A final Environmental Impact Statement (including a 404(b) evaluation) for Beach Erosion Control and Hurricane Protection for Folly Beach, South Carolina was filed with CEQ on July 11, 1980, coordinated with other agencies and circulated for public review and comment.

(2) General characteristics of material: Clean sand from nearby shoals.

(3) Quantity of material proposed for discharge: Initial beach nourishment operations would require 2.5 million cubic yards. Renourishment would require replacement of 1.7 million cubic yards of fill at 8-year intervals.

(4) Source of material: Sandy shoals in the lower Folly River (see Figure 1).

b. Description of the proposed disposal site for dredged or fill materials.

(1) Location: The ocean shoreline along Folly Island, South Carolina. Total project length would be 28,200 feet or 5.34 miles extending from Station 107+00 South to Station 175+00 North.

(2) Type of disposal site: Undiked nourishment area on the above-mentioned beach. This is not a "disposal" site in the usual sense because the primary purpose is to build up an eroding beach, rather than to dispose of unwanted material.

(3) Method of discharge: Hydraulic pipeline.

(4) When will disposal occur: Scheduling will occur after project authorization.

(5) Projected life of disposal site: Not applicable. (See b(2) above).

(6) Bathymetry: Not applicable.

2. Physical Effects (40 CFR 230.4-1(a)).

a. Potential destruction of wetlands - effects on 40 CFR 230.4-1 (a)(1)(i-vi): The intertidal nourishment area would not be considered wetlands under the definition given in 33 CFR 323.2. The area could possibly be considered "wetlands" as defined in Executive Order 11990. In any case, the nourishment area cannot be considered "highly productive" or said to "perform important functions" as described in 40 CFR 230.4-1(a)(1).

(1) Food chain production: Not significant.
(2) General habitat: Not significant.
(3) Nesting, spawning, rearing and resting sites for aquatic or land species: Not significant for the area affected.
(4) Those set aside for aquatic environment study or sanctuaries or refuges: Not applicable.
(5) Natural drainage characteristics: Not significant.
(6) Sedimentation patterns: Not significant.
(7) Salinity distribution: Not significant.
(8) Flushing characteristics: Not significant.
(9) Current patterns: Not significant, except that existing currents and waves erode the beach severely.
(10) Wave action, erosion or storm damage protection: Highly eroded beach would be restored. Renourishment would be required at 8-year intervals to maintain the beach as erosion continues.
(11) Storage areas for storm and flood waters: Not applicable.
(12) Prime natural recharge areas: Not applicable.

b. Impact on water column (40 CFR 230.4-1(a)(2)). Because of the nature of the nourishment area, the clean nature of the material to be dredged and its large particle size, impacts on the water column are not significant.

(1) Reduction in light transmission: Temporary, not significant.
(2) Aesthetic values: Temporary, not significant.
(3) Direct destructive effects on nektonic and planktonic populations: Temporary, not significant.

c. Covering of benthic communities (40 CFR 230.4-1(a)(3)).

(1) Actual covering of benthic communities: The beach benthic community consists of many individuals of relatively few species. Many inhabitants are relatively immobile and would experience suffocation and mortality from beach fill. Initial losses could be large, but recovery would be rapid due to recruitment from adjacent areas. Long term effects would be minor.

(2) Changes in community structure or function: Not significant (see c(1) above).

d. Other effects (40 CFR 230.4-1(a)).

(1) Changes in bottom geometry and substrate composition: Not significant, except for improvement to existing beach.

(2) Water circulation: Not significant.

(3) Salinity gradients: Not significant.

(4) Exchange of constituents between sediments and overlying water with alterations of biological communities: Not significant.

3. Chemical-Biological Interactive Effects (40 CFR 230.4-1(b)).

a. Does the material meet the exclusion criteria? Yes. The material is predominantly sand and shell with particle sizes larger than silt. The material would be dredged only from sandy shoals in the lower Folly River and would be compatible with native beach sand upon which it would be deposited as nourishment. Both exclusions (b)(1)(i) and (b)(1)(ii) are met.

b. Water column effects of chemical constituents (40 CFR 230.4-1(b)(2)): Not applicable.

c. Effects of chemical constituents on benthos (40 CFR 230.4-1(b)(3)): Not applicable.

4. Description of Site Comparison (40 CFR 230.4-1(c).

a. Total sediment analysis (40 CFR 230.4-1(c)(1)): Not required (see 3.a above).

b. Biological community structure analysis (40 CFR 230.4-1(c)(2)) Not required (see 3.a above).

5. Review Applicable Water Quality Standards.

a. Compare constituent concentrations: Not applicable (see 3.a).

b. Consider mixing zone: Not applicable.

c. Based on a and b above will disposal operation be in conformance with applicable standards? Yes.

6. Selection of Disposal Sites (40 CFR 230.5) for Dredged or Fill Material.

a. Need for the proposed activity: The beach has experienced severe shoreline erosion resulting in significant loss of recreational beach and threat of loss to oceanfront property.

b. Alternatives considered: All nonstructural plans considered were either inadequate or inappropriate for meeting project objectives, or had already been implemented. Of all structural plans considered, the only alternatives which sufficiently addressed the planning objectives were beach development and beach plus dune development. The selected plan is the smallest of 9 such beach or beach and dune plans considered. Hence, its requirements for borrow material and beach fill are the lowest capable of meeting the project objectives. Borrow sites would be in areas least subject to environmental degradation and the material is clean and compatible with native beach sand.

c. Objectives to be considered in discharge determination (40 CFR 230.5(a)):

(1) Impacts on chemical, physical, and biological integrity of aquatic ecosystem (40 CFR 230.5(a)(1)): Not significant.
(2) Impact on food chain: Not significant.
(3) Impact on diversity of plant and animal species: Not significant.
(4) Impact on movement into and out of feeding, spawning, breeding and nursery areas: Not significant.
(5) Impact on wetland areas having significant functions of water quality maintenance: Not applicable or not significant.
(6) Impact on areas that serve to retain natural high waters or flood waters: Not applicable.
(7) Methods to minimize turbidity: The borrow area of clean, large particles would be utilized to minimize turbidity.
(8) Methods to minimize degradation of aesthetic, recreational and economic values: The project has as its primary purposes shoreline protection and the improvement of recreational and economic features. Aesthetic enhancement would also result from project construction.

(9) Threatened and endangered species: None adversely affected. Although loggerhead sea turtle nesting habitat does not currently exist in the proposed nourishment project zone, turtle nesting activity could be expected to occur after the beach has been nourished. The proposed project will provide more than five miles of beach habitat suitable for turtle nesting. In order to avoid potential conflicts with turtle nesting, all work will be performed between October 15 and May 15 to minimize impacts to sea turtles, fish, shellfish and infauna.

(10) Investigate other measures that void degradation of aesthetic, recreational, and economic values of navigable waters: Not applicable (see 6.b and 6.c(8)).

d. Impacts on water uses as proposed disposal site (40 CFR 230.5(b)(1-10)):

(1) Municipal water supply intakes: Not applicable.
(2) Shellfish: Not significant.
(3) Fisheries: Not significant.
(4) Wildlife: Not significant.
(5) Recreation activities: Recreational activities would be greatly improved.
(6) Threatened and endangered species: None adversely affected (see 6.c(9)).
(7) Benthic life: Not significant (see 2.c(1)).
(8) Wetlands: Not applicable/not significant.
(9) Submersed vegetation: Not applicable.
(10) Size of disposal site: This project plan was chosen over others that would require more material placed over a larger area.
(11) Coastal Zone Management programs (40 CFR 230.3(e)): The proposed action is consistent with the South Carolina CZM program.

e. Considerations to minimize harmful effects (40 CFR 230.5(c)(1-7)):

(1) Water quality criteria: No legally applicable criteria would be exceeded.
(2) Investigate alternatives to open water disposal: Not applicable.

(3) Investigate physical characteristics of alternative disposal sites: Not applicable.

(4) Ocean dumping: Not applicable.

(5) Where possible, investigate covering contaminated dredged material with cleaner material: Not applicable. Material is clean.

(6) Investigate methods to minimize effect of runoff from confined areas on the aquatic environment: Not applicable.

(7) Coordinate potential monitoring activities at disposal site with EPA: Not applicable. No monitoring would be required as material is clean sand and biotic impacts would be minor.

7. Statement as to contamination of fill material if from a land source (40 CFR 230.5d): Not applicable.

8. Determine mixing zone: Not applicable.

9. Conclusions and determinations:

a. Feasible alternatives to the proposed discharge have been considered and none that are practicable will have less adverse impact on the aquatic and semi-aquatic ecosystem.

b. There are no unacceptable environmental impacts on the aquatic and semi-aquatic ecosystem as a result of the discharge.

c. The discharge of the dredged (or fill) material will be accomplished under conditions which will minimize, to the extent practicable, adverse environmental effects on the aquatic and semi-aquatic ecosystem.

10. Findings: Based on the above evaluation and determinations, the proposed discharge site for the Folly Beach Project has been specified through the application of the Section 404(b) Guidelines.

JAMES T. SCOTT
LTC, Corps of Engineers
District Engineer

FINDING OF NO SIGINIFICANT IMPACT
SHORELINE PROTECTION EXTENSION
FOLLY BEACH, SOUTH CAROLINA

The proposed Folly Beach shoreline protection extension project has been thoroughly assessed and coordinated with local, state and federal agencies. Based upon the attached environmental assessment, 404(B) evaluation, and environmental coordination, I conclude that the environmental affects of the proposed shoreline protection extension and periodic nourishment are not significant, and that the preparation of an Environmental Impact Statement is not warranted. Specific factors considered in making the determination include the following:

- An EIS was prepared and filed with CEQ in 1980 for the base nourishment project at Folly Beach. This NEPA document discusses the need, alternatives, and selected plan in detail.

- Water quality impacts would be temporary and not significant.

- Cultural resources would not be affected.

- No endangered species would be adversely affected. Conversely, over five miles of loggerhead sea turtle habitat would be created and maintained.

- Construction and renourishment activities would not significantly affect fish and wildlife.

- No significant land use changes would occur.

APR 25 1991
Date

James T. Scott
LTC, Corps of Engineers
District Engineer

Appendix 2

Folly Beach Storm Damage Reduction Project Environmental Assessment January 2005

ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT (FONSI)
FOR THE
FOLLY BEACH, SOUTH CAROLINA
SHORE PROTECTION PROJECT

CHARLESTON COUNTY

US Army Corps
of Engineers ®
Charleston District

January 2005

Environmental Assessment

1. Purpose and Need for this Document

This Environmental Assessment (EA) represents the position of the US Army Corps of Engineers, Charleston District regarding the environmental impacts for the 2005 re-nourishment of Folly Island and has been prepared due to the change of the material borrow area for this nourishment cycle of the existing shore protection project. The April 1991 Environmental Assessment for the Folly Beach, South Carolina Shore Protection Project is incorporated in this document by reference and can be found in its entirety in Appendix 3. It is the purpose of this document to explain the design criteria for these changes. Only the subjects of the 1991 EA that need to be updated or are no longer valid are included in this document. All other findings from the 1991 EA are still valid.

2. Project Description

a. Proposed Action. This is a periodic re-nourishment of an existing project. The recommended plan provides for re-nourishment of 28,200 linear feet (5.34 linear miles) of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 9.0 feet national geodetic vertical datum (NGVD). The project extends from just below the U.S. Coast Guard Base, and includes 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 two million cubic yards of beach quality sand will be placed on the beach seaward of existing revetments. The Federal government will not incur cost for any material placed on private property.

Construction will be by means of a hydraulic cutter head dredge that will transport the sand through a pipeline. The pipeline will run parallel with the beach. Beach compatible material (for details see Appendix 2) from the offshore source will be pumped along the roughly 28,000 linear feet of the project and will be discharged as 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 mid-April 2005 and will require approximately 6 months for completion. This schedule could change due to contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

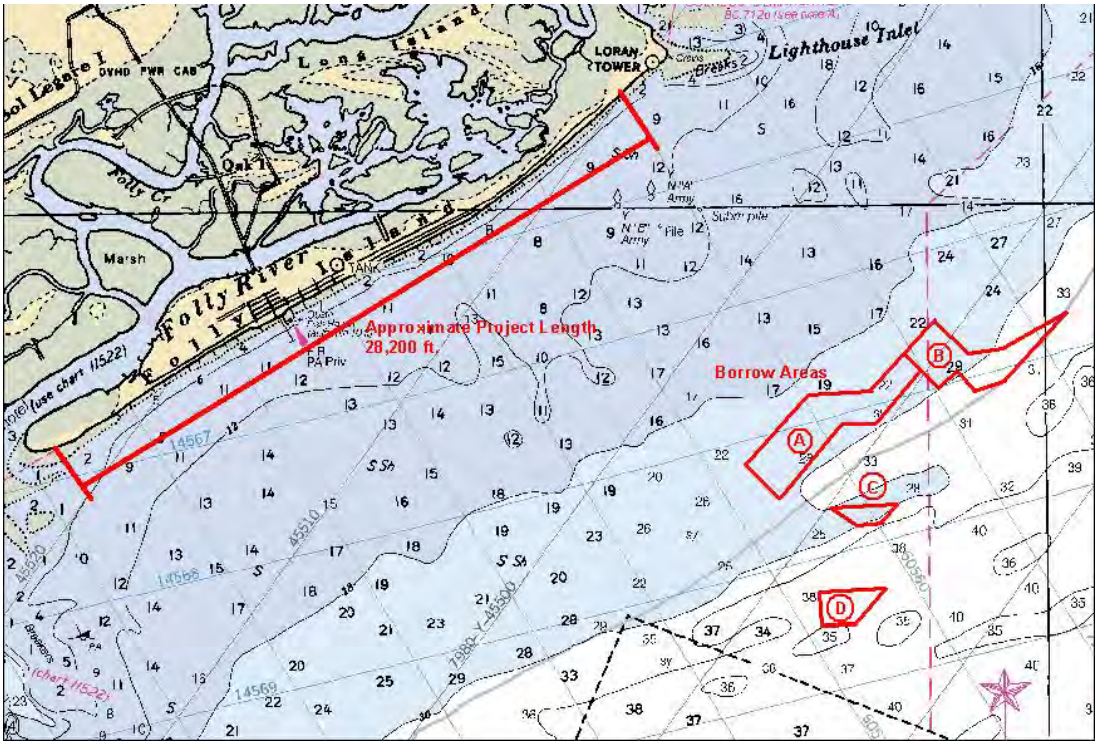


FIGURE 1: LOCATION OF NOURISHMENT AND BORROW AREAS

The borrow areas being used for beach compatible sand are designated in Figure 1. These areas total 620 acres. 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. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers evaluation process. The location of the borrow sites has also been coordinated the South Carolina Department of Natural Resources. The volume of sand (based on dredging to a depth of 6 feet), area, and water depths in each borrow area are as follows:

Borrow Area	Volume (cubic yd)	Area (acres)	Water Depth
A	3,130,000	310	26-36’
B	2,030,000	210	32-40’
C	320,000	30	34’
D	400,000	70	40’

Sand will be removed from the borrow areas to a depth of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed. For a more comprehensive discussion of the geo-technical investigation, see Appendix 2.

3. Endangered Species

Table 1 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 2 contains a list of threatened and endangered species in South Carolina under the jurisdiction of National Marine Fisheries Service (NMFS).

4. Coastal Barrier Resources System (CBRS)

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

5. Environmental Consequences – Mitigation Measures

Temporary degradation of water quality will occur at both the dredging and the nourishment sites due to re-suspension of silt material. A temporary reduction of benthic populations in the borrow and beach fill areas will likely occur as well as a corresponding decline in photosynthesis.

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, and Chaff-seed 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. Also, the hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtles could occur in the project area. However, loggerheads are the primary sea turtle nesters. 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 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.

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY

Common Name	Scientific Name	Status	Occurrence
West Indian manatee	*Trichechus manatus*	E	Known
Bald eagle	*Haliaeetus leucocephalus*	T	Known
Bachman's warbler	*Vermivora bachmanii*	E	Known
Wood stork	*Mycteria americana*	E	Known
Red-cockaded woodpecker	*Picoides borealis*	E	Known
Piping plover	*Charadrius melodus*	T/CH	Known
Kemp's ridley sea turtle	*Lepidochelys kempii**	E	Known
Leatherback sea turtle	*Dermochelys coriacea**	E	Known
Loggerhead sea turtle	*Caretta caretta*	T	Known
Green sea turtle	*Chelonia mydas**	T	Known
Flatwoods salamander	*Ambystoma cingulatum*	T	Known
Shortnose sturgeon	*Acipenser brevirostrum**	E	Known
Sea-beach amaranth	*Amaranthus pumilus*	T	Known
Pondberry	*Lindera melissifolia*	E	Known
Canby's dropwort	*Oxypolis canbyi*	E	Possible
Chaff-seed	*Schwalbea americana*	E	Known
Southern dusky salamander	*Desmognathus auriculatus*	SC	Possible
Gopher frog	*Rana capito*	SC	Known
Godfrey's privet	*Forestiera godfreyi*	SC	Known
Pondspice	*Litsea aestivalis*	SC	Known
Bachman's sparrow	*Aimophila aestivalis*	SC	Possible
Henslow's sparrow	*Ammodramus henslowii*	SC	Known
Red knot	*Calidris canutus*	SC	Possible
Swallow-tailed kite	*Elanoides forficatus forficatus*	SC	Known
American kestrel	*Falco sparverius*	SC	Possible
American oystercatcher	*Haematopus palliatus*	SC	Known
Loggerhead shrike	*Lanius ludovicianus*	SC	Possible
Swainson's warbler	*Limnothlypis swainsonii*	SC	Known
Painted bunting	*Passerina ciris ciris*	SC	Possible
Gull-billed tern	*Sterna nil*otica	SC	Known
Incised groovebur	*Agrimonia incisa*	SC	Known
Venus fly-trap	*Dionaea muscipula*	SC	Known
Southeastern myotis	*Myotis austroriparius*	SC	Known
Southern hognose snake	*Heterodon simus*	SC	Known
Angiosperm (no common name)	*Elytraria caroliniensis*	SC	Known
Creeping St. John's wort	*Hypericum adpressum*	SC	Known
Boykin's lobelia	*Lobelia boykinii*	SC	Known
Sweet pinesap	*Monotropsis odorata*	SC	Known
Savannah or Piedmont cowbane	*Oxypolis ternate*	SC	Known
Pineland plantain	*Plantago sparsiflora*	SC	Known
False coco	*Pteroglossaspis ecristata*	SC	Known
Awned meadowbeauty	*Rhexia aristosa*	SC	Known
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SC	Known
Bull's Island white-tail deer	*Odocoileus virginianus*	SC	Known
Island glass lizard	*Ophisaurus compressus*	SC	Known

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY (CONT'D)

Common Name	Scientific Name	Status	Occurrence
Black-throated green warbler	*Dendroica virens*	SC	Possible
Black rail	*Laterallus jamai*	SC	Possible
Southern myotis	*Myotis austroriparius*	SC	Known

E: Federally endangered T: Federally threatened CH: Critical Habitat

SC: Federal Species of Concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act.

Species proposed for listing: None

Designated Critical Habitat: The U.S. Fish and Wildlife Service has designated critical habitat under the Endangered Species Act of 1973, as amended, for the piping plover (*Charadrius melodus*) on breeding grounds in the Great lakes and Northern Great Plains Regions, and in the wintering grounds along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. There is no designated piping plover critical habitat within the boundaries of the proposed project, however, there is piping plover critical habitat on Bird Key Stono in Stono Inlet immediately south of Folly Island.

*Contact National Marine Fisheries Service for more information on this species.

Consultation with the U.S. Fish and Wildlife Service (USFWS) concerning the effects of the proposed project on threatened and endangered species is ongoing. A Biological Assessment (BA) (see Appendix 1) has been prepared and forwarded to USFWS. The findings of the BA are 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 and their habitat, the finding of the BA is 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.

As a result of the findings of the BA, the following precautions will be taken to minimize the effects to sea turtles:

TABLE 2: NATIONAL MARINE FISHERIES SERVICE THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA

Species	Scientific Name	Status	Date Listed
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	E	12/02/70
Finback whale	*Balaenoptera physalus*	E	12/02/70
Humpback whale	*Megaptera novaeangliae*	E	12/02/70
Right whale	*Eubaleana glacialis*	E	12/02/70
Sei whale	*Balaenoptera borealis*	E	12/02/70
Sperm whale	*Physeter macrocephalus*	E	12/02/70
Listed Sea Turtles			
Green sea turtle	*Chelonia mydas*	T*	07/28/78
Hawksbill sea turtle	*Eretmochelys imbricata*	E	06/02/70
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	12/02/70
Leatherback sea turtle	*Dermochelys coriacea*	E	06/02/70
Loggerhead sea turtle	*Caretta caretta*	T	07/28/78
Listed Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	E	03/11/67
Species of Concern – Fish**			
Dusky shark	*Carcharhinus obscurus*		
Sand tiger shark	*Odontaspis taurus*		
Night shark	*Carcharinus signatus*		
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*		
Speckled hind	*Epinephelus drummondhayi*		
Warsaw grouper	*Epinephelus nigritus*		
Goliath grouper	*Epinephelus itijara*		
White marlin	*Tetrapturus albidus*		
Species of Concern – Invertebrates**			
Ivory bush coral	*Oculina varicosa*		

Species proposed for listing: None

Designated Critical Habitat: None in the area of this project

Proposed Critical Habitat: None in the area of this project

Candidate Species: None

* Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

** Species of Concern are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

- 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 May 1 and November 30, 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 December 1 to April 30, no nesting surveys will be performed.

- For construction activities occurring during the period May 1 through November 30, 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 May 1 through November 30, 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.

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.

6. Essential Fish Habitat

The content of this section was coordinated with National Marine Fisheries Service representative Prescott Brownell. Our 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 NMFS.

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) The primary borrow area for this project is a large area covering 310 acres off the Northeast coast of Folly Island (see Figure 1). It has been surveyed by side-scan sonar, followed by the taking of numerous Vibracore samples in both potential borrow sites. This was done in order to avoid hard bottom areas during dredging, and adequate depths of sand were found to be in the core of the two areas. In addition to our own internal review where we looked for shallow depth of borings (hard bottom), deep sand deposits, and the presence of organic materials in the sample, the SC DNR also reviewed the reports and findings and helped to outline those areas that should be avoided. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow area will fill with sand of the same grain size or slightly smaller after the pumping has been completed.

The secondary borrow area for this project is a 210 acre area adjacent to the primary borrow area (also see Figure 1). The same type of survey work was done on this site and the SC DNR also helped to eliminate those areas that might contain live bottom.

Both borrow area acreages have been adjusted to match the amount of suitable sand depth. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers and SC Department of Natural Resources review and evaluation process. Monitoring of sand borrow sites is normally conducted to determine recovery rates and ecological characteristics. The customary detailed post-dredging assessment of bathymetry and biological characteristics in the borrow area will be needed for this project, even though deep depressions will not be made. Due to the large volume of sand required for this effort being drawn from a broad area(s), and the fact that there may be another cycle of dredging in the future, it was determined by the National Marine Fisheries Service that the detailed post-dredging assessment should be implemented.

3) A description of the proposed action is located in Section II above.

4) 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).

5) Charleston District's views regarding effects: Based on project reviews provided by the National Marine Fisheries Service and the South Carolina Department of Natural Resources to the Charleston District, 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 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 520 acres. Within sand borrow areas; benthic epifauna and infauna will be impacted by excavation and temporary turbidity that may extend beyond the excavation areas.

The majority of the sand would be drawn from the primary borrow site. Sand would be shaved off in layers until the required volumes were met, but the excavation would go no deeper than 5 to 10 feet. If additional material is needed, it will be removed from the secondary site. Both areas have been carefully mapped out to avoid live/hard bottom, and no deep depressions will be created in the borrow areas. Upon completion of the work, inter-tidal and sub-tidal zone 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.

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

7. Cultural Resources

The South Carolina Institute of Archaeology and Anthropology (SCIAA) has pointed out, via letter of October 13, 2004, that there is a possibility of shipwrecks residing in the proposed borrow areas. Similar concerns were expressed by the State Historic Preservation Office (SHPO). These areas are being surveyed for the presence of any significant cultural resources. The findings of the survey will be coordinated with SCIAA and SHPO in order to protect the resource from possible harm during the dredging process.

8. Water Quality Certification

A modification to the water quality certification associated with this project is required due to the change of the borrow site location. The South Carolina Department of Environmental Health and Control does not require a specific public notice to initiate the modification. In lieu of a specific Section 404 public notice, letters were sent to all pertinent agencies and interests describing the proposed project and seeking their input. As a result of this letter request and phone conversations with SC Department of Health and Environmental Control, no difficulties are anticipated in granting the water quality certification and it is expected on or before February 8, 2005. The original WQ certification was granted under P/N 91-2R-022.

9. Coastal Consistency

In a letter dated January 25, 2005 the Office of Ocean and Coastal Resource Management concurred with the Charleston District that this Federal Action was consistent with the Coastal Zone Management Act.

FINDING OF NO SIGNIFICANT IMPACT
FOR THE
FOLLY ISLAND
BEACH RENOURISHMENT
FOR
STORM DAMAGE PROTECTION
CHARLESTON COUNTY, SOUTH CAROLINA

Based on the attached Environmental Assessment and a consideration of other pertinent documents, I conclude that the environmental effects of the proposed renourishment of this hurricane damage protection GI study along the 5.32 mile long reach of Folly Island, where continued erosion is threatening the structural integrity of many dwellings, are not significant and the preparation of an Environmental Impact Statement is not warranted. Specific factors considered in making the determination include the following:

a. Water quality would not be affected.

b. Wetlands would not be adversely affected, since there are none where the work would take place.

c. Cultural resources would not be affected.

d. Endangered species would not be significantly affected.

e. No significant land use changes would occur.

f. Air and noise quality would not be significantly affected.

g. Fish and wildlife would not be significantly affected.

h. Aesthetics would not be significantly affected.

i. Flood plain values would be improved.

j. Benthic invertebrate communities would not be significantly affected.

k. Construction activity would be short term and would not affect navigation or recreational boating.

Alvin B. Lee

DATE 2-1-2005

ALVIN B. LEE
Lieutenant Colonel, EN
Commander, U.S. Army Engineer District,
Charleston

404(b)(1) Evaluation

Folly Beach Shore Protection
Charleston County
South Carolina

I. PROJECT DESCRIPTION

a. Location and General Description. Folly Beach is located on Folly Island about six miles South of the Charleston Harbor Entrance (see Figure 1) and is bounded by Morris Island to the north, Kiawah Island to the south, James Island to the west, and to the east is the Atlantic Ocean. The island is six miles long, one-half mile wide, and is oriented northeast to southwest. The Town of Folly Beach lies in the middle of the island between the former U.S. Coast Guard Loran Station to the northeast and the Charleston County Park to the southwest. South Carolina Route 171 crosses the marsh between James Island and Folly Island and provides the only highway access to Folly Beach.

This is an emergency re-nourishment combined with a periodic re-nourishment of an existing project. The recommended plan provides for re- nourishment of 28,200 linear feet (5.34 linear miles) of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 9.0 feet national geodetic vertical datum (NGVD). The project extends from just below the U.S. Coast Guard Base, and includes the Charleston County Park on the west end of Folly Island (See Figure 2). 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 2 million cubic yards of beach quality sand will be placed on the beach seaward of existing revetments. The Federal government will not incur cost for any material placed on private property.

Construction will be by means of a hydraulic cutter head dredge that will transport the sand through a pipeline. The pipeline will run parallel with the beach. Beach compatible material (sand) from the offshore source will be pumped along the roughly 28,200 linear feet of the project and will be discharged as 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 mid-April 2005 and will require approximately 6 months for completion. This schedule could change due to contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

b. Authority and Purpose. The Folly Beach re-nourishment project study was initially begun under the original project authority, Section 501 of the Water Resources Development Act of 1986. However, due to the extent of the storm damage from the 2004 hurricane season, it was combined with the authority of PL 84-99.

A final Environmental Impact Statement (including a 404(b) evaluation) for Beach Erosion Control and Hurricane Protection for Folly Beach, South Carolina was filed with CEQ on July 11, 1980, coordinated with other agencies and circulated for public review and comment. A subsequent EA and 404(b) evaluation was executed on April 25, 1991. A second EA has been prepared for the present emergency re-nourishment project.

c. General Description and Quantities of the Dredged or Fill Material. The borrow areas proposed for dredging are sand accumulation areas noted as A, B, C, & D in Figure 2. These areas total 620 acres, however, only areas A and B are going to be used for this nourishment effort since 2,000,000 cubic yards are needed to be pumped on the beach. 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. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the four areas. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers evaluation process. The location of the borrow sites has also been coordinated with the South Carolina Department of Natural Resources. The volume of beach compatible sand (based on dredging to a depth of 6 feet), area, and water depths in each borrow area are as follows:

Borrow Area	Volume (cubic yd)	Area (acres)	Water Depth
A	3,130,000	310	26-36’
B	2,030,000	210	32-40’
C	320,000	30	34’
D	400,000	70	40’

Sand will be removed from the borrow areas to a depth of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand. It is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

d. Description of the Proposed Discharge Site(s). The beach compatible material will be placed on the ocean shoreline along Folly Island for a length of 28,200 feet or 5.34 miles, extending from Station 107+00 South to Station 175+00 North, as shown on Figure 1.

e. Description of Disposal Method. The material will be excavated by either a hydraulic cutter head dredge or a hopper dredge, either of which will transport the sand through a pipeline, as described in I. a. above.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations.

(1) Substrate Evaluation and Slope. The elevations of the developed portion of Folly Island range from 5 to 14 feet NGVD. The four borrow areas cover 620 acres and are approximately 3 miles offshore; with areas A and B within the 3-mile limit,

and areas C and D are outside the 3-mile limit (see FIGURE 2). Only areas A and B are being utilized for this renourishment effort.

(2) Sediment Type.

Site A – This site is approximately 310 acres and has 3,130,000 cubic yards of beach compatible sand available in 2 to 10 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 – This site is approximately 210 acres and has 2,030,000 cubic yards of beach compatible sand available in 2 to 10 foot depths. There were a total of 14 vibracores done in this area in 2003 and 2004, 2 of which are shared with the Site A border.

Site C – This site is approximately 30 acres and has 320,000 cubic yards of beach compatible sand available in 4 to 6 foot depths. There were a total of 5 vibracores done in this area in 2003 and 2004.

Site D – This site is approximately 70 acres and has 400,000 cubic yards of beach compatible sand available in 4 to 6 foot depths. There were a total of 7 vibracores done in this area in 2003 and 2004.

Summary of Sites A through D – No hard bottom was found during this site investigation within any of the proposed borrow areas. Cemented sands and/or limestone were encountered in some of the vibracore samples; however, those vibracores were not included in areas designated as borrow areas. In general, the sands located in all four borrow areas are coarser than the native beach sands due to a larger fraction of shells than contained on the beach. The coarser portion of the grain size distribution is typically a coarse sand and fine gravel fraction. The borrow area sands are typically more calcareous than the native beach sands. The silt and clay fraction in the proposed borrow areas was limited to approximately 10%, and much of that will be lost during excavation and placement operations. Sites C and D will not be used during this nourishment cycle.

(3) Dredged/Fill Material Movement. The material will be pumped as a slurry and shaped using land based equipment and training dikes. Some material, particularly any fine-grained sediments will be lost in the surf, but the majority of the material will remain on the island.

(4) Physical Effects on Benthos. Benthic organisms in the vicinity of the construction, either dredging or placement, will be impacted by the construction. However, the construction is temporary, and it is expected that organisms will recolonize the disturbed areas following construction activities.

(5) Actions Taken to Minimize Impacts. The amount of material removed from the borrow sites will only be that quantity necessary to accomplish the project, thereby minimizing impacts to the greatest extent possible.

b. <u>Water Circulation, Fluctuation and Salinity Determinations.</u>

(1) Water.

(a) Salinity. This activity will occur in the open ocean and on an adjacent beach. Construction will have no impact on salinity.

(b) Water Chemistry. Temporary changes in water chemistry related to increased turbidity levels at the construction site may occur. Impacts would be temporary and minimal in nature.

(c) Clarity and Color. The water may become temporarily cloudy at the construction site during construction activity due to increased turbidity levels associated with disturbance of sediments. As noted above, this is expected to return to normal levels shortly after construction ends.

(d) Odor. Construction activities may result in a release of hydrogen sulfide (rotten egg) odor from the disturbance of sediments. This should be minimal, will be a temporary impact and will not result in long-term effects.

(e) Taste. Not applicable.

(f) Dissolved Gas Levels. There may be minor impacts to dissolved oxygen levels as a result of increased turbidity levels. These would be similar to any dredging project, and the impacts will be localized and temporary.

(g) Nutrients. No impacts to nutrient loading at the dredging site or on the beach are expected to occur.

(h) Eutrophication. Not applicable.

(2) Current Patterns and Circulation.

(a) Current Patterns and Flow. This project will not change present current patterns or flow in or around Folly Island.

(b) Velocity. Not applicable.

(c) Stratification. Not applicable.

(d) Hydrologic Regime. This project will not change the present hydrologic regime.

(3) Normal Water Level Fluctuations. Water level will not change, but the increased beach elevations will provide protection to existing structures on the beach.

(4) Salinity Gradients. Salinity gradients will not change.

(5) Actions That Will Be Taken to Minimize Impacts. There are no actions needed since there are not measurable impacts to current patterns and circulation.

c. <u>Suspended Particulate/Turbidity Determinations.</u>

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. Turbidity will increase during construction/disposal operations, but will return to normal levels when construction is complete.

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

(a) Light Penetration. During construction, light penetration at the disposal site may diminish slightly due to a temporary increase in turbidity levels. Light penetration will return to normal levels following construction.

(b) Dissolved Oxygen. Dissolved oxygen (DO) levels may decrease during construction at the disposal site as a result of increased turbidity. However, this decrease will be minimal due to the dynamic characteristics of the ocean, and DO levels should return to normal conditions immediately following construction.

(c) Toxic Metals and Organics. Not applicable.

(d) Pathogens. Not applicable.

(e) Aesthetics. During construction, there would be an increase in the ambient noise levels, which will return to normal levels following construction. In addition, construction activity on the beach obstructs the visual aesthetic of the ocean, but it is a temporary effect, which will also return to normal immediately following construction.

(3) Effects on Biota.

(a) Primary Production & Photosynthesis. Although there will be some turbidity at the construction site, it is not expected that measurable impacts

to primary production and photosynthesis will occur since the area of impact is small.

(b) Suspension/Filter Feeders. Temporary impacts would include increased turbidity, which may reduce oxygen levels and impact food intake to organisms at the construction site. However, water clarity and dissolved oxygen concentrations will improve following construction.

(c) Sight Feeders. A minimal, temporary disruption due to construction disturbances is possible. A rapid recovery is expected since most sight feeders are transient and can relocate until construction activities are complete.

(4) Actions taken to Minimize Impacts. The above noted impacts are temporary and conditions should improve following construction. It is unlikely that further minimization in these areas is possible.

d. Contaminant Determinations. The borrow sites have been tested for grain size analysis and are predominantly sand. No further testing is required since contaminants would not be associated with the sandy substrates.

e. Aquatic Ecosystem and Organism Determinations.

(1) Effects on Plankton. Effects on plankton would be related to turbidity associated with the construction activity. Effects would be minor and temporary in duration.

(2) Effects on Benthos. Benthic activity at the construction site would be impacted as bottom sediments are disturbed or placed on the beach. These disturbances will be temporary and recolonization on the beach will occur following construction.

(3) Effects on Nekton. Not significant.

(4) Effects on Aquatic Food Web. Not significant.

(5) Effects on Special Aquatic Sites.

(a) Sanctuaries and Refuges. Not applicable.

(b) Wetlands. Not applicable.

(c) Mud Flats. Not applicable.

(d) Vegetated Shallows. Not applicable.

(e) Coral Reefs. Not applicable.

(f) Riffle and Pool Complexes. Not applicable.

(6) Threatened and Endangered Species. Although there are known threatened or endangered species within the project area, the potential impacts have been addressed in the environmental assessment and coordinated with pertinent state and Federal agencies. Subsequently, unacceptable adverse impacts to threatened or endangered species are not anticipated or expected.

(7) Other Wildlife. A wide variety of wildlife - birds, mammals, reptiles and amphibians - utilize the beach and ocean. Impacts to wildlife in the project area would be associated with the construction activities. Wildlife would be expected to leave the area during construction, but would return when construction is complete.

(8) Actions to Minimize Impacts. Plans and specs for the project specify requirements to ensure impacts to the environment are minimized or avoided.

f. <u>Proposed Disposal Site Determinations.</u>

(1) Mixing Zone Determination. Not applicable. The State of South Carolina Department of Health and Environmental Control (SCDHEC) does not recognize mixing zones.

(2) Determination of Compliance with Applicable Water Quality Standards. Section 401 Water Quality Certification has not been issued yet by SCDHEC, however, they have stated that it will be issued as a MOD to the existing certification for this project. OCRM, on the other hand, will need to issue a new coastal consistency statement.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supply. Not applicable.

(b) Recreational and Commercial Fisheries. The presence of the dredge and the pipeline may cause commercial or recreational fisherman and commercial shrimpers to utilize different routes or fishing locations since the pipeline will extend perpendicular to the coast for a distance of 3 miles. However, this should result in minimal, temporary impacts to the fishery.

(c) Water Related Recreation. Water related recreational activities may be limited on the beach and in the waters adjacent to the beach due to the presence of the pipeline and equipment. These limitations will move along the beach as the construction activity advances.

(d) Aesthetics. The construction activity will have a negative impact on visual and audible aesthetics. However, the activity will move relatively rapidly down the beach, so no one area will endure the aesthetic impacts for long.

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. Beach and water related recreational activities may be temporarily limited due to the presence of the pipeline and equipment. These limitations will pass through and move along the portion of the beach fronting the park area as the construction activity advances.

g. Determination of Secondary and Cumulative Efects on the Aquatic Ecosystem.
Initial negative effects related to this project include those associated with turbidity, impacts to the benthic community, and aesthetics. These effects are considered temporary. Long-term, permanent effects will provide for the restoration of a dune system which will provide storm damage protection of structures on the island. The beneficial permanent effects outweigh the negative temporary effects associated with the construction activity.

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

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. Alternatives that were considered were included in the 1991 EA. The currently proposed project is not the result of a new analysis, but rather the re-creation of the selected alternative derived from the analysis done for the original project, while using new borrow sites.

c. The proposed construction described in this evaluation would not cause or contribute to violations of any known applicable state water quality standards, which would result in permanent damage to the ecosystem.

d. The proposed project will not violate the Endangered Species Act of 1973.

e. The proposed project will not violate any specified protection measures for marine sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972.

f. The proposed project will not result in significant adverse affects on human health and welfare in regard to municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life states of aquatic life and other wildlife will not be adversely affected. Significant adverse affects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

g. Steps taken to minimize potential adverse impacts of the construction on aquatic ecosystems include limiting construction to the minimum alternative needed to provide the required protection. Plans and specs will provide guidance and requirements to avoid/minimize impacts to threatened and endangered species and other aquatic and terrestrial life.

h. The State Historic Preservation Office has expressed concern about potential cultural resources (ship wrecks) being present in the proposed borrow sites. The borrow areas will be surveyed prior to construction in order to avoid impacts to any archeological site. Any area where cultural resources are identified will be avoided during the construction activity; therefore, the proposed project will not cause unacceptable adverse impacts to any known cultural resources.

i. 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.

Alvin B. Lee

1-31-05
DATE

Alvin B. Lee
Lieutenant Colonel, EN
Commanding

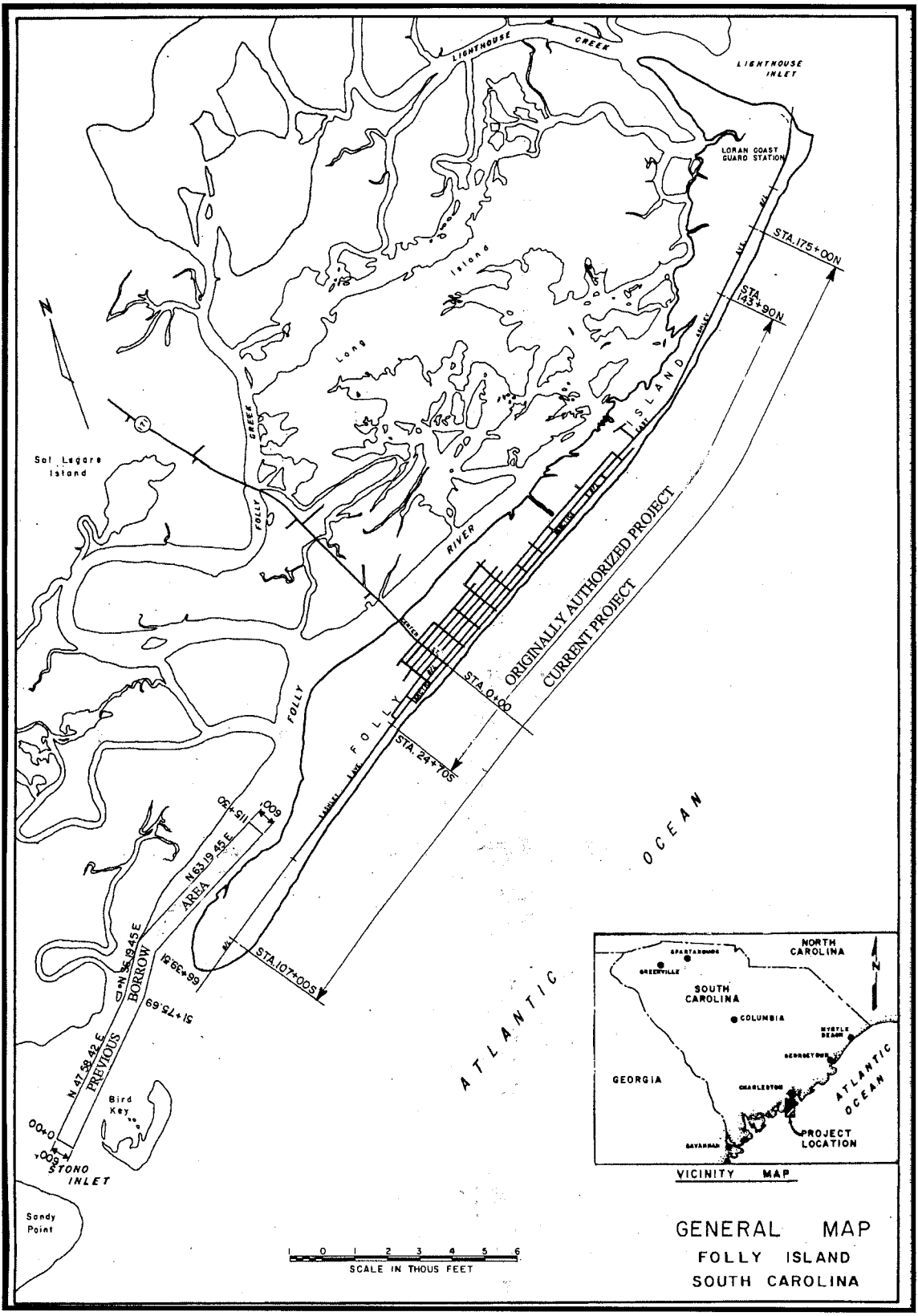

LIGHTHOUSE CREEK
LIGHTHOUSE INLET
LORAN COAST GUARD STATION
STA. 175+00N
STA. 145+90N
LONG ISLAND
FOLLY ISLAND
Sol Legare Island
FOLLY CREEK
FOLLY RIVER
ORIGINALLY AUTHORIZED PROJECT
CURRENT PROJECT
STA. 0+00
STA. 24+70S
FOLLY
OCEAN
ATLANTIC
N 63 19 45 E
AREA
PREVIOUS BORROW
N 47 58 42 E
Bird Key
STONO INLET
Sandy Point
STA. 107+00S
0 1 2 3 4 5 6
SCALE IN THOUS FEET
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
COLUMBIA
CHARLESTON
SAVANNAH
ATLANTIC OCEAN
PROJECT LOCATION
VICINITY MAP
GENERAL MAP
FOLLY ISLAND
SOUTH CAROLINA

FIGURE 1

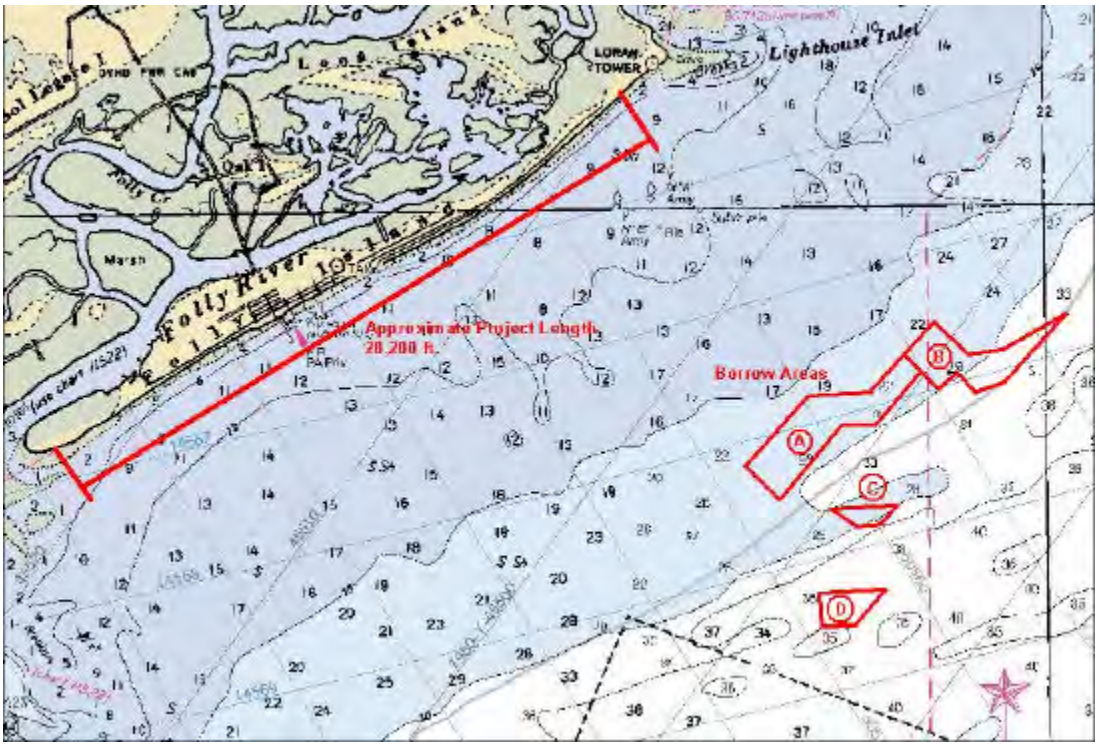

Lighthouse Inlet
LORAN TOWER
Folly River
Approximate Project Length
20,200 ft.
Borrow Areas
A
B
C
D

FIGURE 2

Appendix 1

Biological Assessment

BIOLOGICAL ASSESSMENT
OF THE PROPOSED FOLLY BEACH STORM DAMAGE REDUCTION RE-NOURISHMENT PROJECT
FOLLY BEACH, SOUTH CAROLINA

SEPTEMBER 2004

1.0 INTRODUCTION

Folly Beach is located on the South Carolina coast in Charleston County, approximately 12 miles south of the downtown area of the City of Charleston and 9 miles southwest of Sullivan's Island (see Figure 1). The 6-mile long island reaches from the confluence of the Stono and Folly Rivers at the west end to Lighthouse Creek at the east end. The Folly Beach Storm Damage Reduction project is being conducted under authority of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). An amendment to the previous environmental assessment (EA) is being prepared to evaluate the overall environmental impacts of the proposed project due to the proposed use of an offshore material borrow site. This document re-evaluates the impact of the proposed project on threatened and endangered species and will be incorporated in the amendment to the EA.

The purpose of this project is to protect the economic resources located on Folly Island from erosion and storm events, with a secondary benefit of providing additional beach and dune area that will facilitate sea turtle nesting, as well as providing habitat for the Wilson's plover and least tern. The majority of Folly Island is developed in the manner of a typical suburban municipality and is a mix of residential and commercial properties. The commerce of the island is primarily associated with the tourism industry. The southern end of Folly Island is designated as a Charleston County Park.

2.0 PROPOSED PROJECT DESCRIPTION

This is a periodic nourishment of an existing project. The recommended plan provides for nourishment of 28,200 linear feet (5.34 linear miles) of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 9.0 feet national geodetic vertical datum (NGVD). The project extends from just below the U.S. Coast Guard Base and extends to the Charleston County Park on the west end of Folly Island (see Figure 2). 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 expected erosion rates, it is estimated that 1.7 million cubic yards of beach quality sand will be placed on the beach.

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 parallel with the beach. Beach compatible material (sand) from the off-shore source will be pumped along the roughly 28,000 linear feet reach of the project and will be discharged as a slurry. During construction,

FIGURE 1: LOCATION OF FOLLY BEACH

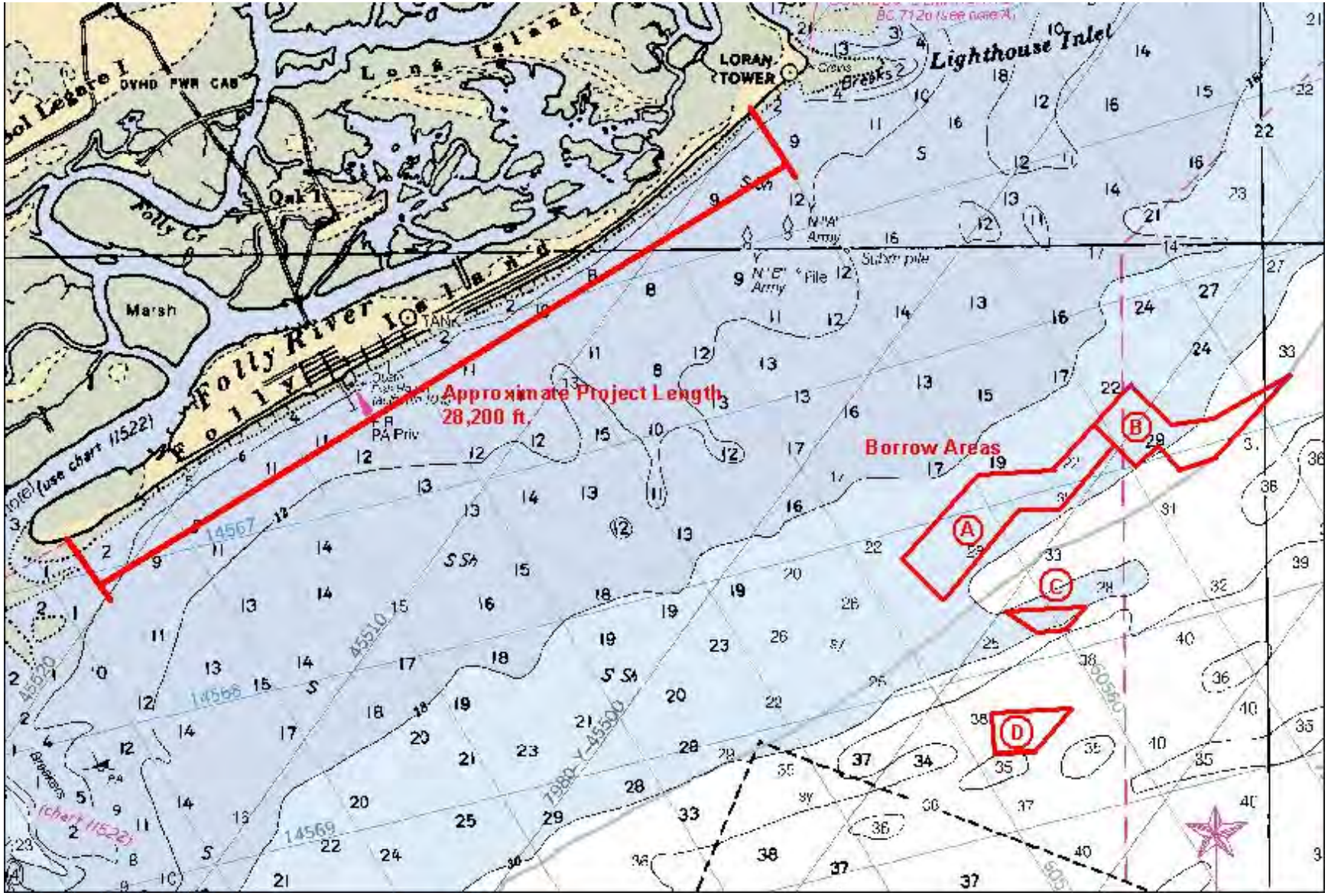


FIGURE 2: FOLLY BEACH PROJECT LIMIITS

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. It is anticipated that construction will begin in late-2005 (i.e., November or December) and will require approximately 6 to 8 months for completion. This construction window should minimize impacts to sea turtles, fish, shellfish, and infauna. This schedule could change due to funding constraints, contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow areas being used for beach compatible sand are designated in Figure 2. These areas total approximately 620 acres. The borrow areas are located approximately three miles off-shore of the northern end of the island. None of the three borrow areas are inside any CBRA zones. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers evaluation process. The location of the borrow sites will be coordinated with South Carolina Department of Natural Resources (SCDNR). The size, sand volume (based on dredging to a depth of 6 feet), and water depth of each borrow area are as follows:

Borrow Area	Area (acres)	Volume (cu. yd.)	Water Depth (ft.)
A	~310	3,130,000	26-36
B	~210	2,030,000	32-40
C	~30	320,000	34
D	~70	400,000	40

Sand will be removed from the borrow areas to a depth of 6 to 8 feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

PRIOR CONSULTATIONS

Previous Section 7 formal or informal consultations occurred in support of the 1991 Environmental Assessment and the 1980 Environmental Impact Statement that were prepared for the original Folly Beach nourishment project.

3.0 LIST OF SPECIES

Table 1 contains a list of species that have been listed by the U.S. Fish and Wildlife Service as occurring or possibly occurring in Charleston County. Table 2 contains a list of threatened and endangered species in South Carolina under the jurisdiction of NOAA Fisheries.

4.0 GENERAL EFFECTS ON LISTED SPECIES/CRITCAL HABITAT

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, and chaff-seed 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. Also, the hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtles could occur in the project area. However, loggerheads are the primary sea turtle nesters. 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 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 (see Figure 3). The southern terminus of sea-beach amaranth range is Folly Island. However, there are currently no known populations that occur on the island.

5.0 SPECIES ASSESSMENTS

5.1 Blue, finback, humpback, right, sei, and sperm whales

The blue whale may be the largest mammal ever to inhabit the earth. It may reach lengths of up to 100 feet—roughly the length of a basketball court. Blue whales weigh up to 160 tons. They feed on small shrimp-like crustaceans. The whales consume up to eight tons of these animals a day during their feeding period. A blue whale produced the loudest sound ever recorded from an animal, and some scientists have speculated that they may be able to remain in touch with each other over hundreds of miles. The number of blue whales in the southern hemisphere was severely depleted by whaling. Due to commercial whaling the size of the population is less than ten percent of what it was originally.

The finback whale is the second largest whale, reaching lengths of up to 88 feet and weighing up to 76 tons. The finback whale because of its crescent-shaped dorsal fin, and obvious characteristic, is easily seen at sea. Depending on where they live, finback whales eat both fish and small pelagic crustaceans, and squids. It sometimes leaps clear of the water surface, yet it is

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY

Common Name	Scientific Name	Status	Occurrence
West Indian manatee	*Trichechus manatus*	E	Known
Bald eagle	*Haliaeetus leucocephalus*	T	Known
Bachman's warbler	*Vermivora bachmanii*	E	Known
Wood stork	*Mycteria americana*	E	Known
Red-cockaded woodpecker	*Picoides borealis*	E	Known
Piping plover	*Charadrius melodus*	T/CH	Known
Kemp's ridley sea turtle	*Lepidochelys kempii**	E	Known
Leatherback sea turtle	*Dermochelys coriacea**	E	Known
Loggerhead sea turtle	*Caretta caretta*	T	Known
Green sea turtle	*Chelonia mydas**	T	Known
Flatwoods salamander	*Ambystoma cingulatum*	T	Known
Shortnose sturgeon	*Acipenser brevirostrum**	E	Known
Sea-beach amaranth	*Amaranthus pumilus*	T	Known
Pondberry	*Lindera melissifolia*	E	Known
Canby's dropwort	*Oxypolis canbyi*	E	Possible
Chaff-seed	*Schwalbea americana*	E	Known
Southern dusky salamander	*Desmognathus auriculatus*	SC	Possible
Gopher frog	*Rana capito*	SC	Known
Godfrey's privet	*Forestiera godfreyi*	SC	Known
Pondspice	*Litsea aestivalis*	SC	Known
Bachman's sparrow	*Aimophila aestivalis*	SC	Possible
Henslow's sparrow	*Ammodramus henslowii*	SC	Known
Red knot	*Calidris canutus*	SC	Possible
Swallow-tailed kite	*Elanoides forficatus forficatus*	SC	Known
American kestrel	*Falco sparverius*	SC	Possible
American oystercatcher	*Haematopus palliatus*	SC	Known
Loggerhead shrike	*Lanius ludovicianus*	SC	Possible
Swainson's warbler	*Limnothlypis swainsonii*	SC	Known
Painted bunting	*Passerina ciris ciris*	SC	Possible
Gull-billed tern	*Sterna nil*otica	SC	Known
Incised groovebur	*Agrimonia incisa*	SC	Known
Venus fly-trap	*Dionaea muscipula*	SC	Known
Southeastern myotis	*Myotis austroriparius*	SC	Known
Southern hognose snake	*Heterodon simus*	SC	Known
Angiosperm (no common name)	*Elytraria caroliniensis*	SC	Known
Creeping St. John's wort	*Hypericum adpressum*	SC	Known
Boykin's lobelia	*Lobelia boykinii*	SC	Known
Sweet pinesap	*Monotropsis odorata*	SC	Known
Savannah or Piedmont cowbane	*Oxypolis ternate*	SC	Known
Pineland plantain	*Plantago sparsiflora*	SC	Known
False coco	*Pteroglossaspis ecristata*	SC	Known
Awned meadowbeauty	*Rhexia aristosa*	SC	Known
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SC	Known
Bull's Island white-tail deer	*Odocoileus virginianus*	SC	Known
Island glass lizard	*Ophisaurus compressus*	SC	Known

TABLE 1: USF&WS THREATENED AND ENDANGERED SPECIES IN CHARLESTON COUNTY (CONT'D)

Common Name	Scientific Name	Status	Occurrence
Black-throated green warbler	*Dendroica virens*	SC	Possible
Black rail	*Laterallus jamai*	SC	Possible
Southern myotis	*Myotis austroriparius*	SC	Known

E: Federally endangered T: Federally threatened CH: Critical Habitat

SC: Federal Species of Concern. These species are rare or limited in distribution but are not currently legally protected under the Endangered Species Act.

Species proposed for listing: None

Designated Critical Habitat: The U.S. Fish and Wildlife Service has designated critical habitat under the Endangered Species Act of 1973, as amended, for the piping plover (*Charadrius melodus*) on breeding grounds in the Great lakes and Northern Great Plains Regions, and in the wintering grounds along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. There is no designated piping plover critical habitat within the boundaries of the proposed project, however, there is piping plover critical habitat on Bird Key Stono in Stono Inlet immediately south of Folly Island (see Figure 3).

* Contact NOAA Fisheries for more information on this species.

also a deeper diver than some of the other baleen whales. The finback's range is in the Atlantic from the Arctic Circle to the Greater Antilles, including the Gulf of Mexico. In the Pacific Ocean the Finback ranges from the Bering Sea to Cape San Lucas, Baja California.

The humpback whale reaches a maximum length of about 50 feet and a maximum weight of about 37½ tons. They are mostly black, but the belly is sometimes white. Flippers and undersides of the flukes are nearly all white. They are migratory. They eat krill and schooling fish. In the Atlantic they migrate from Northern Iceland and Western Greenland south to the West Indies, including the Northern and Eastern Gulf of Mexico. In the Pacific Ocean they migrate from the Bering Sea to Southern Mexico. The humpback is one of the most popular whales for whale watching on both the east and west coasts. Scientists estimate that there are 10,000 humpbacks worldwide, only about 8% of its estimated initial population.

The sei whale is one of the largest whales. It can reach a length of 60 feet and a weight of 32 tons. They feed primarily on krill and other small crustaceans, but also feed at times on small fish. The sei whale is the fastest of the baleen whales and can reach speeds of more than 20 miles per hour. In the Atlantic Ocean the Sei whale ranges from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the Sei whale may range from the Bering Sea to Southern Mexico. The Sei whale is endangered due to past commercial whaling.

TABLE 2: NOAA FISHERIES THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA

Species	Scientific Name	Status	Date Listed
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	E	12/02/70
Finback whale	*Balaenoptera physalus*	E	12/02/70
Humpback whale	*Megaptera novaeangliae*	E	12/02/70
Right whale	*Eubaleana glacialis*	E	12/02/70
Sei whale	*Balaenoptera borealis*	E	12/02/70
Sperm whale	*Physeter macrocephalus*	E	12/02/70
Listed Sea Turtles			
Green sea turtle	*Chelonia mydas*	T*	07/28/78
Hawksbill sea turtle	*Eretmochelys imbricata*	E	06/02/70
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	12/02/70
Leatherback sea turtle	*Dermochelys coriacea*	E	06/02/70
Loggerhead sea turtle	*Caretta caretta*	T	07/28/78
Listed Fish			
Shortnose sturgeon	*Acipenser brevirostrum*	E	03/11/67
Species of Concern – Fish**			
Dusky shark	*Carcharhinus obscurus*		
Sand tiger shark	*Odontaspis taurus*		
Night shark	*Carcharinus signatus*		
Atlantic sturgeon	*Acipenser oxyrhynchus oxyrhynchus*		
Speckled hind	*Epinephelus drummondhayi*		
Warsaw grouper	*Epinephelus nigritus*		
Goliath grouper	*Epinephelus itijara*		
White marlin	*Tetrapturus albidus*		
Species of Concern – Invertebrates**			
Ivory bush coral	*Oculina varicosa*		

Species proposed for listing: None

Designated Critical Habitat: None in the area of this project

Proposed Critical Habitat: None in the area of this project

Candidate Species: None

* Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

** Species of Concern are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future. Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

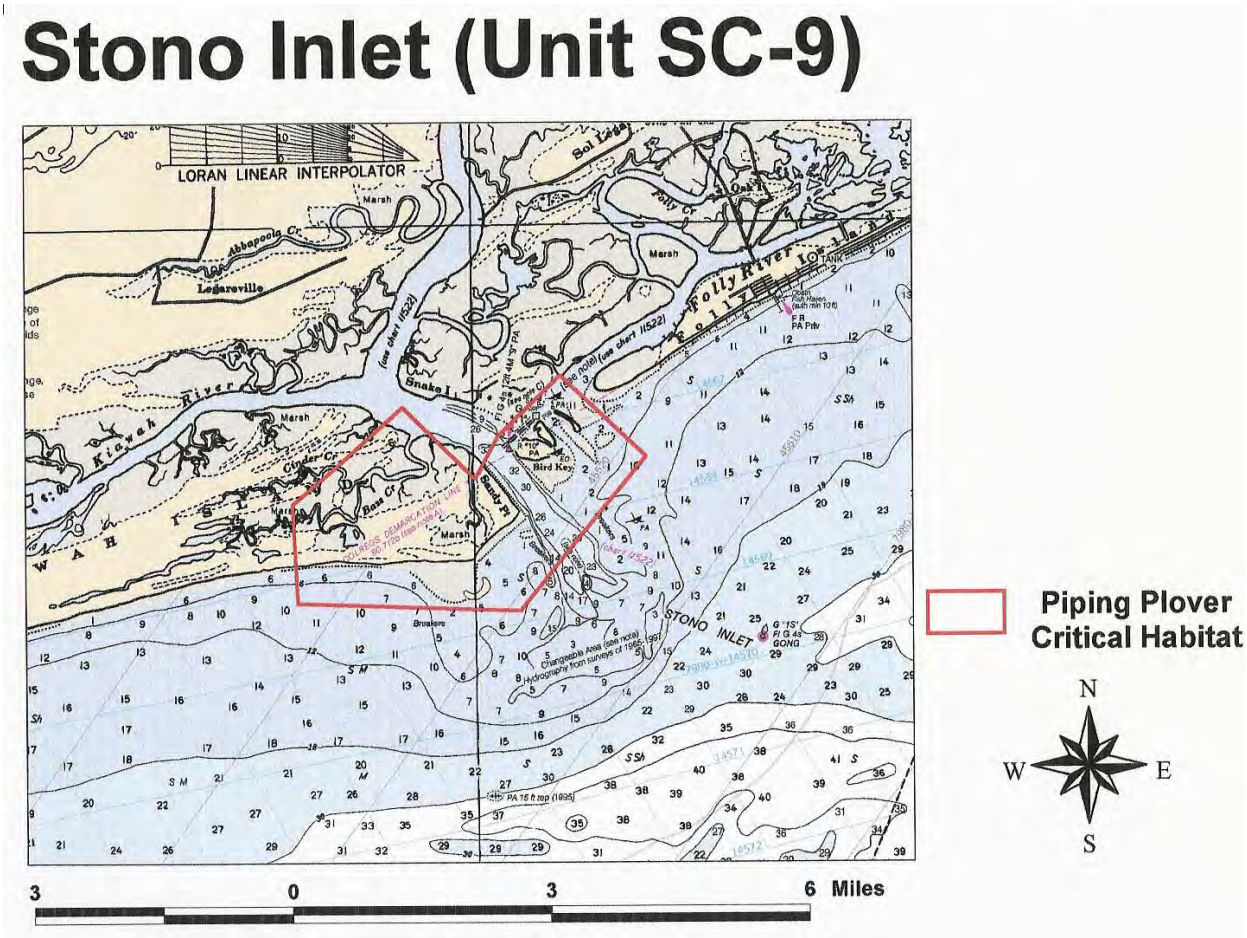


FIGURE 3: PIPING PLOVER CRITICAL HABITAT IN STONO INLET

Unlike the other great whales on the endangered species list, the sperm whale is a toothed whale. It is the largest of the toothed whales reaching a length of 60 feet in males and 40 feet in females. Sperm whales are noted for their dives that can last up to an hour and a half and go as deep as 2 miles under the surface. It is the most abundant of all the endangered whales, with an estimated population of two million. Sperm whales feed mainly on squid, including the giant squid. They range in the Atlantic Ocean from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the sperm whale ranges from the Bering Sea to Southern Mexico. The sperm whale was almost hunted to extinction for its oil (spermaceti). This oil was used in the manufacture of ointments, cosmetics, and candles. The sperm whales usually inhabit the offshore waters.

The right whale is the most endangered species of whale off of the U.S. coasts. The right whale got its name because it was the "right" whale to hunt. It was slow moving and floated after being killed. Current estimates indicate that presently no more than a few hundred exist. Right whales can reach a length of 60 feet and a weight of 100 tons. Although the species has been internationally protected since 1937, it has failed to show any signs of recovery.

Right whales have been observed along the eastern coast of North America from the Florida Keys north to the Gulf of St. Lawrence in Canada. They are found in relatively large numbers around Massachusetts and near Georges Bank in the spring, and then they migrate to two areas in Canadian waters by mid-summer. Most cows that give birth in any given year travel in the winter to the coastal waters of Georgia and Florida to calve and raise their young for the first three months. The Bay of Fundy, between Maine and Nova Scotia, appears to serve as the primary summer and fall nursery hosting mothers and their first-year calves. The calf will stay with its mother through the first year and it is believed that weaning occurs sometime in the fall. Calves become sexually mature in about 8 years. Females are believed to calve about every three to four years. Sightings of right whales and their occurrence in the inshore waters of the State, although rare, are generally assumed to represent individuals seen during this migration.

Right whales feed primarily on copepods and euphausids. They swim very close to the shoreline, often noted only a few hundred meters offshore. Because of their habit of traveling near the coast, there is concern over impacts resulting from collisions with boats and ships. Some right whales have been observed to bear propeller scars on their backs resulting from collisions with boats (NMFS, 1984). Destruction or pollution of right whale habitat is not known to be a problem in the project area. There is no designation of critical habitat for whales in SC.

Effect Determination

Of these six species of whales being considered, only the right whale would normally be expected to occur within the project area during the construction period; therefore the other species of whales are not likely to be affected by the proposed project. The majority of right whale sightings occur from December through February. Since the proposed work is expected to occur during this time period, the dredge will be required to have endangered species observers standing watch on the bridge of the dredge to look for whales during construction. The presence of a hydraulic cutterhead pipeline or hopper dredge in this area should pose no direct impacts to the right whale, however, when relocating, the dredge and any supporting vessels are required to alter course and stop if necessary to avoid approaching whales. If whales are spotted during the day within 10 miles of the dredging operation, then the dredge is required to reduce transit speed at night, should it need to relocate during that time period. Corps contract specifications expressly require avoidance of right whales. For these reasons, it has been determined that the project as proposed is **not likely to adversely affect the right whale**. (The 29 October 1997 "National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast" has jurisdiction on right whale effects)

5.2 Manatee

West Indian manatees are massive fusiform-shaped animals with skin that is uniformly dark grey, wrinkled, sparsely haired, and rubber-like. Manatees possess paddle-like forelimbs, no hind limbs, and a spatulate, horizontally flattened tail. Females have two axillary mammae, one at the base of each forelimb. Their bones are massive and heavy with no marrow cavities in the ribs or long bones of the forearms (Odell 1982). Adults average about 11.5 feet in length and 2,200 pounds in weight, but may reach lengths of up to 15 feet (Gunter 1941) and weigh as much as 3,570 pounds (Rathburn *et al*. 1990). Newborns average 4 to 4½ feet in length and about 66 pounds (Odell 1981).

The West Indian manatee (*Trichechus manatus*) was listed as endangered on March 11, 1967, under a law that preceded the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.). Additional Federal protection is provided for this species under the Marine Mammal Protection Act of 1972, as amended (16 USC 1461 et seq.) The manatee population in the United States is confined during the winter months to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia (USFWS, 1996). However, during the summer months, they may migrate as far north as coastal Virginia on the East Coast and as far west as Louisiana on the Gulf of Mexico (USFWS, 1991). The manatee is an uncommon summer resident of the South Carolina coast with some visual reports in various locations along the coast.

Effect Determination

The proposed work is currently scheduled to occur during the time of year when manatees are generally not visiting the area. If schedule slippage or weather changes result in work being performed when conditions are more favorable for the presence of manatees, then precautions will be taken to ensure that any manatees in the vicinity are not harmed or harassed. In addition, since the proposed work is to be performed with either a pipeline dredge or a hopper dredge (dredge plants that are slow moving) and since manatees are uncommon in the vicinity of Folly Island, no impacts to the manatee are anticipated. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the manatee**.

5.3 Kemp's ridley, leatherback, loggerhead, green, and hawksbill sea turtles

There are five species of sea turtles on the Atlantic Coast, Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas)*, and the hawksbill sea turtle (*Eretmochelys imbricata*). These five species of sea turtles are protected by the Convention on International Trade in Endangered Species (CITES). They are also listed as endangered or vulnerable in the Red Data Book by the International Union for the Conservation of Nature (IUCN). The hawksbill, Kemp's ridley and leatherback were listed as endangered by the U. S. Endangered Species Act in 1973. The green turtle and the loggerhead were added to the list as threatened in 1978.

Sea turtles vary in size from an average of 75 pounds for the olive ridley (does not occur in the project area) to the giant leatherback, which may exceed 800 pounds. Modified for living in the open ocean, they have paddle-like front limbs for swimming. The thick neck and head cannot be drawn back into the body. Sea turtles also have special respiratory mechanisms and organs to excrete excess salt taken in with seawater when they feed.

The leatherback is very different from the other sea turtle species. Instead of plates (scutes) on the shell, the leatherback's carapace has seven hard longitudinal ridges along the length of the back. Its rubber-like covering is black with white spots and a pinkish-white underside. The average length of its shell is 5 feet. The green turtle is the second largest sea turtle and the loggerhead the third. Green turtles get their name from the color of their fat, not their shells, which are grayish in older animals. The smallest sea turtle that may be present in the area of the proposed project is the Kemp's ridley; it has a drab olive to grayish-black shell. Loggerheads have rich reddish-brown shells and yellow on their undersides. The loggerhead's large skull provides for the attachment of strong jaw muscles for crushing conchs and crabs. The hawksbill has a patterned shell of brown and yellow with scutes that overlap like shingles on a roof. Its long, narrow head and beak enable it to feed among coral reefs.

Sea turtles occupy different habitats, depending upon their species, sex and age (size). Hatchlings and smaller juvenile loggerheads appear to live in floating mats of sargassum in the open ocean. This seaweed offers cover, protection from predators and a source of food. Larger juveniles are generally seen in the same coastal habitat as the adults, especially during the summer.

Leatherbacks feed entirely on jellyfish, and they often travel long distances to keep up with large concentrations of this food source drifting in the ocean currents. Green turtles are herbivorous and remain near pastures of turtle-preferred grasses. Often these pastures are not near their nesting beaches, so these turtles may migrate hundreds of miles to nest. Loggerheads usually leave the cold, coastal waters in the winter and are often seen along the edge of the Gulf Stream. Hawksbills live on coral reefs almost year-round, feeding on sponges, sea squirts and other bottom organisms. Although the Kemp's ridley nests only on Mexico's Gulf Coast, small juveniles of this species and the green turtle occur along the South Carolina coast during the summer.

Very little is known about male sea turtles since they almost never come ashore. Male loggerheads are seen in near-shore waters during the spring and early summer breeding season but apparently move back offshore once breeding is completed. Since the reproductive cycles of all sea turtles are similar, a generalized version encompasses all. Mating takes place offshore, and the turtles must only mate once to fertilize all eggs laid during the nesting season. When nesting, the female crawls onto the beach, usually at night, and digs a hole in the sand with her hind flippers. After laying about 100 (number of eggs vary among species) white, leathery eggs, she covers them and returns to the sea. A single female may nest several times a season, usually at 2-week intervals. The eggs incubate about 60 days, depending on the weather. Hatchlings dig out of the sand at night and make their way to the sea using light cues for guidance. Destruction of nests and hatchling mortality at sea are usually high. It appears sea turtles' high number of eggs per clutch and several nestings per season offset this high mortality rate. Nesting habits of

the Kemp's ridley deviate from those of other sea turtles. The Kemp's ridley is the only species that nests during the day. Most sea turtles do not nest every year. They return on either a 2- or 3-year cycle to the same general area or beach. Of these five species, only the loggerhead is considered to be a regular nester in SC. However, in September 1996, a green sea turtle nested on Garden City Beach and another also nested on Garden City Beach in September 2002. Leatherback nests were recorded on Huntington Beach State Park in 2000, at Botany Bay in June 2003 and on Folly Beach in July 2003. There is no critical habitat designation for sea turtles in SC. For purposes of this assessment, the loggerhead is considered to be the only species likely to nest in the project area.

Loggerhead Sea Turtle. The loggerhead sea turtle has a worldwide distribution and is found in temperate and subtropical waters. Major nesting areas in North America occur along the Southeast Coast from North Carolina to Florida. Loggerhead sea turtles regularly nest along the southern coast of South Carolina from Georgetown south, usually from mid-May to August. Nesting is preferred on remote beaches-and away from human disturbance. The loggerhead is considered a turtle of shallow water with juveniles preferring bays and estuaries. An omnivore, crustaceans, molluscs, squid, jellyfish, fish, and plant materials are desirable foods. Stranding data reveals that up to 70% of all stranded sea turtles are loggerheads with the majority of strandings occurring from May to August. Therefore, it can be surmised that the potential presence of loggerheads in the project area would most-likely occur at this time. In Georgia, South Carolina and North Carolina the nesting season generally begins in mid-May and ends by mid-August. Nesting activity is greatest, however, in June and July. Loggerheads are known to nest from one to seven times within a nesting season; the mean is approximately 4.1. The internesting interval varies around a mean of about 14 days. There is general agreement that females mate prior to the nesting season (and possibly only once) and then lay multiple clutches of fertile eggs throughout some portion of the nesting season. Mean clutch size varies from about 100 to 125 along the southeastern United States coast. Loggerheads are nocturnal nesters, but exceptions to the rule do occur infrequently. Multi-annual remigration intervals of two and three years are most common in loggerheads, but the number can vary from one to six years. The length of the incubation period is related to nest temperature. Sex determination in loggerhead hatchlings is temperature dependent and the species apparently lacks sex chromosomes. Loggerhead hatchlings engage in a "swimming frenzy" for about 20 hours after they enter the sea and that frenzy takes them about 22 to 28 kilometers offshore. At some point thereafter they become associated with sargassum rafts and/or debris at current gyres. Upon reaching about 45 cm mean straight carapace length (sCL), they abandon their pelagic existence and migrate to near-shore and estuarine waters of the eastern United States, the Gulf of Mexico and the Bahamas and begin the subadult stage. As adults, loggerheads become migratory for the purpose of breeding. Reported tag recoveries suggest a "migratory path" from Georgia to Cape Hatteras, North Carolina with a single recovery of a Georgia tagged female on the Florida Gulf Coast (Tampa Bay). Little else is known of the scheduled travels of Georgia, South Carolina, and North Carolina nesters outside of the nesting season (NMFS, USFWS, 1991).

Affected sea turtle environment. The areas of affected environment for this proposed project are the four marine areas (an approximate 625 acre total area) proposed for borrow material dredging (see Figure 2) and the placement of an estimated 1,700,000 cubic yards of sand along 28,200 feet of beach from the east terminal groin southward. This sand placement

will result in an increase in the size of the dry beach; conversion of existing intertidal beach to dry beach and shifting the intertidal zone seaward from its existing location; and conversion of some subtidal beach to intertidal beach and shifting the subtidal zone seaward from its existing location. Due to erosion, these acreages and the shifting of the intertidal and subtidal zones will change over time.

Current rangewide conditions for sea turtles. It is not possible, at present, to estimate the size of the loggerhead population in United States territorial waters if one includes subadults. There is, however, general agreement that enumeration of nesting females provides a useful index to population size and stability. It is estimated that 14,150 females nest per year in the southeastern United States. This estimate was based on aerial survey data from 1983 has been accepted as the best current approximation. Given a stochastically derived mean number of nests per female (4.1), this figure provides an estimate of approximately 58,000 nests deposited per year in the Southeast. Based on more extensive ground and aerial surveys throughout the Southeast in recent years (1987 to 1990), it is estimated that approximately 50,000-70,000 nests are deposited annually. These totals constitute about 35 to 40 percent of the loggerhead nesting known worldwide and clearly rank the southeastern United States aggregation as the second largest in the world, with the somewhat larger Oman assemblage being the only other truly large group remaining anywhere (NMFS, USFWS, 1991).

A recent review considered consequences of life tables and population models; mortality rates in the Southeast; population declines in South Carolina and Georgia; and estimates of annual mean clutch production per female. It was concluded that the stock of loggerheads represented by females that nest in the Southeast is continuing to decline (NMFS, USFWS, 1991).

Factors Impacting Nesting Success in the Area

In general, no other factor contributes to egg mortality more than nest predation. A variety of natural and introduced predators such as raccoons, foxes, ghost crabs and ants prey on incubating eggs and hatchling sea turtles. Normally, it is expected that the raccoon (*Procyon lotor*) would be the principal predator, as it is throughout the coast, followed by fox and ghost crabs. Raccoons are known to patrol primary dune lines at night and dig up nests after they were buried in the dune. Raccoons may take up to 96 percent of all nests deposited on a beach if there is no intervention. These nests may be empty or only have a few eggs remaining after predation. Any remaining eggs can be cleaned and then relocated, however, these small nests normally exhibit very low hatching success. In addition to the destruction of eggs, other predators may take considerable numbers of hatchlings just prior to or upon emergence from the sand (NMFS, USFWS, 1991).

Cumulative effects of actions in project area on sea turtles. Very little is known about sea turtle diseases or natural mortality rates. However, it is believed that declines in populations are a direct result of human actions. Erosion of nesting beaches can result in partial or total loss of suitable nesting habitat. Dynamic coastal processes, including sea level rise, influence erosion rates. Man's interference with these natural processes through coastal development and associated activities has resulted in accelerated erosion rates and interruption of natural shoreline

migration. Where beachfront development occurs the site is often fortified to protect the property from erosion. Virtually all shoreline engineering is carried out to save structures, not dry sandy beaches, and ultimately, this results in environmental damage. One type of shoreline engineering, collectively referred to as beach armoring, includes sea walls, rock revetments, riprap, sandbag installations, groins and jetties. Beach armoring can result in permanent loss of a dry nesting beach through accelerated erosion and prevention of natural beach/dune accretion and can prevent or hamper nesting females from accessing suitable nesting sites. Clutches deposited seaward of these structures may be inundated at high tide or washed out entirely by increased wave action near the base of these structures. As these structures fail and break apart they spread debris on the beach that may further impede access to suitable nesting sites (resulting in higher incidences of false crawls) and trap hatchlings and nesting turtles. Sandbags are particularly susceptible to rapid failure and result in extensive debris on nesting beaches. Rock revetments, riprap and sand bags can cause nesting turtles to abandon nesting attempts or to construct improperly, sized and shaped egg cavities when inadequate amounts of sand cover these structures. Approximately 21 percent (234 km) of Florida's, 10 percent (18 km) of Georgia's and 10 percent (30 km;) of South Carolina's beaches are armored (NMFS, USFWS, 1991).

Groins and jetties are designed to trap sand during transport in longshore currents or to keep sand from flowing into channels in the case of the latter. These structures prevent normal sand transport and accrete beaches on one side of the structure while starving neighboring beaches on the other side thereby resulting in severe beach erosion and corresponding degradation of suitable nesting habitat. Beach nourishment consists of pumping, trucking or scraping sand onto the beach to rebuild what has been lost to erosion. Beach nourishment can impact turtles through direct burial of nests and by disturbance to nesting turtles if conducted during the nesting season. Sand sources may be dissimilar from native beach sediments and can affect nest site selection, digging behavior, incubation temperature (and hence sex ratios), gas exchange parameters within incubating nests, hydric environment of the nest, hatching success and hatchling emergence success. Beach nourishment can result in severe compaction or concretion of the beach. Trucking of sand onto project beaches may increase the level of compaction (NMFS, USFWS, 1991).

Significant reductions in nesting success have been documented on severely compacted nourished beaches. Compaction levels that have been evaluated at ten re-nourished east coast Florida beaches concluded that 50 percent were hard enough to inhibit nest digging, 30 percent were questionable as to whether their hardness affected nest digging and 20 percent were probably not hard enough to affect nest digging. In general, beaches nourished from offshore borrow sites are harder than natural beaches, and, while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more. However, it is not known if these conclusions on Florida beaches are applicable to South Carolina beaches, since informal observations and sporadic cone penetrometer testing throughout the state has shown nesting occurring where sand compaction is over 500 pounds per square inch. In light of this limited amount of information, the Charleston District proposes to test sea turtle (loggerheads) nesting preferences by tilling only alternate sections of the beach after sand placement, as described in the Effect Determination Section. Nourished beaches often result in severe escarpments along the mid-beach and can hamper or prevent access to nesting sites.

Nourishment projects result in heavy machinery, pipelines, increased human activity and artificial lighting on the project beach. These activities are normally conducted on a 24-hour basis and can adversely affect nesting and hatching activities. Pipelines and heavy machinery can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls (non-nesting emergences). Increased human activity on the project beach at night may cause further disturbance to nesting females. Artificial lights along the project beach and in the nearshore area of the borrow site may deter nesting females and disorient or misorient emergent hatchlings from adjacent non-project beaches (NMFS, USFWS, 1991).

Beach nourishment projects require continual maintenance (subsequent nourishment) as beaches erode and hence their potential negative impacts to turtles are repeated on a regular basis. Beach nourishment projects conducted during the nesting season can result in the loss of some nests which may be inadvertently missed or misidentified as false crawls during daily patrols conducted to identify and relocate nests deposited on the project beach. Nourishment of highly eroded beaches (especially those with a complete absence of dry beach) can be beneficial to nesting turtles if conducted properly. Careful consideration and advance planning and coordination must be carried out to ensure timing, methodology and sand sources are compatible with nesting and hatching requirements (NMFS, USFWS, 1991).

Extensive research has demonstrated that the principal component of the sea finding behavior of emergent hatchlings is a visual response to light. Artificial beachfront lighting from buildings, streetlights, dune crossovers, vehicles and other types of beachfront lights has been documented in the disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchling turtles. The results of disorientation or misorientation are often fatal. As hatchlings head toward lights or meander along the beach their exposure to predators and likelihood of desiccation is greatly increased. Misoriented hatchlings can become entrapped in vegetation or debris, and many hatchlings are found dead on nearby roadways and in parking lots after being struck by vehicles. Hatchlings that successfully find the water may be misoriented after entering the surf zone or while in nearshore waters. Intense artificial lighting can even draw hatchlings back out of the surf (NMFS, USFWS, 1991).

The problem of artificial beachfront lighting is not restricted to hatchlings. It has been indicated that adult loggerhead emergence patterns were correlated with variations in beachfront lighting in south Brevard County, Florida, and that nesting females avoided areas where beachfront lights were the most intense. It has also been noted that loggerheads aborted nesting attempts at a greater frequency in lighted areas. Problem lights may not be restricted to those placed directly on or in close proximity to nesting beaches. The background glow associated with intensive inland lighting, such as that emanating from nearby large metropolitan areas, may deter nesting females and disorient or misorient hatchlings navigating the nearshore waters. Cumulatively, along the heavily developed beaches of the southeastern United States, the negative effects of artificial lights are profound (NMFS, USFWS, 1991).

Residential and tourist use of developed (and developing) nesting beaches can also result in negative impacts to nesting turtles, incubating egg clutches and hatchlings. The most serious threat caused by increased human presence on the beach is the disturbance to nesting females.

Night-time human activity can cause nesting females to abort nesting attempts at all stages of the behavioral process. It has been reported that disturbance can cause turtles to shift their nesting beaches, delay egg laying, and select poor nesting sites. Heavy utilization of nesting beaches by humans (pedestrian traffic) may result in lowered hatchling emergence success rates due to compaction of sand above nests and pedestrian tracks can interfere with the ability of hatchlings to reach the ocean. Campfires and the use of flashlights on nesting beaches misorient hatchlings and can deter nesting females (NMFS, USFWS, 1991).

Nest loss due to erosion or inundation and accretion of sand above incubating nests appear to be the principal abiotic factors that may negatively affect incubating egg clutches. While these factors are often widely perceived as contributing significantly to nest mortality or lowered hatching success, few quantitative studies have been conducted. Studies on a relatively undisturbed nesting beach indicated that, excepting a late season severe storm event, erosion and inundation played a relatively minor role in destruction of incubating nests. Inundation of nests and accretion of sand above incubating nests as a result of the late season storm played a major role in destroying nests from which hatchlings had not yet emerged. Severe storm events (e.g., tropical storms and hurricanes) may result in significant nest loss, but these events are typically aperiodic rather than annual occurrences. In the southeastern United States, severe storm events are generally experienced after the peak of the hatching season and hence would not be expected to affect the majority of incubating nests. Erosion and inundation of nests are exacerbated through coastal development and shoreline engineering. These threats are discussed above under beach armoring (NMFS, USFWS, 1991).

The effects of dredging are evidenced through the degradation of habitat and incidental take of marine turtles. Channelization of inshore and nearshore habitat and the disposal of dredged material in the marine environment can destroy or disrupt resting or foraging grounds (including grass beds and coral reefs) and may affect nesting distribution through the alteration of physical features in the marine environment. Hopper dredges are responsible for incidental take and mortality of marine turtles during dredging operations. Other types of dredges (clamshell and pipeline) have not been implicated in incidental take (NMFS, USFWS, 1991). Incidental takes of sea turtles by hopper dredges comes under the jurisdiction of NOAA Fisheries and is covered by a separate Biological Opinion (NMFS, 1997).

Of all commercial and recreational fisheries conducted in the United States, shrimp trawling is the most damaging to the recovery of marine turtles. The estimated number of loggerheads killed annually by the offshore shrimping fleet in the southeastern United States Atlantic and Gulf of Mexico is 5,000 to 50,000. Incidental capture and drowning in shrimp trawls is believed to be the largest single source of mortality on juvenile through adult stage marine turtles in the southeastern United States. Most of these turtles are juveniles and subadults, the age and size classes most critical to the stability and recovery of marine turtle populations. Quantitative estimates of turtle take by shrimp trawlers in inshore waters have not been developed, but the level of trawling effort expended in inshore waters along with increasing documentation of the utilization of inshore habitat by loggerhead turtles suggest that capture and mortality may be significant. Trawlers targeting species other than shrimp tend to use larger nets than shrimp trawlers and probably also take sea turtles, although capture levels have not been developed. These fisheries include, but are not limited to bluefish, croaker, flounder, calico

scallops, blue crab and whelk. Of these, the bluefish, croaker and flounder trawl fisheries likely pose the most serious threats. The harvest of sargassum by trawlers can result in incidental capture of post hatchlings and habitat destruction (NMFS, USFWS, 1991).

Effect Determination

Loggerhead sea turtle nesting activities have been recorded within the project area on Folly Island. The placement of sand and construction activities associated with the placement of that sand on this reach of beach could adversely affect any existing sea turtle nests and sea turtles attempting to nest. Placement of the dredged material is currently scheduled to occur during the months of November through April; however, it is possible that the start of construction work will be delayed until nesting season or that completion of the project will be delayed and construction will extend into the nesting season. If any construction work occurs during sea turtle nesting season, then the following precautions will be taken to minimize the effects to sea turtles:

- If any construction of the project occurs during the period between May 1 and November 30, 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 December 1 to April 30, no nesting surveys will be performed.

- For construction activities occurring during the period May 1 through November 30, 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 May 1 through November 30, 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 perform cone penetrometer compaction testing of the newly constructed sand berm. This compaction testing will be repeated 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 (psi), then the following tilling protocol will be performed:

For a period of 3 years, starting at the most northern reach of the project, the sand placed on the beach will be tilled/untilled in alternating sections of 500 feet each. Sea turtle nesting data and false crawls will be monitored for this

3-year period and analyzed to determine if tilling (or lack of tilling) has an effect on nesting behavior.

This tilling protocol is being proposed because informal observations and sporadic cone penetrometer testing throughout the State of South Carolina has frequently shown nesting occurring where sand compaction is much greater than 500 psi. Since most previous turtle nesting/sand compaction research has been done in Florida, it is questionable as to whether those test results are applicable to South Carolina's shores. This tilling protocol, when combined with other data being collected in the state, should help answer the question of whether tilling is necessary on re-nourished beaches.

Visual surveys for escarpments along the project area will be made immediately after completion of the project and prior to May 1 for 3 subsequent years. Results of the surveys will be submitted to the USFWS prior to any action being taken. Since construction of the project should not occur during the sea turtle nesting season, escarpment leveling will not be performed until immediately prior to the nesting season. 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.

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. However, because of the possibility of missing a sea turtle nest during the nest monitoring program or inadvertently breaking eggs during relocation, it has been determined that the proposed project **may adversely affect the loggerhead sea turtle**.

5.4 Shortnose sturgeon

The Shortnose Sturgeon occurs in Atlantic seaboard rivers from southern New Brunswick to northeastern Florida. Department of Commerce studies have shown that the shortnose sturgeon exists in many of the large coastal river systems in South Carolina. Little is known about the shortnose sturgeon population level, life history or ecology. Their status is probably due to exploitation, damming of rivers and deterioration of water quality. Because there is no coastal river associated with this project, there is a lack of suitable freshwater spawning areas for the sturgeon in the immediate project area.

Effect Determination

It is unlikely that the shortnose sturgeon occurs in the project area, however, should it occur, its habitat would be only minimally altered by the proposed project. Any shortnose sturgeons in the area should be able to avoid being taken by a slow moving pipeline dredge or hopper dredge. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the shortnose sturgeon**.

5.5 Piping plover

Piping plovers are small shorebirds approximately six inches long with sand-colored plumage on their backs and crown and white under parts. Breeding birds have a single black breast band, a black bar across the forehead, bright orange legs and bill, and a black tip on the bill. During the winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black.

The piping plover breeds on the northern Great Plains, in the Great Lakes, and along the Atlantic coast (Newfoundland to North Carolina); and winters on the Atlantic and Gulf of Mexico coasts from North Carolina to Mexico, and in the Bahamas West Indies.

Piping plovers nest along the sandy beaches of the Atlantic Coast from Newfoundland to North Carolina, the gravelly shorelines of the Great Lakes, and on river sandbars and alkali wetlands throughout the Great Plains region. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. The piping plover winters along the coast, preferring areas with expansive sand or mudflats (feeding) in close proximity to a sandy beach (roosting). The primary threats to the piping plover are habitat modification and destruction, and human disturbance to nesting adults and flightless chicks. A lack of undisturbed habitat has been cited as a reason for the decline of other shorebirds such as the black skimmer and least tern (USFWS, 1996a).

The piping plover is an occasional visitor along the South Carolina coast during the winter months and individuals are occasionally sighted in the project area. However, there are no large wintering concentrations in the state. Piping plovers are considered threatened species under the Endangered Species Act of 1973, as amended, when on their wintering grounds. The species is not known to nest in the project area.

Effect Determination

Placement of the dredged material is currently scheduled to occur during the months of November through April. Direct loss of nests from the disposal of the dredged material should not occur, as the species is not known to nest in the project area. Piping plover foraging distribution on the beach during the winter months may be altered as beach food resources may be affected by placement of material along the project area. Such disruptions will be temporary and of minor significance. Any shorebird habitat area originally existing along the length of the island has suffered severe erosion. Dredged material will likely help restore the habitat lost to erosion in this area while the protective berm is being constructed. The placement of dredged material into the intertidal zone will provide additional foraging habitat for the wintering piping plover. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the piping plover**. It has also been determined that the proposed project is **not likely to adversely modify critical habitat for wintering piping plovers**.

5.6 Seabeach Amaranth

Seabeach amaranth (*Amaranthus pumilus*) is an annual plant historically native to the barrier island beaches of the Atlantic coast from Massachusetts to South Carolina. No other vascular plant occurs closer to the ocean. The species was Federally listed as threatened by the U.S. Fish and Wildlife Service in 1993 (COE, 2001). Seabeach amaranth is listed as threatened and of national concern in South Carolina.

Germination takes place over a relatively long period of time, generally beginning in April and continuing at least through July. Upon germinating, this plant initially forms a small-unbranched sprig but soon begins to branch profusely into a clump, often reaching a foot in diameter and consisting of 5 to 20 branches. Occasionally a clump may get as large as a yard of more across, with hundreds of branches. The stems are fleshy and pink-red or reddish, with small rounded leaves that are 1.3 to 2.5 centimeters in diameter. The leaves are clustered toward the tip of the stem, are normally a somewhat shiny, spinach-green color, and have a small notch at the rounded tip. Flowers and fruits are relatively inconspicuous and are borne in clusters along the stems. Flowering begins as soon as plants have reached sufficient size, sometimes as early as June in the Carolinas but more typically commencing in July and continuing until their death in late fall or early winter. Seed production begins in July or August and reaches a peak in most years in September; it likewise continues until the plant dies (COE, 2001).

Seabeach amaranth occurs on barrier island beaches, where its primary habitat consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of non-eroding beaches. It occasionally establishes small temporary populations in other habitats, including sound side beaches, blowouts in foredunes, and in dredged material placed for beach re-nourishment or disposal. Seabeach amaranth appears to be intolerant of competition and does not occur on well-vegetated sites. The species appears to need extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner. These characteristics allow it to move around in the landscape as a fugitive species, occupying suitable habitat as it becomes available (COE, 2001).

Seabeach amaranth is a "fugitive" species that cannot compete with dense perennial beach vegetation and only occurs in the newly-disturbed habitat of a high-energy beach. It occurs on barren or sparsely-vegetated sand above the high water line, an area classified as marine wetland. This habitat usually disappears completely when seawalls or other hard structures are built along the shoreline. This loss of habitat from seawall construction and global sea level rise are thought to be major factors in the species' extirpation throughout parts of its historic range. It has been postulated that estuarine and coastal shore plants will suffer some of the most significant impacts as a result of global climate changes. Coastal development will prevent these species from migrating up slope to slightly higher ground if sea levels rise. To a large extent, this is already occurring as beaches are being fortified to prevent erosion. Beach re-nourishment projects eliminate existing plants if conducted during the summer and may bury the seed needed to reestablish the plant the following year if conducted during the winter. However, beach re-nourishment projects often rebuild the habitat this species requires. Fortification with seawalls and other stabilization structures or heavy vehicular traffic may eliminate seabeach amaranth populations locally. Any given site will become unsuitable at some time because of

natural forces. However, if a seed source is no longer available in adjacent areas, seabeach amaranth will be unable to reestablish itself when the site is once again suitable or new favorable habitat is created. In this way, it can be progressively eliminated even from generally favorable stretches of habitat surrounded by permanently unfavorable areas (COE, 2001).

Historically, seabeach amaranth occurred in 31 counties in 9 states from Massachusetts to South Carolina. It has been eliminated from six of the States in its historic range. The only remaining large populations are in New York and North Carolina. Surveys in South Carolina found that the number of plants along our coast dropped by 90% (from 1,800 to 188) as a result of Hurricane Hugo, subsequent winter storms and beach rebuilding projects that occurred in its wake. South Carolina populations are still low and exhibit a further downward trend although 1998 and 2003 were better years than most with 279 plants identified along the coast in 1998 and 1381 identified in 2003. The remaining populations in areas with suitable habitat are in constant danger of extirpation from hurricanes, webworm predation, and other natural and anthropogenic factors (COE, 2001). At the present time, there are no known populations of seabeach amaranth in the project area.

Effect Determination

Because there are no know populations of seabeach amaranth in the project area, there is also no viable seed source. As such, the proposed project is **not likely to adversely effect seabeach amaranth**.

6.0 SUMMARY OF PROTECTIVE MEASURES

Manatee

Should a change in the schedule necessitate work during the manatee migration period, personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing manatees. The Contractor may be held responsible for any manatee harmed, harassed, or killed as a result of vessel collisions or construction activities. Failure of the Contractor to follow these specifications is a violation of the Endangered Species Act and could result in prosecution of the Contractor under the Endangered Species Act or the Marine Mammals Protection Act. The standard manatee conditions apply annually from 1 June to 30 September. The Contractor will be instructed to take necessary precautions to avoid any contact with manatees. If manatees are sighted within 100 yards of the dredging area, all appropriate precautions will be implemented to insure protection of the manatee. The Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than 100 yards of the manatee. Operation of equipment closer than 50 feet to a manatee will necessitate immediate shutdown of that equipment.

Right Whales

Since the construction is anticipated to be scheduled during the right whale migration period, personnel will be advised that there are civil and criminal penalties for harming,

harassing, or killing right whales. The Contractor may be held responsible for any whale harmed, harassed, or killed as a result of vessel collisions or construction activities. Failure of the Contractor to follow these specifications is a violation of the Endangered Species Act and could result in prosecution of the Contractor under the Endangered Species Act or the Marine Mammals Protection Act. The time when most right whale sightings occur is December, January, and February. The Contractor will be instructed to take necessary precautions to avoid any contact with whales. If whales are sighted within 1000 feet of the borrow area, all appropriate precautions will be implemented to insure protection of the whale. In addition, the Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than this distance.

Sea Turtles

Should the schedule necessitate work during the sea turtle nesting time period, in order to minimize impacts to nesting sea turtles a beach monitoring and nest relocation program for sea turtles will be implemented. This program will include daily patrols of sand placement areas at sunrise, relocation of any nests laid in areas to be impacted by sand placement, and monitoring of hatching success of the relocated nests. Sea turtle nests will be relocated to an area suitable to both the USFWS and the SCDNR. The Corps will perform any necessary maintenance of beach profile (tilling and shaping or knocking down escarpments) during construction and prior to each nesting season.

During construction of this project, staging areas for construction equipment will be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all dredge pipes that are placed on the beach will be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes will be off the beach to the maximum extent possible. Temporary storage of pipes on the beach will be in such a manner so as to impact the least amount of nesting habitat and will likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline will be recommended as the method of storage).

During construction of this project, all on-beach lighting associated with the project will be limited to the immediate area of active construction only. Such lighting will be shielded, low-pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. Red filters will be placed over vehicle headlights (i.e., bulldozers, front end loaders). Lighting on offshore equipment will be similarly minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements. Shielded, low pressure sodium vapor lights will be highly recommended for lights on any offshore equipment that cannot be eliminated.

7.0 SUMMARY OF EFFECT DETERMINATIONS

This assessment has examined the potential impacts of the proposed project on the 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. Critical habitat has not been designated for whales, manatees, sea turtles, or sturgeon in South Carolina; therefore, none would be affected. Based on this analysis, the following determinations have been made.

- It has been determined that the proposed project is not likely to adversely affect the blue, finback, humpback, right, sei, or sperm whales.
- 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 Kemp's ridley, leatherback, green, or hawksbill sea turtles.
- It has been determined that the proposed project is not likely to adversely affect the shortnose sturgeon.
- It has been determined that the proposed project is not likely to adversely affect the piping plover.
- It has been determined that the proposed project is not likely to adversely affect seabeach amaranth.
- It has been determined that the proposed project is not likely to adversely modify critical habitat for wintering piping plovers.
- It has been determined that the proposed project may adversely affect the nesting loggerhead sea turtle.

8.0 List of Contacts Made

Extensive use was made of the research, communication, and coordination that was part of the March 2003 Biological Assessment prepared for the Pawleys Island Hurricane and Storm Damage Reduction project in Georgetown County, South Carolina and the August 2004 Biological Assessment prepared for the Hunting Island Ecosystem Restoration and Protection Project in Beaufort County, South Carolina.

In addition to all the coordination that occurred with the development of those documents, most of which equally applies to this project area, there is continuous contact with USFWS, SCDNR, SCDHEC, and NOAA Fisheries with regard to this coastal project and the development of the supporting EA and water quality work (all of which is utilized in this document). Extensive communication and coordination will continue to occur with USFWS, SCDNR, SCDHEC-OCRM, and NOAA Fisheries to adequately address environmental concerns until the beach re-nourishment project is completed.

LITERATURE CITED

Hopkins-Murphy, Sally R., Charlotte P. Hope, and Margaret E. Hoyle, 1999. A History of Research and Management of the Loggerhead Turtle (Caretta caretta) on the South Carolina Coast. Final Report to the U.S. Fish and Wildlife Service.

National Marine Fisheries Service, Office of Protected Species. 1997. Regional Biological Opinion for Hopper Dredging Along South Atlantic Coast. Silver Spring, Maryland.

Biological Assessment prepared on April 2001 for the Operations and Maintenance Dredging and Disposal work for the Murrells Inlet Project in Georgetown County, South Carolina. Extensive use was made of the research, communication, and coordination meetings that were part of this document.

Those references utilized for the development of the Murrells Inlet April 2001 BA.

Hopkins, J. Stephen, Richard D. Hamilton II, (SCDNR) and Stephen D. Roff (SCPRT) 1999. 1999 Research Plan: Development of Restoration Techniques for Seabeach Amaranth (*Amaranthus pumilus*) in South Carolina

National Marine Fisheries Service, 1984. Marine Fisheries Review, The Status of Endangered Whales. National Marine Fisheries Service, Scientific Publications Office, Seattle, Washington.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery Plan for U.S. Population of Loggerhead Turtle. National Marine Fisheries Service, Washington, D.C.

(Corps) U.S. Army Engineer District, Charleston, South Carolina. 1976. Final Environmental Impact Statement. Murrells Inlet Navigation Project, Georgetown County, South Carolina.

U.S. Fish and Wildlife Service. 1995. Florida Manatee Recovery Plan Second Revision. U.S. Fish and Wildlife Service, Atlanta, Georgia. 160 pp.

U.S. Fish and Wildlife Service. 1996a. Piping Plover *(Charadrius melodus),* Atlantic Coast Population, Revised Recovery Plan. Hadley Massachusetts. 258 pp.

U.S. Fish and Wildlife Service. 1996b. Recovery Plan for Seabeach Amaranth (*Amaranthus pumilus*). Rafinesque. Atlanta, Georgia

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

March 11, 2005

Mr. Joseph A. Jones
Chief, Planning Branch
Department of the Army
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Attn: Alan Shirey

Re: Folly Beach Renourishment
Charleston County, South Carolina
FWS Log No. 4-6-04-F-111R

Dear Mr. Jones:

This document is the Fish and Wildlife Service's (Service) revised biological opinion based on additional information obtained regarding the original incidental take statement and on our review of the proposed sand relocation project located in the waters of the Atlantic Ocean along the shoreline of Folly Beach in Charleston County, South Carolina, and its effects on the loggerhead sea turtle (*Caretta caretta*), the leatherback sea turtle (*Dermochelys coriacea*), the piping plover (*Charadrius melodus*) and designated critical habitat, and the seabeach amaranth (*Amaranthus pumilus*) per section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your September 30, 2004, request for formal consultation was received on December 9, 2004.

This biological opinion is based on information provided in the September 30, 2004, biological assessment, the September 30, 2004, draft environmental assessment, the January 12, 2005, re-nourishment meeting, other sources of information, and further communication with related parties. A complete administrative record of this consultation is on file at the Charleston Field Office, 176 Croghan Spur Road, Suite 200, Charleston, South Carolina 29407.

CONSULTATION HISTORY

September 30, 2004 - The Service received the biological assessment.

December 9, 2004 – The Service provided a letter to the Department of the Army that acknowledged receipt of all information necessary to initiate formal consultation on the proposed action, as required in the regulations governing interagency consultations (50 (Code of Federal Regulations [CFR] 402.14)

January 10, 2005 - The Service received a letter from the Department of the Army that informed us of changes to the authority, quantity of sand, and time frame for the proposed project.

January 12, 2005 - The Service attended a meeting with other state and local agencies at the U.S. Army Corps of Engineers (Corps) to discuss the changes addressed in the letter received on January 10, 2005.

FWS Log No: 4-6-04-F-111
Application No: PL84-99
Date Started: December 9, 2004
Ecosystem: 75j
Applicant: Town of Folly Beach
Action Agency: Corps and Federal Emergency Management Administration
Project Title: Folly Beach Renourishment
County: Charleston

Table 1. Species and critical habitat evaluated for effects and those where the Service has concurred with a "not likely to be adversely affected" determination.

SPECIES or CRITICAL HABITAT	PRESENT IN ACTION AREA
Piping plover	No
Piping plover critical habitat	No
Seabeach amaranth	No

The above species and critical habitat not impacted by this action will not be discussed further in this biological opinion.

Also, this opinion does not address potential impacts of this project on loggerhead or leatherback sea turtles while in the open ocean. The Service's endangered species jurisdiction only extends to nesting turtles. Turtles in the open ocean are the jurisdiction of the Department of Commerce's National Marine Fisheries Service (NMFS).

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Project Description

The proposed project consists of the nourishment of 28,200 linear feet (5.34 linear miles) of shoreline. The project extends from just below the U.S. Coast Guard Base and extends to the Charleston County Park on the west end of Folly Island. 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 expected erosion rates, it is estimated that two million cubic yards of beach quality sand will be placed on the beach.

Construction will be by means of hydraulic cutterhead dredge that will transport the sand through a pipeline. The pipeline will run parallel with the beach. Beach compatible material (sand) from the off-shore source will be pumped along the roughly 28,000 linear feet reach 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. It is anticipated that construction will begin in March 2005 and will require from six to eight months for completion.

The borrow areas being used for beach compatible sand are about 620 acres and are located about three miles off-shore of the northern end of the island. None of the three borrow areas are inside any CBRA zones. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. The size, sand volume (based on dredging to a depth of six feet), and water depth of each borrow area are as follows:

Borrow Area	Area (Acres)	Volume (Cubic yards)	Water Depth (Feet)
A	~310	3,130,000	26-36
B	~210	2,030,000	32-40
C	~30	320,000	34
D	~70	400,000	40

Sand will be removed from the borrow areas to a depth of six to eight feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*), listed as a threatened species on July 28, 1978, (Federal Register [FR] 1978), inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson, 1984).

No critical habitat has been designated for the loggerhead sea turtle.

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) listed as an endangered species on June 2, 1970, (FR 1970), nests on shores of the Atlantic, Pacific, and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard, 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NMFS and Service, 1992; National Research Council [NRC], 1990a).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (NMFS and Service, 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (Murphy, 1996; Winn, 1996; Boettcher, 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff, 1990; Florida Fish and Wildlife Conservation Commission; unpublished data); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff, 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands.

Life history

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert et al., 1980; Richardson and Richardson, 1982; Lenarz et al., 1981); the mean is about 4.1 (Murphy and Hopkins, 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd, 1988). Mean clutch size varies from about 100 to 126 along the southeastern United States coast (NMFS and Service, 1991b). Nesting migration intervals of two to three years are most common in loggerheads, but the number can vary from one to seven years (Dodd, 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group [TWEG], 1998).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (NMFS and Service, 1992). The interval between nesting events within a season is about nine to ten days. Clutch size averages 101 eggs on Hutchinson Island, Florida (Martin, 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton, 1996). Leatherbacks are believed to reach sexual maturity in six to ten years (Zug and Parham, 1996).

Population dynamics

Loggerhead Sea Turtle

Total estimated nesting in the Southeast is approximately 68,000 to 90,000 nests per year (Florida Fish and Wildlife Conservation Commission statewide nesting database, 2002; Georgia Department of Natural Resources statewide nesting database, 2002; South Carolina Department of Natural Resources [SCDNR] statewide nesting database, 2002; North Carolina Wildlife Resources Commission statewide nesting database, 2002). In 1998, there were over 80,000 nests in Florida alone. From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross, 1982; Ehrhart, 1989; NMFS and Service, 1991b). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) is cause for considerable concern (Meylan et al., 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NMFS and Service, 1991b). About 80% of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (NMFS and Service, 1991b).

Leatherback Sea Turtle

Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually (Spotila *et al.*, 1996). The largest nesting populations at present occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year) and Colombia (estimated several thousand nests annually), and in the western Pacific in West Papua (formerly Irian Jaya) and Indonesia (about 600 to 650 females nesting/year). In the United States, small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year).

Status and distribution

Loggerhead Turtle

Genetic research involving analysis of mitochondrial DNA has identified five different loggerhead subpopulations/nesting aggregations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Dry Tortugas, Florida, Subpopulation, (4) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (5) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen, 1994; 1995; Bowen et al., 1993; Encalada et al., 1998; Pearce, 2001). These data indicate that gene flow between these five regions is limited. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting subpopulation. The Northern Subpopulation has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (TEWG, 1998; 2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating that the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 2002. Nesting surveys in the Dry Tortugas, Northwest Florida, and Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group 1998, 2000).

Threats include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65% of worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings.

The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Analysis of the Species/Critical Habitat Likely to be Affected

Loggerhead and Leatherback Sea Turtle

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting, behavior modification of nesting females due to escarpment formation within the project area during a nesting season resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. The quality of the placed sand could affect the ability of female turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated in the continental United States; therefore, the proposed action would not result in an adverse modification.

ENVIRONMENTAL BASELINE

Status of the species within the action area

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for South Carolina beaches extends from May 1st through November 30th. Incubation ranges from about 45 to 95 days. Loggerhead turtle nesting along South Carolina beaches varies from less than one nest per 0.62 miles at Turtle Island to more than 200 nests per 0.62 miles at Cape Island (Hopkins and Richardson 1984). Loggerhead nesting at Folly Beach averages 47 nests/year (unpublished data).

Leatherback Sea Turtle

The leatherback sea turtle nesting and hatchling season for South Carolina beaches extends from April 15th through September 30th. Leatherback turtle nesting is rare in Georgia, South Carolina, and North Carolina (Murphy 1996; Winn 1996; Boettcher, 1998). In 2003, there was one successful leatherback nest on Folly Beach (unpublished data).

EFFECTS OF THE ACTION

Factors to be considered

Proximity of the action

The proposed project is in the immediate vicinity of habitats important to nesting loggerhead sea turtles. Specifically, the proposed project will potentially impact habitat for the loggerhead sea turtles from the Northern subpopulation. In addition, the proposed action has the potential to directly impact 28,200 feet of shoreline (including pipeline placement and fill).

Distribution

Disturbance activities that will impact listed species will primarily occur on the ocean front shoreline of Folly Beach and the Atlantic Ocean. As mobile species, sea turtles may also be affected in nearby waterways and on adjacent islands by intraspecific competition, excessive energy expenditure, and marginally suitable habitat selection.

Timing

The timing of the proposed project will result in direct impacts occurring during the nesting season of loggerhead and leatherback sea turtles.

Nature of the Effect

The effects of the action are likely to destroy, alter, or diminish the nesting success of sea turtles. Any reduction in productivity and/or survival rate will contribute to a vulnerability to extinction in sea turtles.

Duration

The duration of the direct impacts resulting from construction operations could be short-term, lasting about six to eight months.

Analyses for effects of the action

Loggerhead Sea Turtle

Beneficial Effects

The placement of sand on a beach with reduced dry fore-dune habitat may increase sea turtle nesting habitat if the placed sand is compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project.

Direct Effects

Placement of sand on a beach in and of itself may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Nourishment construction during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program or a nest mark and avoidance program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, and/or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about seven percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (1994).

1. Nest relocation

Project construction is likely to occur during the sea turtle nesting season, therefore, sea turtle nest relocation is likely during the estimated six to eight month project construction window. Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement, particularly if eggs are not relocated within 12 hours of deposition (Limpus *et al.* 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al.*, 1979; Ackerman, 1980; Parmenter, 1980; Spotila *et al.*, 1983; McGehee, 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al.*, 1984), mobilization of calcium (Packard and Packard, 1986), mobilization of yolk nutrients (Packard *et al.*, 1985), hatchling size (Packard *et al.*, 1981, McGehee, 1990), energy reserves in the yolk at hatching (Packard *et al.*, 1988), and locomotory ability of hatchlings (Miller *et al.*, 1987).

Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21% decrease to a nine percent increase for relocated nests (Florida Department of Environmental Protection, unpublished data). Comparisons of emergence success between relocated and *in situ* nests have also noted significant variation ranging from a 23% decrease to a five percent increase for relocated nests (DEP, unpublished data). A 1994 Florida Department of Environmental Protection study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01% (range = 7.19% increase to 16.31% decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range = 3.6 to 23.36%) (Meylan, 1995).

2. Equipment

The placement of pipelines and the use of heavy machinery or equipment on the beach during a construction project may also have adverse effects on sea turtles. They can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. The equipment can also create impediments to hatchling sea turtles as they crawl to the ocean.

3. Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjorndal, 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean

(Philibosian, 1976; Mann 1977; DEP, unpublished data). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington, 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

Indirect Effects

Many of the direct effects of beach nourishment may persist over time and become indirect impacts. These indirect effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, future sand migration, and accelerated downdrift erosion.

1. Increased susceptibility to catastrophic events

Nest relocation may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn, 1998; Wyneken *et al.*, 1998).

2. Increased beachfront development

Pilkey and Dixon (1996) state that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also notes that the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami during 1982, investment in new and updated facilities substantially increased tourism there (NRC, 1995). Increased building density immediately adjacent to the beach often resulted as older buildings were replaced by much larger ones that accommodated more beach users. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (NRC, 1990a), and can also result in greater adverse effects due to artificial lighting, as discussed above.

3. Changes in the physical environment

Beach nourishment may result in changes in sand density or compaction, beach shear resistance or hardness, beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson, 1987; Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al.*, 1987; Nelson and Dickerson, 1988a). Significant reductions in nesting success (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer, 1980; Raymond, 1984; Nelson and Dickerson, 1987, Nelson *et al.*, 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson, 1988c). Nelson and Dickerson (1988b) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for ten years or more. These impacts can be minimized by using suitable sand and by tilling compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson, 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to one year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure that project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

4. Escarpment formation

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center, 1984; Nelson *et al.*, 1987). In addition, escarpments may develop on the crenulate beaches located between groins as the beaches equilibrate to their final positions. These escarpments can hamper or prevent access to nesting sites (Nelson and

Blihovde, 1998). Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Species' Response to the Proposed Action

Loggerhead Sea Turtle

Ernest and Martin (1999) conducted a comprehensive study to assess the effects of beach nourishment on loggerhead sea turtle nesting and reproductive success. The following findings illustrate sea turtle responses to and recovery from a sediment disposal project. A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on Control or pre-nourished beaches. This reduction in nesting success was most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the sediment disposal project (e.g., beach profile, sediment grain size, beach compaction, frequency and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on the untilled, hard-packed sands of one treatment area increased significantly relative to control and background conditions. However, in another treatment area, tilling was effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to background levels.

During the first post-construction year, nests on the nourished beaches were deposited significantly farther from both the toe of the dune and the tide line than nests on control beaches. Furthermore, nests were distributed throughout all available habitat and were not clustered near the dune as they were in the Control. As the width of nourished beaches decreased during the second year, among-treatment differences in nest placement diminished. More nests were washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped beaches of the Control. This phenomenon persisted through the second post-construction year monitoring and resulted from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrated to a more natural contour.

Ernest and Martin (1999) found that the principal effect of sediment disposal on sea turtle reproduction was a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin indicate that changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a more natural beach

profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Beach bulldozing and sandbagging (i.e., above the high tide line and not requiring a Federal permit) by private individuals or local groups and governments is another activity that may adversely affect sea turtles using project area beaches. The purpose of the proposed beach disposal is to protect beachfront buildings; however, the effort creates the impression that beachfront property will be protected from time to time by government action. Sandbagging while sea turtle nests are present on action area beaches has the potential to destroy these nests or create artificial barriers that prohibit hatchlings from reaching the shore. In addition, beach bulldozing activities could create escarpments and sandbags could create barriers that hinder females from accessing suitable nesting habitat.

CONCLUSION

After reviewing the current status of the loggerhead and leatherback sea turtle, the environmental baseline for the action area, the effects of the proposed Folly Beach renourishment project and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence the loggerhead or leatherback sea turtle. No critical habitat has been designated for the loggerhead or leatherback sea turtle in South Carolina; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental

to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions or (2) fails to require a contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Loggerhead and Leatherback Sea Turtles

The Service expects incidental take of sea turtles will occur on 28,200 feet of sea turtle nesting beach but will be difficult to detect for the following reasons:

(1) the turtles nest primarily at night and all nests are not found because
[a] natural factors, such as rainfall, wind, and tides may obscure crawls and
[b] human-caused factors, such as pedestrian traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program;
(2) the total number of hatchlings per undiscovered nest is unknown;
(3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown;
(4) an unknown number of females may avoid the project beach and be forced to nest in another area;
(5) lights may misdirect an unknown number of hatchlings and cause death; and
(6) escarpments may form and prevent an unknown number of females from nesting.

However, the level of take of these species can be anticipated by the disturbance of renourishment construction because: (1) turtles nest within the project site; (2) beach nourishment construction will likely occur during a portion of the nesting season; (3) beach nourishment will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting may misdirect nesting females and hatchlings.

The take is expected to be in the form of: (1) destruction of some nests and eggs that may be missed by a nest survey and marking program; (2) destruction of some nests deposited after nest surveys and marking programs are completed; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of

disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches; (5) misdirection of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females due to escarpment formation within the project area; and (7) destruction of nests from escarpment leveling within a nesting season.

Table 2 below represents the level of take that could occur if the reasonable and prudent measures were not implemented. However, due to the implementation of the sea turtle protection measures, we anticipate that the take will not exceed seven percent of the nesting average in the project area. According to Schroeder, 1994, there is an average survey error of seven percent; therefore, there is a possibility that some of the nests on Folly Beach may be missed. This number is not the level of incidental take exempted, because the exact number cannot be predicted nor can the level of incidental take be monitored.

Table 2. The average number of sea turtle nests, based on the best available commercial and scientific information.

SPECIES	NESTS**	TAKE TYPE	CRITICAL HABITAT AFFECTED
Loggerhead sea turtle	37*	Harm/Harassment	None
Leatherback sea turtle	1	Harm/Harassment	None

* This number is the average number of nests within the project area
**Not the parameter that will be monitored for tracking compliance with the Incidental Take Statement

Table 3 below represents the amount of turtle nesting habitat that will be affected by the project.

Table 3. Monitoring the incidental take for the proposed project will be done by amount of habitat affected

SPECIES	CRITICAL HABITAT AFFECTED	HABITAT AFFECTED
Loggerhead sea turtle	None	28,200 feet of nesting
Leatherback sea turtle	None	28,200 feet of nesting

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the loggerhead or leatherback sea turtle. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and minimize impacts of incidental take of the Loggerhead and Leatherback sea turtle:

1. Only beach compatible sand should be deposited on Folly Beach as part of this project.

2. Sea turtle protection measures, as defined in the following terms and conditions, must be employed to minimize the likelihood of take.

3. Immediately after completion of the project and prior to the next three nesting seasons, beach compaction will be monitored.

4. After completion of the project and prior to the next three nesting seasons, monitoring must be conducted to determine if escarpments are present, and escarpments must be leveled as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.

5. The applicant must make sure that contractors conducting the nourishment construction work fully understand the sea turtle protection measures detailed in this incidental take statement.

6. During the sea turtle nesting, construction equipment and materials must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.

7. During the sea turtle nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and misdirecting nesting and/or hatchling sea turtles.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which carry out the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Service's Charleston Field Office, 176 Croghan Spur Road, Suite 200, Charleston, South Carolina 29407 within 60 days of completion of the proposed work. This report will include the status of the species (nesting loggerhead and leatherback sea turtles) addressed in this opinion. This report will include the dates of actual construction activities, names and qualifications of

personnel involved in surveys (sea turtle nests) and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, and hatching success of nests for sea turtles. The report will also include any known impacts, either beneficial or adverse, of the project upon completion of the construction phase and following each maintenance phase, inclusive of the years between each operational event.

2. The dates of actual construction activities and the names and qualifications of personnel involved in species surveys should also be included.

3. The biological and geographical scope of these reports will not be limited to areas of actual disposal and pipeline activity, but each report shall encompass all areas within the project action area.

4. All fill material placed on beaches will be sand that is similar to that already existing at the beach site in both coloration and grain size distribution. All such fill material must be free of construction debris, rocks, organic materials, or other foreign matter and will generally not contain, on average, greater than ten percent fines (i.e., silt and clay; passing the # 200 sieve) and must not contain, on average, greater than five percent coarse gravel or cobble, exclusive of shell material (retained by the # 4 sieve).

5. Daily early morning surveys for sea turtle nests will be required if any portion of the beach nourishment project occurs during the period from May 1 to November 30. Nesting surveys must be initiated 65 days prior to nourishment activities or by May 1, whichever is later. Nesting surveys must continue through the end of the project or through November 30, whichever is earlier. If nests are constructed in areas where they may be affected by beach nourishment activities, eggs must be relocated per the following requirements.

   5a. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must be trained by SCDNR and have a valid SCDNR permit. Nesting surveys must be conducted daily between sunrise and 9 a.m. Surveys must be performed in such a manner so as to make sure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures. At a minimum, the following protocol must be followed:
   - The number of nests, in situ and relocated, as well as false crawls, should be counted and recorded on a daily basis.
   - Methods used for marking and screening nests should also be noted.
   - The dates of first and last nesting should be recorded.
   - Emergence activity should be calculated including duration of each nest, date of first emergence, date of evaluation (inventory).
   - Percent of hatching and nest success rate of in situ and relocated nests.

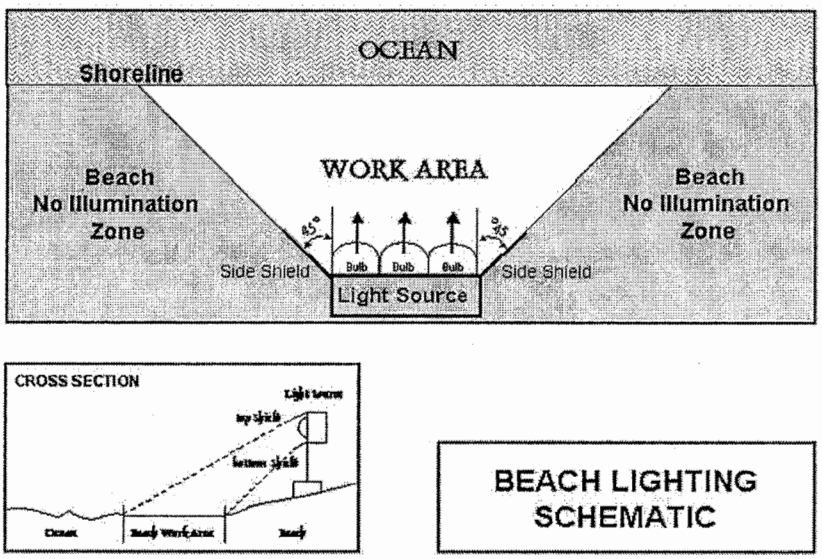
- Information should also be gathered on predation, erosion, and lighting disorientation problems.

5b. Only those nests that may be affected by beach nourishment activities will be relocated. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities must cease when beach nourishment activities no longer threaten nests.

6. From May 1 through November 30, staging areas for construction equipment must be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes that are placed on the beach must be located as far landward as possible while still allowing for heavy equipment traffic on the landward side of the pipe without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes must be off the beach to maximum extent practicable. Temporary storage of pipes on the beach must be in such a manner as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. From May 1 to November 30, direct lighting of the beach and near shore waters must be limited to the immediate construction area and must comply with safety requirements. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters' surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting plants must be reduced to the minimum standard required by OSHA for general construction areas, in order not to misdirect sea turtles. Shields must be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (see figure below).

Figure 1. Lighting Diagram



8. No permanent exterior lighting will be installed in association with this construction project.

9. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project must be notified so the eggs can be moved to a suitable relocation site.

10. Upon locating a sea turtle adult, hatchling, or egg harmed or destroyed as a direct or indirect result of the project, initial notification must be made to the Service Law Enforcement Office at (843) 727-4707 ext. 28 or (843) 297-9829. Additional notification must also be made to the Charleston Service Field Office at 843-727-4707. Care should be taken in handling injured turtles or eggs to make sure that effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

11. Immediately after completion of the beach nourishment project and prior to May 1 for three subsequent years, sand compaction must be monitored in the area of restoration following a protocol agreed to by the Service, the State regulatory agency, and the applicant. At a minimum, the protocol provided under 11a and 11b below must be followed. If required, the area must be tilled to a depth of 24 inches. All tilling activity must be completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. An annual summary of compaction surveys and the actions taken must be submitted to the Service. (NOTE: The requirement for

compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Also, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.)

11a. Compaction sampling stations shall be located at 500 feet intervals along the project area. One station must be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station must be midway between the dune line and the high water line (normal wrack line).

At each station, the cone penetrometer must be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to make sure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lay over less compact layers. Replicates must be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

11b. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled immediately prior to May 1. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

12. Visual surveys for escarpments along the project area must be made immediately after completion of the beach nourishment and prior to May 1 for three subsequent years. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by May 1. If the project is completed during sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes the methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the Service. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the beach.)

13. A 100 foot buffer must remain around any sea turtle attempting to nest in the project area and all heavy equipment must be shut down until the turtle returns to the ocean.

14. All construction personnel must complete and sign-off on a training session provided by the Service before beginning work on the project.

15. Project initiation will begin at the north end of Folly Beach where the pipeline will come ashore at the washout and proceed north and south from that point.

16. The Corps will purchase all supplies and provide the labor necessary to construct a hatchery for the Folly Turtle Crew if needed. Such hatchery, if needed, will be fenced, locked, and patrolled by staff of the town of Folly Beach.

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Fish and Wildlife Service Law Enforcement Office at (843) 727-4707 ext. 211 or (843) 297-9829. Additional notification must be made to the Fish and Wildlife Services Field Office at (843) 727-4707 ext. 204. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that the sea turtles that nest, are young or as eggs on 28,200 feet of beach will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

For the benefit of the loggerhead and leatherback sea turtle, the Service recommends the following conservation recommendations:

1. Construction activities for similar future projects should be planned to take place outside the sea turtle nesting and hatching season.

2. Surveys for nesting success of sea turtles should be continued for a minimum of three years following project construction to determine whether sea turtle nesting success has been adversely impacted.

3. More in-depth research should be conducted to assess the potential of the beach nourishment to impact nesting sea turtles, nest incubation, and movement of hatchlings from the nest to the ocean.

4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

5. Fire ant eradication on the beaches of the town of Folly Beach should be implemented and monitored for success in order to reduce turtle hatchling mortality.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the conservation recommendations carried out.

This concludes formal consultation on the action outlined in your request for formal consultation on the Folly Beach re-nourishment project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Corps involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take, to be monitored by the nourishment of 28,200 feet of beach, is exceeded; (2) new information reveals effects of the Corps' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the Corps' action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

For this biological opinion the incidental take would be exceeded when the beach nourishment of 28,200 feet of beach on which the incidental take of an undetermined number of young or eggs of sea turtles have been exempted from the prohibitions of section 9 by this opinion. The Service appreciates the cooperation of the Corps during this consultation. We would like to continue

working with you and your staff regarding this project for Folly Beach renourishment. For further coordination please contact Melissa Bimbi at (843) 727-4707, ext. 204. In future correspondence concerning the project, please reference FWS Log No 4-6-03-F-111.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/MKB

cc: USFWS, Atlanta, GA (Joe Johnston) (via email)
USFWS, Jacksonville, FL (Sandy MacPherson)
SCDNR, Charleston, SC (Sally Murphy)
FEMA, U.S. Department of Homeland Security, Region IV, Atlanta, GA

LITERATURE CITED

Ackerman, R. A. 1980. Physiological and ecological aspects of gas exchange by sea turtle eggs. American Zoologist 20:575-583.

Boettcher, R. 1998. Personal communication. Biologist. North Carolina Wildlife Resources Commission. Marshallberg, North Carolina.

Bowen, B.W. 1994. Letter dated November 17, 1994, to Sandy MacPherson, National Sea Turtle Coordinator, U.S. Fish and Wildlife Service, Jacksonville, Florida. University of Florida. Gainesville, Florida.

Bowen, B.W. 1995. Letter dated October 26, 1995, to Sandy MacPherson, National Sea Turtle Coordinator, U.S. Fish and Wildlife Service, Jacksonville, Florida. University of Florida. Gainesville, Florida.

Bowen, B., J. C. Avise, J. I. Richardson, A. B. Meylan, D. Margaritoulis, and S. R. Hopkins-Murphy. 1993. Population structure of loggerhead turtles (Caretta caretta) in the northwestern Atlantic Ocean and Mediterranean Sea. Conservation Biology 7:834-844.

Coastal Engineering Research Center. 1984. Shore protection manual, volumes I and II. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Dean, C. 1999. Against the tide: The battle for America's beaches. Columbia University Press, New York, NY.

Dickerson, D.D. and D.A. Nelson. 1989. Recent results on hatchling orientation responses to light wavelengths and intensities. Pages 41-43 *in* Eckert, S.A., K.L. Eckert, and T.H. Richardson (compliers). Proceedings of the 9th Annual Workshop on Sea Turtle Conservation and Biology. NOAA Technical Memorandum NMFS-SEFC-232.

Dodd, C. K., Jr. 1988. Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758). U.S. Fish and Wildlife Service, Biological Report 88(14).

Ehrhart, L. M. 1989. Status report of the loggerhead turtle. Pp. 122-139 in Proceedings of the Second Western Atlantic Turtle Symposium, L. Ogren et al., eds. NOAA Technical Memorandum NMFS-SEFC-226.

Encalada, S. E., K. A. Bjorndal, A. B. Bolten, J. C. Zurita, B. Schroeder, E. Possardt, C. J. Sears, and B.W. Bowen. 1998. Population structure of loggerhead turtle (*Caretta caretta*) nesting colonies in the Atlantic and Mediterranean, as inferred from mitochondrial DNA control region sequences. Marine Biology 130:567-575.

Ernest, R. G., and R. E. Martin. 1999. Martin County beach nourishment project: Sea turtle monitoring studies. 1997 Annual Report and Final Assessment. Unpublished report to Florida Department of Environmental Protection.

Fletemeyer, J. 1980. Sea turtle monitoring project. Unpublished report to Broward County Environmental Quality Control Board, FL.

Glenn, L. 1998. The consequences of human manipulation of the coastal environment on hatchling loggerhead sea turtles (*Caretta caretta*, L). Pp. 58-59 in Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation, R. Byles and Y. Fernandez, compilers. NOAA Technical Memorandum NMFS-SEFSC-412.

Hopkins, S. R., and J. I. Richardson (eds.). 1984. Recovery plan for marine turtles. National Marine Fisheries Service, St. Petersburg, FL.

LeBuff, C.R., Jr. 1990. The loggerhead turtle in the eastern Gulf of Mexico. Caretta Research, Inc.; Sanibel Island, Florida.

Lenarz, M. S., N. B. Frazer, M. S. Ralston, and R. B. Mast. 1981. Seven nests recorded for loggerhead turtle (*Caretta caretta*) in one season. Herpetological Review 12:9.

Limpus, C. J., V. Baker, and J. D. Miller. 1979. Movement induced mortality of loggerhead eggs. Herpetologica 35:335-338.

Mann, T.M. 1977. Impact of developed coastline on nesting and hatchling sea turtles in southeastern Florida. M.S. thesis. Florida Atlantic University, Boca Raton, Florida.

Martin, E. 1992. Personal communication. Biologist. Ecological Associates, Inc. Jensen Beach, Florida.

McDonald, D.L. and P.H. Dutton. 1996. Use of PIT tags and photoidentification to revise remigration estimates of leatherback turtles (*Dermochelys coriacea*) nesting in St. Croix, U.S. Virgin Islands, 1979-1995. Chelonian Conservation and Biology 2(2):148-152.

McGehee, M. A. 1990. Effects of moisture on eggs and hatchlings of loggerhead sea turtles (*Caretta caretta*). Herpetologica 46:251-258.

Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the State of Florida 1979-1992. Florida Marine Research Publications 52:1-51.

Miller, K., G. C. Packard, and M. J. Packard. 1987. Hydric conditions during incubation influence locomotor performance of hatchling snapping turtles. Journal of Experimental Biology 127:401-412.

Mrosovsky, N. and A. Carr. 1967. Preference for light of short wavelengths in hatchling green sea turtles (*Chelonia mydas*), tested on their natural nesting beaches. Behavior 28:217-231.

Mrosovsky, N. and S.J. Shettleworth. 1968. Wavelength preferences and brightness cues in water finding behavior of sea turtles. Behavior 32:211-257.

Murphy, S. 1996. Personal communication. Biologist. South Carolina Department of Natural Resources. Charleston, South Carolina.

Murphy, T. M., and S. R. Hopkins. 1984. Aerial and ground surveys of marine turtle nesting beaches in the southeast region. Final report to NMFS-SEFC.

[NMFS and USFWS] National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991b. Recovery plan for U.S. population of loggerhead turtle (*Caretta caretta*). National Marine Fisheries Service, Washington, DC.

[NMFS and USFWS] National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1992. Recovery plan for leatherback turtles (*Dermochelys coriacea*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C.

[NRC] National Research Council. 1990a. Decline of the sea turtles: Causes and prevention. National Academy Press, Washington, DC.

[NRC] National Research Council. 1995. Beach nourishment and protection. National Academy Press, Washington, DC.

Nelson, D.A. 1987. The use of tilling to soften nourished beach sand consistency for nesting sea turtles. Unpublished report of the U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Nelson, D. A. 1988. Life history and environmental requirements of loggerhead turtles. U.S. Fish and Wildlife Service Biological Report 88(23). U.S. Army Corps of Engineers TR EL-86-2 (Rev.).

Nelson, D.A. and B. Blihovde. 1998. Nesting sea turtle response to beach scarps. Page 113 *in* Byles, R., and Y. Fernandez (compilers). Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-412.

Nelson, D. A., and D. D. Dickerson. 1987. Correlation of loggerhead turtle nest digging times with beach sand consistency. [Abstract]. Seventh Annual Workshop on Sea Turtle Conservation and Biology.

Nelson, D. A., and D. D. Dickerson. 1988a. Effects of beach nourishment on sea turtles. Proceedings of the Beach Preservation Technology Conference '88. Florida Shore & Beach Preservation Association, Inc., Tallahassee, FL.

Nelson, D. A. and D. D. Dickerson. 1988b. Response of nesting sea turtles to tilling of compacted beaches, Jupiter Island, Florida. Unpublished report. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

Nelson, D.A. and D.D. Dickerson. 1988c. Response of nesting sea turtles to tilling of compacted beaches, Jupiter Island, Florida. Unpublished report of the U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Nelson, D.A., K. Mauck, and J. Fletemeyer. 1987. Physical effects of beach nourishment on sea turtle nesting, Delray Beach, Florida. Technical Report EL-87-15. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Packard, M. J., and G. C. Packard. 1986. Effect of water balance on growth and calcium mobilization of embryonic painted turtles (*Chrysemys picta*). Physiological Zoology 59(4):398-405.

Packard, G. C., M. J. Packard, and T. J. Boardman. 1984. Influence of hydration of the environment on the pattern of nitrogen excretion by embryonic snapping turtles (*Chelydra serpentina*). Journal of Experimental Biology 108:195-204.

Packard, G. C., M. J. Packard, and W. H. N. Gutzke. 1985. Influence of hydration of the environment on eggs and embryos of the terrestrial turtle Terrapene ornata. Physiological Zoology 58:564-575.

Packard, G. C., M. J. Packard, T. J. Boardman, and M. D. Ashen. 1981. Possible adaptive value of water exchange in flexible-shelled eggs of turtles. Science 213:471-473.

Packard, G. C., M. J. Packard, K. Miller, and T. J. Boardman. 1988. Effects of temperature and moisture during incubation on carcass composition of hatchling snapping turtles (*Chelydra serpentina*). Journal of Comparative Physiology B. 158:117-125.

Parmenter, C. J. 1980. Incubation of the eggs of the green sea turtle, *Chelonia mydas*, in Torres Strait, Australia: The effect of movement on hatchability. Australian Wildlife Research 7:487-491.

Pearce, A.F. 2001. Contrasting population structure of the loggerhead turtle (*Caretta caretta*) using mitochondrial and nuclear DNA markers. M.S. thesis. University of Florida, Gainesville, Florida.

Philbosian, R. 1976. Disorientation of hawksbill turtle hatchlings, Eretmochelys imbricata, by stadium lights. Copeia 4:824.

Pilkey, O. H. and K. L. Dixon. 1996. The Corps and the Shore. Island Press, Washington, DC.

Pritchard, P.C.H. 1992. Leatherback turtle *Dermochelys coriacea*. Pages 214-218 *in* Moler, P.E. (editor). Rare and Endangered Biota of Florida, Volume III. University Press of Florida; Gainesville, Florida.

Raymond, P. W. 1984. The effects of beach restoration on marine turtles nesting in south Brevard County, Florida. M.S. thesis, University of Central Florida, FL.

Richardson, J.I. and T.H. Richardson. 1982. An experimental population model for the loggerhead sea turtle (*Caretta caretta*). Pages 165-176 *in* Bjorndal, K.A. (editor). Biology and Conservation of Sea Turtles. Smithsonian Institution Press; Washington, D.C.

Ross, J. P. 1982. Historical decline of loggerhead, ridley, and leatherback sea turtles. Pp. 189-195 in Biology and Conservation of Sea Turtles, K. A. Bjorndal, ed. Smithsonian Institution Press,Washington, D.C.

Schroeder, B. A. 1994. Florida index nesting beach surveys: Are we on the right track? Pp. 132-133 in Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation, K.A. Bjorndal et al., compilers. NOAA Technical Memorandum NMFS-SEFSC-351.

Spotila, J. R., E. J. Standora, S. J. Morreale, G. J. Ruiz, and C. Puccia. 1983. Methodology for the study of temperature related phenomena affecting sea turtle eggs. U.S. Fish and Wildlife Service Endangered Species Report 11.

Spotila, J.R., A.E. Dunham, A.J. Leslie, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 1996. Worldwide population decline of *Dermochelys coriacea*: are leatherback turtles going extinct? Chelonian Conservation Biology 2(2):290-222.

Talbert, O. R., Jr., S. E. Stancyk, J. M. Dean, and J. M. Will. 1980. Nesting activity of the loggerhead turtle (*Caretta caretta*) in South Carolina I: A rookery in transition. Copeia 1980:709-718.

Turtle Expert Working Group. 1998. An assessment of the Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409.

Turtle Expert Working Group. 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-444.

Winn, B. 1996. Personal communication. Biologist. Georgia Department of Natural Resources. Brunswick, Georgia.

Witherington, B. E. 1992. Behavioral responses of nesting sea turtles to artificial lighting. Herpetologica 48:31-39.

Witherington, B.E. and K.A. Bjorndal. 1991. Influences of artificial lighting on the seaward orientation of hatchling loggerhead turtles (*Caretta caretta*). Biological Conservation 55:139-149.

Wyneken, J., L. DeCarlo, L. Glenn, M. Salmon, D. Davidson, S. Weege., and L. Fisher. 1998. On the consequences of timing, location and fish for hatchlings leaving open beach hatcheries. Pp. 155-156 in Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation, R. Byles and Y. Fernandez, compilers. NOAA

Zug, G.R. and J.F. Parham. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testidines: Dermochelyidae): a skeletochronological analysis. Chelonian Conservation Biology 2(2):224-249.

Appendix 2

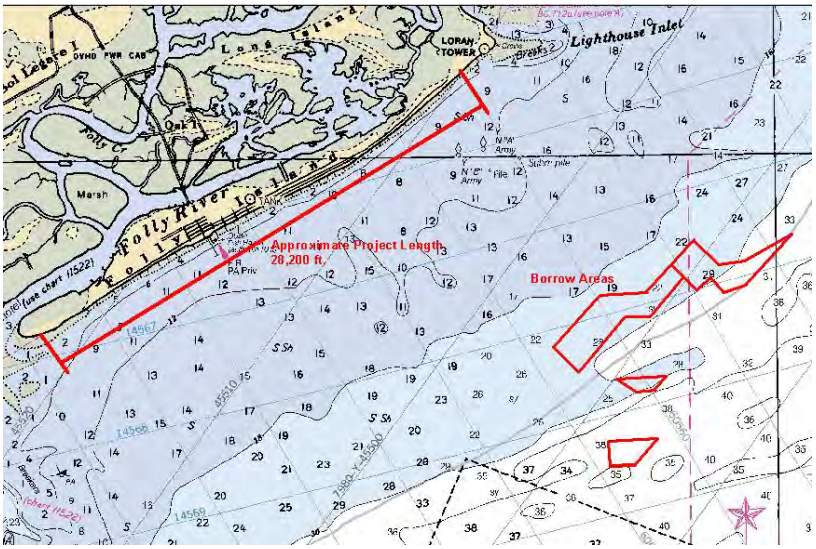
Geo-technical Report

DRAFT REPORT

Geotechnical Report

Folly Beach Storm Protection Project
Folly Beach, South Carolina

Search for Beach Compatible Sands
Offshore Borrow Area Study



September 30, 2004

Folly Beach Storm Damage Protection Project

Search for Compatible Sands
Offshore Borrow Area Study

Introduction

The US Army Corps of Engineers, Charleston District (COE) has completed the Geotechnical Offshore Investigation at Folly Beach, South Carolina. This report presents the results of a geotechnical exploration for beach quality sands offshore of Folly Beach. Figure 1 shows the location of the vibracores with respect to the Folly Beach shoreline. The vibracore locations on this figure include vibracores performed by Coastal Science and Engineering, LLC and the US Army Corps of Engineers, as detailed in the following paragraphs. The investigation concluded that borrow material is available in four potential borrow areas (labeled Area A, B, C and D in Figure 2) containing beach compatible sand of significant depth to excavate with conventional dredging equipment. Figure 2 also shows the approximate bathymetry of the ocean bottom based on the depth of water at the vibracore locations, corrected for tidal variations.

Within these borrow areas suitable sands do exist, however, in variable layer thickness. Isopachs (contours of equal thickness) of the sand deposits are shown on Figure 3. The thickness of the sand layer was obtained from the individual vibracores, and the computer program “InRoads” was used to extrapolate between borings to contour the layer thickness. The sands encountered in the potential borrow areas contain more shell material than previously sampled on the beach; the borrow materials are also coarser, and more well graded than the native materials. Quantity estimates were made for the four areas using “InRoads”. These are shown on Figure 4. A caution regarding the quantities presented is in order. The quantities are based on a linear interpolation of depth of suitable sand between borings, where thickness of suitable sand layer information is available. The thickness of the sand layer between borings (made on 1000’ to 2000’ centers) is bound to vary. Depending on the magnitude of the variation from the linear assumption, there may be significantly more or less sand available. Additional borings split-spacing existing borings is the only way to refine the quantity calculations. Figure 4 also shows the Northings and Eastings on the corners of the proposed borrow areas.

The quantities reported are maximum quantities based on excavating all the material available within the boundaries of the borrow area, irrespective of the top or bottom sand layer elevation. The capability of the contractor to remove the sand between variable elevations without excavating unsuitable underlying material will determine the actual quantity of sand available. One final point on quantities, it may be possible to increase the available quantity by including some vibracore locations that were deemed marginally satisfactory based on median grain size, D_{50} greater than or equal to 0.18 mm. A lower D_{50} was not considered, but its consideration could impact

boundary areas and thereby increase quantities, though it is not recommended that the value drop below a mean value of 0.15 mm.

Native Beach Sands

Finding adequate sources of sand that are compatible with native beach sands is at the heart of the borrow area investigations. A borrow area that is readily accessible, contains sufficient quantities of compatible materials, and can be quarried cost-effectively is the ideal source for beach sands. Native beach sand samples for Folly Beach were not collected for this study. Instead, original data presented in the 1991 General Design Memorandum were used to determine a compatible D_{50}. The table below presents beach sand data collected from the previous study; near shore material was not used in the computation for a beach compatible D_{50}.

Table 1

Sample	D_{50}	D_{84}	D_{16}	PHI D_{50}	PHI D_{84}	PHI D_{16}	mean	mm	difference	%difference
5+00 N1	0.18	0.13	0.19	2.47	2.94	2.40	2.60	0.16	-0.02	-9.47
5+00 N2	0.18	0.11	0.22	2.47	3.18	2.18	2.61	0.16	-0.02	-10.22
5+00N3	0.17	0.12	0.2	2.56	3.06	2.32	2.65	0.16	-0.01	-6.39
30+00 N1	0.18	0.14	0.2	2.47	2.84	2.32	2.54	0.17	-0.01	-4.99
30+00 N2	0.19	0.13	0.22	2.40	2.94	2.18	2.51	0.18	-0.01	-8.07
30+00 N3	0.18	0.13	0.21	2.47	2.94	2.25	2.56	0.17	-0.01	-5.88
59+20 N1	0.13	0.1	0.14	2.94	3.32	2.84	3.03	0.12	-0.01	-6.48
59+20 N2	0.17	0.13	0.22	2.56	2.94	2.18	2.56	0.17	0.00	-0.35
59+20 N3	0.19	0.15	0.26	2.40	2.74	1.94	2.36	0.19	0.00	2.54
80+00 N1	0.18	0.14	0.2	2.47	2.84	2.32	2.54	0.17	-0.01	-4.99
80+00 N2	0.18	0.14	0.22	2.47	2.84	2.18	2.50	0.18	0.00	-1.70
80+00 N3	0.16	0.12	0.21	2.64	3.06	2.25	2.65	0.16	0.00	-0.53
105+00 N1	0.18	0.13	0.2	2.47	2.94	2.32	2.58	0.17	-0.01	-7.61
105+00 N2	0.16	0.12	0.2	2.64	3.06	2.32	2.67	0.16	0.00	-2.17
105+00 N3	0.16	0.12	0.19	2.64	3.06	2.40	2.70	0.15	-0.01	-3.94
135+00 N1	0.17	0.14	0.2	2.56	2.84	2.32	2.57	0.17	0.00	-1.06
135+00 N2	0.18	0.14	0.19	2.47	2.84	2.40	2.57	0.17	-0.01	-6.80
135+00 N3	0.17	0.12	0.2	2.56	3.06	2.32	2.65	0.16	-0.01	-6.39
160+00 N1	0.22	0.18	0.23	2.18	2.47	2.12	2.26	0.21	-0.01	-5.35
160+00 N2	0.17	0.13	0.2	2.56	2.94	2.32	2.61	0.16	-0.01	-3.59
160+00 N3	0.18	0.14	0.28	2.47	2.84	1.84	2.38	0.19	0.01	6.15
179+71 N1	0.19	0.17	0.22	2.40	2.56	2.18	2.38	0.19	0.00	1.17
179+71 N2	0.21	0.17	0.27	2.25	2.56	1.89	2.23	0.21	0.00	1.32
179+71 N3	0.18	0.16	0.19	2.47	2.64	2.40	2.50	0.18	0.00	-2.15
5+00 S1*										
5+00 S2	0.16	0.12	0.2	2.64	3.06	2.32	2.67	0.16	0.00	-2.17
5+00 S3	0.2	0.14	0.48	2.32	2.84	1.06	2.07	0.24	0.04	15.88
35+00 S1	0.17	0.13	0.19	2.56	2.94	2.40	2.63	0.16	-0.01	-5.37
35+00 S2	0.17	0.13	0.19	2.56	2.94	2.40	2.63	0.16	-0.01	-5.37
35+00 S3	0.17	0.13	0.26	2.56	2.94	1.94	2.48	0.18	0.01	5.09
65+00 S1	0.18	0.14	0.2	2.47	2.84	2.32	2.54	0.17	-0.01	-4.99
65+00 S2	0.17	0.12	0.23	2.56	3.06	2.12	2.58	0.17	0.00	-1.55

65+00 S3	0.14	0.12	0.19	2.84	3.06	2.40	2.76	0.15	0.01	4.92
75+00 S1	0.16	0.12	0.2	2.64	3.06	2.32	2.67	0.16	0.00	-2.17
75+00 S2	0.18	0.14	0.2	2.47	2.84	2.32	2.54	0.17	-0.01	-4.99
75+00 S3	0.18	0.13	0.29	2.47	2.94	1.79	2.40	0.19	0.01	4.92
90+00 S1	0.18	0.15	0.19	2.47	2.74	2.40	2.54	0.17	-0.01	-4.37
90+00 S2	0.18	0.15	0.2	2.47	2.74	2.32	2.51	0.18	0.00	-2.60
90+00 S3	0.17	0.12	0.22	2.56	3.06	2.18	2.60	0.16	-0.01	-3.06
110+00 S1	0.15	0.12	0.19	2.74	3.06	2.40	2.73	0.15	0.00	0.44
110+00 S2	0.17	0.13	0.2	2.56	2.94	2.32	2.61	0.16	-0.01	-3.59
110+00 S3	0.15	0.12	0.23	2.74	3.06	2.12	2.64	0.16	0.01	6.58
Average	0.17	0.13	0.22	2.53	2.92	2.23	2.56	0.17	0.00	-2.18

*No sample taken at this location

The analysis above indicates that a mean PHI of 2.56, corresponding to a mean grain diameter of 0.17 mm was obtained from the samples collected from the upper beach profile (above mean low water). Incorporation of the near shore grain size distributions results in a finer composite mean grain diameter of 0.149 mm. Dr. Tim Kana, in his 2002 report to the City of Folly Beach, indicated that the mean grain diameter at two transects on the beach was 0.185 mm. The data for this determination came from elevations between the fore dune and low water. Considering the fineness of the offshore materials and the effect on the erosion rates, a larger mean grain size was used for the compatibility criteria. It was determined to use a mean grain size equal to 0.17 mm. The actual comparisons were done based on the median grain diameter, D_{50}, using a D_{50} of 0.18 mm, as this could be accomplished much more rapidly. Therefore, as a first estimate of available borrow, vibracore samples with a median grain size, D_{50}, of 0.18 mm or greater were considered as potential sources of compatible sand for Folly Beach.

Exploration Program

The first step in the sand search was accomplished by identifying potential borrow locations using seismic surveying techniques (side scan sonar and sub-bottom profiling). The United States Geological Service (USGS) performed this work under contract to the Charleston District. The equipment, procedures, results and recommendations of the survey are presented in Appendix A. The primary value of the seismic survey lies in the hope that the interpretation of the data will pinpoint areas of potential sand bearing units within the very large offshore area without having to physically sample all areas. As part of the scope of services provided by the USGS, they identified 45 proposed vibracore locations where the potential for compatible beach sand was the greatest, based on their interpretation of the seismic profiles. A potential sand deposit still needs to be sampled though, because the seismic record can only give a vague idea of the material present; it cannot distinguish between grain sizes within a coarse fraction, nor can it know the amount of fines present in a grain size distribution, or its mineralogical composition. USGS proposed three priority areas for future sampling, as shown in Figure 5. With this information in hand, the City of Folly Beach hired Coastal Science and Engineering, LLC. to perform preliminary vibracoring, while the Charleston District waited for project funding. The City of Folly Beach shared the results of that investigation with the USACE. The results of CSE's study are attached in Appendix B. CSE's vibracore program only sampled in 10 of the 45 vibracore locations recommended by USGS, but those 10 vibracores were preformed in the three priority areas, Figure 6. The results of CSE's limited study indicated that priority areas 1 and 2 did not contain beach quality sand; it was either too fine (D_{50} was smaller than the native beach soils), or the sands contained more than 10% silt and clay size soils. However, Priority Area 3 showed some promise regarding beach compatible sands. Based on the preliminary vibracoring effort by CSE, and in consultation with Tim Kana, the USACE developed a new vibracoring plan that included 36 vibracores located on a grid pattern approximately 2000' on center in Priority Area 3. The locations of the Phase 1 vibracores are shown on Figure 7. The Phase 1 final report was completed in October 2003 under contract to Gulf Engineers and Consultants, Inc. The phase 1 vibracores were split, photographed, sampled on specified intervals and tested in the soils laboratory for grain size distribution and percent carbonate. The Phase 1 vibracore logs and results of laboratory testing are presented in Appendix C. The results of the laboratory testing were then compared to the native beach sands for compatibility. A compatibility criteria was established consisting of: median grain diameter of 0.18 mm, less than 10% passing the No. 200 standard sieve, and a carbonate content of less than 35%. This criterion was compared to the vibracore sample test results to determine which vibracores contained beach compatible sands. A further refinement in the decision analysis included the thickness of the sand layer, and the practicality of excavating the materials with conventional dredging equipment. Once a vibracore was determined to have suitable sand of sufficient thickness, it was compared to surrounding vibracores to see if the area were large enough for production purposes.

The results of that analysis concluded that some areas contained beach compatible sands, however, the 2000 ft. grid spacing was too coarse to permit quantity

determinations. Additionally, some areas on the perimeter of Phase 1 vibracores showed promise, and those areas would be sampled in Phase 2. The second phase exploration program was designed to split-space the Phase 1 vibracores, and prove other areas on the perimeter of the initial borrow field investigation. The second phase exploration program consisted of 55 additional vibracores sampled to 10' depth. Figure 8 shows the locations of the second phase vibracores (FB-04-37 through FB-04-91). The Phase 2 vibracoring and laboratory testing was contracted to GEC, Inc, and the report on Phase 2 was completed in May, 2004. The Phase 2 vibracore logs and results of laboratory testing are presented in Appendix D.

The same compatibility criteria used to select suitable sand from the Phase 1 vibracoring study was used for the Phase 2 vibracores. The results of applying these criteria to Phase 1, Phase 2 and CSE vibracore results are shown in Table 2. Color-coding the vibracores aids in quickly identifying which locations contain suitable sand, or sufficient thickness of sand layer, for beach nourishment. The color code is: Green represents compatible sand in sufficient quantity (Satisfactory); Yellow represents marginal compatibility due to not meeting one criteria, usually too small median grain size, or too shallow thickness of fill (Marginal); and Red indicates more than one critical criteria not met (Unsatisfactory).

Table 2

Folly Beach Vibracoring

	Easting	Northing	Corr. El.	Elev. Bott. Sand	Depth Sand ft.	% fines	Remarks
CSE Cores							
FB-01	2320799.48	277305.77	-25	-25	0		
FB-04	2329507.34	282148.95	-27.7	-27.7	0		
FB-08	2336807.34	287871.02	-20.5	-20.5	0		
FB-11	2352976.03	298712.98	-21.2	-24.2	3		
FB-12	2338944.23	288166.59	-23.7	-23.7	0		
FB-15	2340306.11	287987.08	-26	-26	0		
FB-18	2360263.51	301214.26	-34.5	-42	7.5		
FB-19	2343844.84	289153.04	-26.1	-29.1	3		d_{50} too small = 0.15
FB-20	2356055.33	297237.35	-31.9	-37.9	6		
FB-25	2362093.14	300016.15	-34.9	-39.9	5		
FB-26	2350988.30	291480.81	-25.6	-33.1	7.5		
Phase 1							
FB-03-01	2346367.85	291195.14	-31.61	-37.6	6	7	
FB-03-02	2347878.23	289855.34	-29.1	-34.1	5	3	
FB-03-03	2349404.00	288549.78	-36.64	-42.6	6	9	
FB-03-04	2350924.93	287234.49	-39.46	-47.5	8	11	
FB-03-05	2347688.97	292672.81	-32.36	-33.4	1	9	
FB-03-06	2349207.37	291357.71	-30.37	-31.4	1	8	
FB-03-07	2350726.24	290024.80	-37.63	-37.6	0		cemented
FB-03-08	2352217.93	288730.83	-35.99	-41	5	4	
FB-03-09	2348981.33	294215.10	-26.83	-31.8	5	5	
FB-03-10	2350544.10	292876.97	-34.21	-35.7	1.5	6	

FB-03-11	2352052.19	291585.97	-27.04	-35	8	2	
FB-03-12	2353555.22	290256.71	-36.1	-36.1	0		cemented
FB-03-13	2350339.59	295712.39	-28.36	-37.4	9	4	
FB-03-14	2351835.71	294400.27	-35.11	-35.1	0		<0.18mm
FB-03-15	2353352.74	293082.99	-29.84	-32.8	3	2	
FB-03-16	2354873.94	291753.15	-33.8	-35.8	2	3	
FB-03-17	2351664.09	297230.41	-24.08	-25.6	1.5	8	high silt content 1.5' - 3.2'; good sand 5' - 10'
FB-03-18	2353177.03	295894.88	-30.25	-35.3	5	5	
FB-03-19	2354684.69	294583.63	-30.99	-35	4	9	
FB-03-20	2356192.48	293272.44	-35.18	-35.2	0		cemented
FB-03-21	2352992.00	298768.87	-24.93	-29.9	5	2	
FB-03-22	2354489.04	297407.30	-31.14	-39.1	8	4	
FB-03-23	2355991.56	296096.05	-32.12	-32.1	0		too fine in upper 3'
FB-03-24	2357504.46	294784.99	-34.75	-34.8	0		no recovery
FB-03-25	2354333.82	300227.36	-30.04	-32	2	2	
FB-03-26	2355830.52	298891.84	-34.92	-42.4	7.5	3	
FB-03-27	2357303.62	297590.39	-33.03	-37.5	4.5	3	
FB-03-28	2358816.58	296273.33	-35.33	-36.3	1	3	
FB-03-29	2355638.14	301722.21	-26.96	-27	0		too fine for 10'
FB-03-30	2357150.50	300417.19	-33.93	-33.9	0		too fine
FB-03-31	2358645.28	299084.21	-36.06	-40.6	4.5	2	
FB-03-32	2360148.96	297774.08	-35.6	-35.6	0		high % of fines
FB-03-33	2356963.38	303225.36	-26.15	-27.2	1	1	underlain by too fine sand
FB-03-34	2358433.86	301942.92	-33.04	-33	0		too fine; too high %200
FB-03-35	2359954.41	300603.44	-37.14	-41.6	4.5	10	Underlain by silt
FB-03-36	2361467.69	299273.16	-39.24	-40.2	1	2	Underlain by >>10% fines
Phase 2							
FB-04-37	2349522.10	287154.30	-39.02	-42.1	3.1	4	
FB-04-38	2348015.20	288465.30	-37.86	-37.9	0		>>%fines
FB-04-39	2346507.20	289792.50	-26.13	-29.6	3.5	3	d_{50} too small
FB-04-40	2345768.60	290430.00	-30.94	-30.9	0		>>%fines; d_{50} too small
FB-04-41	2345002.70	291104.70	-29.72	-29.7	0		>>%fines; d_{50} too small
FB-04-42	2350170.00	287943.20	-36.12	-38.6	2.5	2	underlain by cemented sand >>%fines
FB-04-43	2348650.70	289203.10	-36.8	-36.8	0		>>%fines; underlain by cemented sand
FB-04-44	2347152.00	290536.60	-29.65	-29.7	0		>>%fines; d_{50} too small
FB-04-45	2345620.30	291888.90	-29.83	-37.8	8	9	d_{50} small = 0.17
FB-04-46	2344769.20	292550.80	-28.5	-35	6.5	7	d_{50} too small = 0.16
FB-04-47	2349330.80	289970.90	-35.83	-40.8	5	10	>>%fines; d_{50} too small
FB-04-48	2348552.80	290612.70	-29.49	-33.5	4	4	d_{50} too small
FB-04-49	2347824.00	291289.90	-32.43	-32.4	0		>>%fines; d_{50} too small
FB-04-50	2347068.90	291980.40	-32.06	-40.1	8	10	d_{50} too small = 0.16
FB-04-51	2346272.80	292625.40	30.53	30.53	0		>>%fines
FB-04-52	2348479.10	292049.40	-33.25	-33.3	0		>>%fines; d_{50} too small
FB-04-53	2346222.80	294026.10	-26.96	-34.5	7.5	5	
FB-04-54	2349892.00	292130.20	-34.46	-40.7	6.25	8	surface d_{50} and %fines outside criteria
FB-04-55	2349137.20	292812.60	-34.07	-34.1	0		>>%fines
FB-04-56	2348362.50	293443.40	-33.55	-38.1	4.5	6	overlies cemented sand
FB-04-57	2347611.20	294106.40	-27.89	-36.9	9	5	d_{50} too small = 0.16
FB-04-58	2349796.20	293536.80	-34	-37.5	3.5	6	d_{50} small = 0.17
FB-04-59	2347525.20	295522.60	-21.64	-23.6	2	2	

FB-04-60	2350438.20	294288.60	-33.08	-33.1	0		d_{50} too small
FB-04-61	2349686.10	294942.30	-30.2	-37.2	7	7	d_{50} small = 0.17
FB-04-62	2348937.90	295604.80	-26.3	-34.3	8	7	d_{50} = .18; 1.25 thick layer of 30% fines at 1.25'
FB-04-63	2348863.40	297018.40	-23.7	-33.7	10	6	average d_{50} = .18
FB-04-64	2353270.60	294507.90	-34.88	-34.9	0		cemented
FB-04-65	2351760.90	295819.50	-31.88	-37.4	5.5	8	>>%fines below 3'
FB-04-66	2351002.40	296457.70	-27.1	-36.1	9	4	
FB-04-67	2350274.30	297113.90	-27.49	-37.5	10	6	1.25' - 2.33' d_{50} = .14
FB-04-68	2352436.10	296554.80	-31.71	-37.2	5.5	6	
FB-04-69	2350180.20	298538.50	-26.62	-26.6	0		>>%fines
FB-04-70	2354606.50	296007.80	-32.5	-37	4.5	3	shallow depth underlain by SC
FB-04-71	2353854.50	296648.20	-31.97	-32	0		d_{50} too small = 0.14
FB-04-72	2353098.20	297305.80	-31.57	-36.6	5	6	d_{50} too small < 0.17
FB-04-73	2352352.40	297978.90	-26.39	-36.4	10	10	0.83' - 3' contains 35% fines
FB-04-74	2351592.90	298608.20	-27.59	-27.6	0		>>%fines
FB-04-75	2355257.80	296758.20	-34.8	-34.8	0		>>%fines; d_{50} too small
FB-04-76	2353748.20	298088.60	-30.81	-40.8	10	6	
FB-04-77	2356645.40	296813.80	-35.9	-37.4	1.5	3	
FB-04-78	2355900.8	297474.1	-32.61	-40.6	8	4	
FB-04-79	2355260.90	298066.90	-32.52	-41.5	9	6	
FB-04-80	2352329.80	299360.80	-26.93	-26.9	0		>>%fines
FB-04-81	2356572.30	298241.60	-35.23	-39.2	4	7	
FB-04-82	2357984.60	298325.60	-35.43	-38.9	3.5	3	d_{50} too small = 0.17
FB-04-83	2357221.80	298988.50	-33.5	-40.5	7	4	
FB-04-84	2353916.40	295243.90	-35.35	-37.4	2	6	underlain by cemented sand
FB-04-85	2355353.70	295335.40	-33.54	-34.5	1	2	below 1', too fine; too high %200
FB-04-86	2354033.80	293813.60	-32.76	-34.3	1.5	2	
FB-04-87	2351976.00	292972.60	-33.88	-34.9	1	1	underlain by very fine sand with too high %200
FB-04-88	2352733.30	292331.10	-30.91	-35.4	4.5	2	
FB-04-89	2351311.30	292236.00	-29.7	-34.2	4.5	2	
FB-04-90	2350827.80	288649.40	-38.37	-40.9	2.5	6	underlain by finer material
FB-04-91	2351576.00	288025.90	-40.29	-42.8	2.5	6	underlain by cemented sands

Legend

Beach Compatible Soils
Marginally Compatible
Not Suitable Beach Fill

Potential Borrow Areas

Potential offshore borrow areas are based on the results of testing sands recovered during this study and the work of Dr. Tim Kana (2002). Figure 2 graphically depicts those areas designated as Area A – D. Below is a summary of the four potential borrow sources.

Borrow Area A

Borrow Area A is about 3 miles offshore and is approximately 312 acres in size. The thickness of suitable soils in Area A varies from 2 ft. to 10 ft. as shown on Figure 3. It is evident that a variable depth of cut will have to be made across the site. Excavation over most of the area could be made with either a hopper dredge or a cutter head dredge. A small portion of the borrow would not be available to a cutter suction dredge due to the minimum thickness of 5 ft. to 6 ft. required for efficient dredging with the cutterhead dredge. Based on INROADS® quantity calculations, it is estimated that there is approximately 3.13 million cubic yards of beach compatible sand in Borrow Area A. The Northings and Eastings at the corners are shown in Table 3 and Figure 4.

Table 3

Borrow Area A	
Easting	Northing
2346222.80	294026.10
2348863.40	297018.40
2351664.09	297230.41
2352992.00	298768.87
2353796.94	298036.77
2351760.90	295819.50
2350339.59	295712.39
2347688.97	292672.81

Borrow Area B

Borrow Area B is about 3 miles offshore and is approximately 212 acres in size. The thickness of suitable soils in Area A varies from 2 ft. to 10 ft. as shown on Figure 3. A variable depth of cut will have to be made across the site. Excavation over most of the area could be made with either a hopper dredge or a cutter head dredge, however, a hopper dredge would be better able to mine more of the borrow since it is able to excavate the soils in layers of one foot rather than requiring a 5 foot vertical face for the cutter suction dredge. Based on INROADS® quantity calculations, it is estimated that approximately 2,030,000 cubic yards of beach compatible sand is available in Borrow Area B. The Northings and Eastings are shown in Table 4 and Figure 4.

Table 4

Borrow Area B	
Easting	Northing
2352992.00	298768.87
2354286.97	300269.17
2355830.52	298891.84
2357221.80	298988.50
2359846.36	300703.52
2360029.77	300533.64
2357303.62	297590.39
2356055.33	297237.35
2354489.04	297407.30
2353796.94	298036.77

Borrow Area C

Borrow Area C is about 3.5 miles offshore and is approximately 32 acres in size. The thickness of suitable soils in Area A varies from 4 ft. to 6 ft. as shown on Figure 3. A variable depth of cut will have to be made across the site. Excavation over most of the area could be made with either a hopper dredge or a cutter head dredge, however, a hopper dredge would be better able to mine more of the borrow since it is able to excavate the soils in layers of one foot rather than requiring a 5 foot vertical face for the cutter suction dredge. Based on INROADS® quantity calculations, it is estimated that approximately 320,000 cubic yards of beach quality sand is available in Borrow Area C. The Northings and Eastings are shown in Table 5 and Figure 4.

Table 5

Borrow Area C	
Easting	Northing
2350988.30	291480.81
2349892.00	292130.20
2352733.30	292331.10
2352052.19	291585.97

Borrow Area D

Borrow Area D is about 3.5 miles offshore and is approximately 68 acres in size. The thickness of suitable soils in Area D varies from 4 ft. to 6 ft. as shown on Figure 3. A variable depth of cut will have to be made across the site. Excavation over most of the area could be made with either a hopper dredge or a cutter head dredge, however, a hopper dredge would be better able to mine more of the borrow since it is able to excavate the soils in layers of one foot rather than requiring a 5 foot vertical face for the cutter suction dredge. Based on INROADS® quantity calculations, it is estimated that there are approximately 400,000 cubic yards of beach compatible sand in Borrow Area D.

Table 6

Borrow Area D	
Easting	Northing
2349522.10	287154.30
2349404.00	288549.78
2352217.93	288730.83
2350924.93	287234.49

Construction Considerations

Feasible Equipment

Due to the distance from shore, the depth of water, and sea state, working offshore at any of the four borrow areas will require an ocean-certified 27-inch or 30-inch compensated, cutter-suction dredge or hopper dredge. The water depths range from a 24 ft. to 38 ft. in Borrow Area A; 30 ft. to 42 ft. in Borrow Area B, 34 ft. in Borrow Area C, and 34 ft. to 40 ft. in Borrow Area D. The ocean certified hopper dredge and cutterhead-suction dredge would have sufficient depth of water to operate. The bank height in some portions of the borrow areas is not sufficient for the cutter head dredge to work efficiently (requires 5 ft. to 6 ft. of bank for efficient operation). The hopper dredge will be able to mine more of the available material since it can remove an incremental thickness (1 ft.) of the sand layer. Borrow Areas C and D are probably too small for a hopper dredge given the short run lengths.

Hard Bottom

No hard bottom was found during this site investigation within any of the proposed borrow areas, and buffers will be established around the borrow Areas to avoid disturbing ecologically sensitive areas.

Cemented Sands

Cemented sands and/or limestone were encountered in some of the vibracore samples; however, those vibracores were not included in areas designated as borrow areas (see Table 2 above). However, some cemented sands may be encountered during the dredging process. This usually manifests itself as large cobbles and boulders making their way to the beach during dredging. If this occurs it can be remedied by raking the larger pieces of rock off the beach. If the cemented materials make up a significant volume of the placement, it may be necessary to direct the contractor to a different section of the borrow area or an entirely different borrow area. Experience with cemented sands at Charleston Entrance Channel can create boulder size particles with unconfined compressive strengths on the order of 100 psi to 5000 psi.

Conclusions

In general, the sands located in Borrow Areas A, B, C and D are coarser than the native beach sands due to a larger fraction of shells than contained on the beach. The coarser portion of the grain size distribution is typically a coarse sand and fine gravel fraction. The borrow area sands are typically more calcareous than the native beach sands (presumably caused by the shell content). The silt and clay fraction in the proposed borrow areas was limited to approximately 10%, and much of that will be lost during excavation and placement operations.

Borrow Area A has approximately 3.13 million cubic yards of suitable beach quality sand. Actual quantities may vary due to the actual conditions between borings. The same is true for Borrow Areas B, C and D.

At a nourishment rate of approximately 110 cubic yards per foot along approximately 28,200 feet (5.34 miles) of beach, approximately 3.102 million cubic yards of sand at will be required. With approximately 5.880 million cubic yards of beach quality sand estimated to be available in borrow areas A and B, approximately two full nourishment cycles will be possible.

Appendix A

GEOPHYSICAL SURVEY REPORT

Appendix B

RECONNAISSANCE BORINGS REPORT

Appendix C

PHASE 1 VIBRACORE REPORT

Appendix D

PHASE 2 VIBRACORE REPORT

Appendix 3

Folly Beach Storm Damage Reduction Project Environmental Assessment
April 1991

APPENDIX 4
ENVIRONMENTAL ASSESSMENT
404 (b) EVALUATION
401 WATER QUALITY CERTIFICATION

FOLLY BEACH, SOUTH CAROLINA
SHORE PROTECTION PROJECT
GENERAL DESIGN MEMORANDUM

ENVIRONMENTAL ASSESSMENT

Shoreline Protection
Folly Beach, South Carolina

1. Introduction. This environmental assessment addresses an extension and modifications to the authorized shoreline protection project at Folly Beach, S.C. 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, coordinated with other agencies, and circulated for public review and comment. The 1980 authorized Folly Beach protection plan recommended nourishment of 16,860 feet of beach with five year periodic renourishments. A 25 foot wide berm would be constructed four feet NGVD and fronted by a beach with a face slope of 30' horizontal to 1' vertical. Near shore sand borrow sites were located adjacent to the lighthouse and bird key inlets. The 1991 Folly Beach General Design Memorandum provides for extending the Folly Beach shoreline protection project approximately 3,000 feet north and 8,000 feet south. This environmental assessment addresses in detail the extended portions of the project, modifications to the proposed beach profile along the entire reach of the project, relocation of the borrow sites and addresses the impact of new environmental laws and regulations on the entire project since filing of the Environmental Impact Statement in 1980.

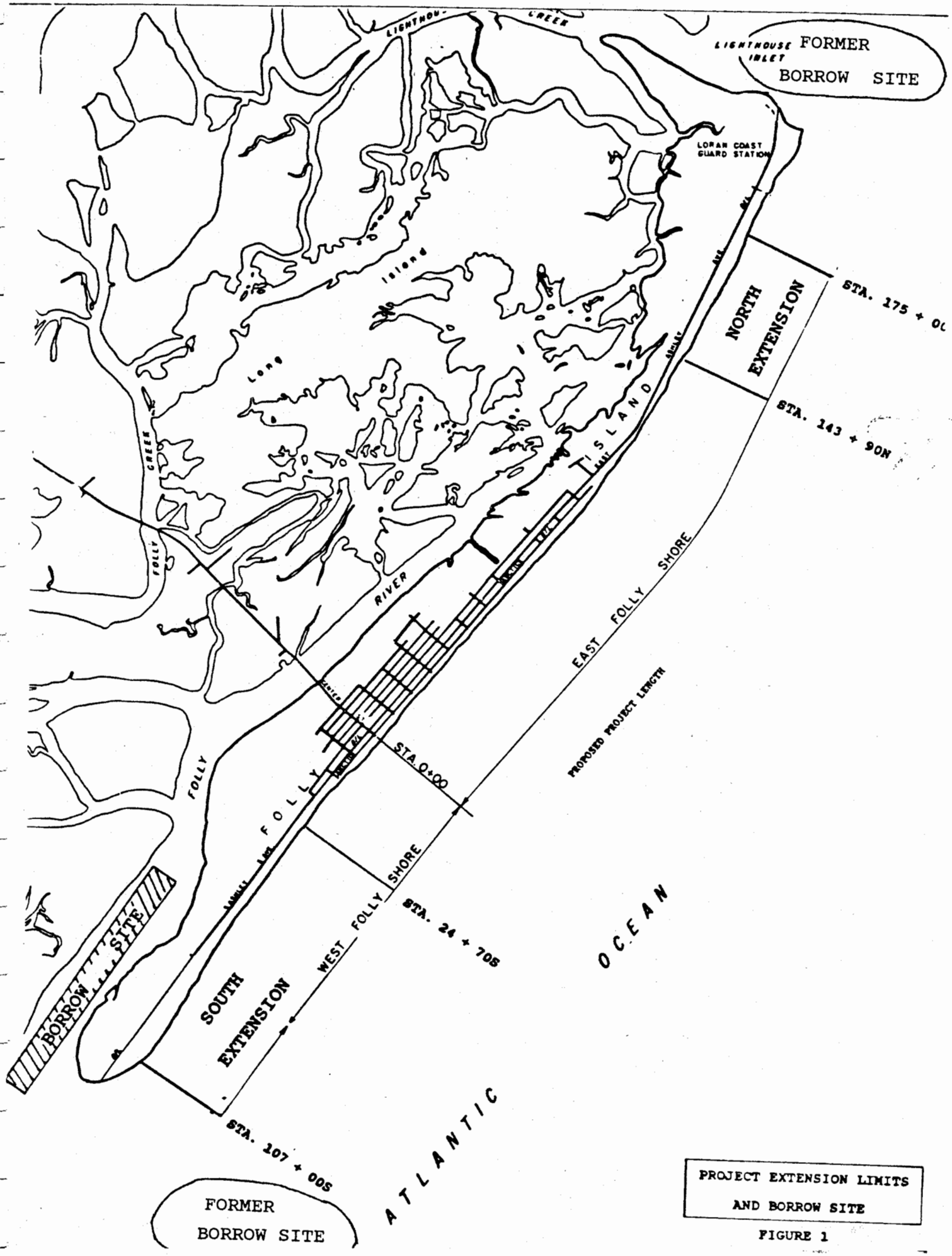
Supplemental information concerning the environmental impacts of Shoreline Protection on Folly Beach may be found in:

a. 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.

b. Final Detailed Project Report, Charleston Harbor, Folly Beach, South Carolina; U.S. Army Corps of Engineers, Charleston District, South Carolina, August 1987.

2. Project Description.

a. Location. Folly Beach is located on Folly Island about six miles South of the Charleston Harbor Entrance (Figure 1). The island is six miles long, one-half mile wide, and is oriented northeast to southwest. The Town of Folly Beach lies in the middle of the island between the former U.S. Coast Guard Loran Station to the northeast and the Charleston County Park to the southwest. South Carolina Route 171 crosses the marsh between James Island and Folly Island and provides the only highway access to Folly Beach.



PROJECT EXTENSION LIMITS AND BORROW SITE

FIGURE 1

b. Proposed Action. The modified plan of improvement provides for extending the shoreline protection northeastward from Station 143+90N to Station 175+00N and southwestward from Station 24+70S to Station 107+00S (Figure 1). Total project length would be 28,200 feet or 5.34 linear miles of shoreline. A berm will be constructed with a top width of 15 feet and an elevation of 9.0 feet NGVD. The project extends from just below the former U.S. Coast Guard base (station 175+00 north), and includes the Charleston County Park on the west end of Folly Island (station 107+00 south). 2.5 million cubic yards of beach quality material will be placed during the initial effort. This material will be placed seaward of existing revetments.

Periodic nourishment will require 1.7 million cubic yards of material every eight years with one periodic nourishment effort occurring at the last 10 year interval. This last periodic nourishment will require 2.1 million cubic yards of material. Actual quantities of periodic nourishment will be based on a monitoring plan which will be implemented immediately upon completion of initial construction.

The Corps of Engineers', Coastal Enginering Research Center determined that the nine groins immediately north of the Holiday Inn (meeting a 90 percent impermeability criteria) would substantially reduce the quanitity of sand required for shoreline protection. As a part of the recommended plan these nine groins will be rehabilitated to meet this criteria. The groin design is explained in detail in the Engineering Design and Cost Estimates appendix of the General Design Memorandum.

Adequate quantities of sandy borrow material exist in the borrow site located in lower Folly River which is designated for the total project length. Core borings of the insitu material within the borrow area characterize the material as a fine sand classification under the Unified Soils Classification system. Grain size for the sand samples varied from 0.10 millimeters (3.39 phi) to 0.28 millimeters (1.85 phi) with a composite mean grain size of 0.15 millimeters (2.75 phi).The initial 1980 approved near shore borrow sites (located adjacent to Stono Inlet and Lighthouse Inlet) were eliminated based on environmental concerns and the potential diversion of sand from Bird Key and Kiawah Island.

Construction would be by means of a pipeline dredge. The pipeline would run adjacent to and parallel with revetments on the beach. Navigation on Folly River would be minimally affected by the presence of the dredge. Sand would be pumped along the 28,200 linear feet reach of the project. Sand would be discharged as a slurry to a design elevation of +9.0 feet NGVD. Temporary training dikes of sand would be used to contain the discharge and control the fill placement. Fill sections

will be graded by landbase equipment. Scraps and any hardpan that may develop during or after project completion will be graded and raked as necessary in coordination with recommendations and requirements from regulatory agencies. All work will be performed between October 15 and May 15 to minimize impacts to sea turtles, fish, shellfish and infauna. It is anticipated construction will take 5 to 6 months including mobilization.

3 Topography and Soils. Folly Beach lies on the lower coastal plain which was once a submerged portion of the continental shelf. The island is fronted by gently sloping beaches on the seaward side and backed by productive salt marshes. Elevations of the developed section of the island range from 5 to 14 feet NGVD. Soils are white, medium-to fine-grained siliceous sands with some sea shells and shell fragments. The soils have alkaline tendencies and low fertility due to excessive nutrient leaching.

4 Surface Waters - The principal surface waters in the planning area are the Folly River and Stono River and the Atlantic Ocean. The Folly and Stono Rivers are classified by the State of South Carolina as SA or waters suitable for shellfishing for market purposes and other uses requiring waters of lesser quality.

5 Biotic Communities - A detailed description of the individual biotic communities and fish and wildlife resources is found in the final EIS.

6 Other Environmental Factors:

7 Endangered Species - Comprehensive coverage of Endangered Species which may occur in the Folly Beach Project area was discussed in the 1980 EIS. However, following is the most current list of endangered or threatened species which may be present in the Folly Beach area:

West Indian manatee (Trichechus manatus) - E
Bald eagle (Haliaeetus leucocephalus) - E
Bachman's warbler (Vermivora bachmanii) - E
Wood stork (Mycteria americana) - E
Red-cockaded woodpecker (Picoides borealis) - E
Arctic peregrine falcon (Falco peregrinus tundrius) - T
Piping plover (Charadrius melodus) - T
Kemp's ridley sea turtle (Lepidochelys kempii) - E
Loggerhead sea turtle (Caretta caretta) - T
Shortnose sturgeon (Acipenser brevirostrum) - E
Canby's dropwort (Oxypolis canbyi) - E
Pondberry (Lindera melissifolia) - E

Seven species are currently listed which are under status review.

American swallow-tailed kite (Elanoides forficatus forficatus) - SR
Bachman's sparrow (Aimophila aestivalis) - SR
Flatwoods salamander (Ambystoma cingulatum) - SR
Incised groovebur (Agrimonia incisa) - SR
Sea-beach pigweed (Amaranthus pumilus) - SR
Cypress knee sedge (Carex decomposita) - SR
Chaff-seed (Schwalbea americana) - SR

Recent coordination with the U.S. Fish and Wildlife Service (USFWS) and S.C. Wildlife and Marine Resources Department (SCWMRD) has shown that the loggerhead sea turtle nests on Folly Beach adjacent the project zone on the north and south ends of the island where high tide beach exists.

8 Cultural Resources - A review of the National Historical Register indicates no known historical or archeological sites are located within the proposed project zone. The nearest identified site adjacent to the project is a civil war encampment located at the northeast end of Folly Island within the former Coast Guard compound. The Folly Beach project will have no impact on the site.

9 Coastal Barrier Resources System (CBRS) - The lower reach of Folly River lies within the Bird Key Complex, M07, of the CBRS. Approximately 30% of the designated borrow site falls within the Bird Key Complex. Formal consultation with the USFWS (October 1, 1990) has determined that the proposed project is consistent with purposes of the CBRA. However, the USFWS stipulated that the Corps 1) implement a monitoring plan to assess the integrity of Bird Key; 2) make a concerted effort to perform beach nourishment outside turtle nesting season; and 3) maintain coordination with the Service and SCWMRD throughout the life of the project.

10 Other Environmental Factors - There are no wildlife preserves, important agricultural lands, wild and scenic rivers, natural landmarks, recognized scenic areas, or any other environments of special interest located where they could be impacted by the proposed project.

Existing Beach Conditions - Folly Beach has and continues to experience severe erosion problems. The historic shoreline erosion rate for Folly Island was 4.2 feet per year before the construction of revetments and bulkheads. Groin fields and an array of hard shore protection devices constructed by local property owners have afforded only a limited level of protection of shoreline recession. The mean tidal range is 5.3 feet with a significant wave height of about 4.2 feet. Hardened shoreline

protection coupled with continued erosion have almost eliminated a high tide beach area over most of the island except the extreme north and south ends of the beach.

12 Need for Proposed Actions - The recommended project provides for beach restoration and periodic nourishment of 28,200 feet of beach at Folly Island. The beach fill section would provide an average usable width above mean high water of 90 feet, which would provide shore protection as well as wildlife and recreational usage., Advance nourishment would proivde an additional sacrifical usable beach approximately 110 feet wide.

13 Alternative Analysis - The Final Detailed Project Report, Charleston Harbor, Folly Beach, S.C., 1987, evaluated a total of 6 nonstructural and 6 structural alternatives and the no action alternative. The extension of the beach nourishment lengths was addressed in the initial alternative analysis.

14 Environmental Consequences - Mitigative Measures

The proposed project will immediately benefit the environment by providing shore line protection benefits and land loss prevention. A beach will be maintained which will provide a diverse habitat for wildife and benthic populations, enhance aesthetic beauty and add to recreational enjoyment.

Temporary degradation of water quality will occur at both the dredging and the nourishment sites due to the re-suspension of silty material. A temporary reduction of benthic populations in the borrow and beach fill areas will likely occur as well as a corresponding decline in photosynthesis.

During dredging and filling operations, motile members of the invertebrate and fish communities can be expected to avoid the area. Re-colonization of disturbed areas of benthic organisms can be expected to occur once dredging and beach nourishment operations are completed.

Even though sea turtle nesting habitat does not currently exist in the proposed nourishment project zone, turtle nesting activity could be expected to occur after the beach has been nourished. The proposed project will provide more than five miles of beach habitat suitable for turtle nesting. All construction activities will be restricted during the active turtle nesting season.

15 Alternatives To Proposed Action.

Alternatives to the proposed project were identified and discussed in detail in the FEIS and Final Detailed Project Report, Folly Beach, August 1987.

Conclusion

The proposed action has been thoroughly assessed and coordinated and will not significantly affect the environment, therefore, the Corps of Engineers issues a Finding of No Significant Impact (FONSI).

404(b) EVALUATION FOR THE SHORELINE PROTECTION OF FOLLY BEACH, SOUTH CAROLINA

1. Project Description.

a. Description of the proposed discharge of dredged or fill materials.

(1) General: This 404(b) Evaluation addresses an extension and modifications to the authorized shoreline protection project at Folly Beach, South Carolina. A final Environmental Impact Statement (including a 404(b) evaluation) for Beach Erosion Control and Hurricane Protection for Folly Beach, South Carolina was filed with CEQ on July 11, 1980, coordinated with other agencies and circulated for public review and comment.

(2) General characteristics of material: Clean sand from nearby shoals.

(3) Quantity of material proposed for discharge: Initial beach nourishment operations would require 2.5 million cubic yards. Renourishment would require replacement of 1.7 million cubic yards of fill at 8-year intervals.

(4) Source of material: Sandy shoals in the lower Folly River (see Figure 1).

b. Description of the proposed disposal site for dredged or fill materials.

(1) Location: The ocean shoreline along Folly Island, South Carolina. Total project length would be 28,200 feet or 5.34 miles extending from Station 107+00 South to Station 175+00 North.

(2) Type of disposal site: Undiked nourishment area on the above-mentioned beach. This is not a "disposal" site in the usual sense because the primary purpose is to build up an eroding beach, rather than to dispose of unwanted material.

(3) Method of discharge: Hydraulic pipeline.

(4) When will disposal occur: Scheduling will occur after project authorization.

(5) Projected life of disposal site: Not applicable. (See b(2) above).

(6) Bathymetry: Not applicable.

2. Physical Effects (40 CFR 230.4-1(a)).

a. Potential destruction of wetlands - effects on 40 CFR 230.4-1 (a)(1)(i-vi): The intertidal nourishment area would not be considered wetlands under the definition given in 33 CFR 323.2. The area could possibly be considered "wetlands" as defined in Executive Order 11990. In any case, the nourishment area cannot be considered "highly productive" or said to "perform important functions" as described in 40 CFR 230.4-1(a)(1).

(1) Food chain production: Not significant.
(2) General habitat: Not significant.
(3) Nesting, spawning, rearing and resting sites for aquatic or land species: Not significant for the area affected.
(4) Those set aside for aquatic environment study or sanctuaries or refuges: Not applicable.
(5) Natural drainage characteristics: Not significant.
(6) Sedimentation patterns: Not significant.
(7) Salinity distribution: Not significant.
(8) Flushing characteristics: Not significant.
(9) Current patterns: Not significant, except that existing currents and waves erode the beach severely.
(10) Wave action, erosion or storm damage protection: Highly eroded beach would be restored. Renourishment would be required at 8-year intervals to maintain the beach as erosion continues.
(11) Storage areas for storm and flood waters: Not applicable.
(12) Prime natural recharge areas: Not applicable.

b. Impact on water column (40 CFR 230.4-1(a)(2)). Because of the nature of the nourishment area, the clean nature of the material to be dredged and its large particle size, impacts on the water column are not significant.

(1) Reduction in light transmission: Temporary, not significant.
(2) Aesthetic values: Temporary, not significant.
(3) Direct destructive effects on nektonic and planktonic populations: Temporary, not significant.

c. Covering of benthic communities (40 CFR 230.4-1(a)(3)).

(1) Actual covering of benthic communities: The beach benthic community consists of many individuals of relatively few species. Many inhabitants are relatively immobile and would experience suffocation and mortality from beach fill. Initial losses could be large, but recovery would be rapid due to recruitment from adjacent areas. Long term effects would be minor.

(2) Changes in community structure or function: Not significant (see c(1) above).

d. Other effects (40 CFR 230.4-1(a)).

(1) Changes in bottom geometry and substrate composition: Not significant, except for improvement to existing beach.

(2) Water circulation: Not significant.

(3) Salinity gradients: Not significant.

(4) Exchange of constituents between sediments and overlying water with alterations of biological communities: Not significant.

3. Chemical-Biological Interactive Effects (40 CFR 230.4-1(b)).

a. Does the material meet the exclusion criteria? Yes. The material is predominantly sand and shell with particle sizes larger than silt. The material would be dredged only from sandy shoals in the lower Folly River and would be compatible with native beach sand upon which it would be deposited as nourishment. Both exclusions (b)(1)(i) and (b)(1)(ii) are met.

b. Water column effects of chemical constituents (40 CFR 230.4-1(b)(2)): Not applicable.

c. Effects of chemical constituents on benthos (40 CFR 230.4-1(b)(3)): Not applicable.

4. Description of Site Comparison (40 CFR 230.4-1(c).

a. Total sediment analysis (40 CFR 230.4-1(c)(1)): Not required (see 3.a above).

b. Biological community structure analysis (40 CFR 230.4-1(c)(2)) Not required (see 3.a above).

5. Review Applicable Water Quality Standards.

a. Compare constituent concentrations: Not applicable (see 3.a).

b. Consider mixing zone: Not applicable.

c. Based on a and b above will disposal operation be in conformance with applicable standards? Yes.

6. Selection of Disposal Sites (40 CFR 230.5) for Dredged or Fill Material.

a. Need for the proposed activity: The beach has experienced severe shoreline erosion resulting in significant loss of recreational beach and threat of loss to oceanfront property.

b. Alternatives considered: All nonstructural plans considered were either inadequate or inappropriate for meeting project objectives, or had already been implemented. Of all structural plans considered, the only alternatives which sufficiently addressed the planning objectives were beach development and beach plus dune development. The selected plan is the smallest of 9 such beach or beach and dune plans considered. Hence, its requirements for borrow material and beach fill are the lowest capable of meeting the project objectives. Borrow sites would be in areas least subject to environmental degradation and the material is clean and compatible with native beach sand.

c. Objectives to be considered in discharge determination (40 CFR 230.5(a)):

(1) Impacts on chemical, physical, and biological integrity of aquatic ecosystem (40 CFR 230.5(a)(1)): Not significant.
(2) Impact on food chain: Not significant.
(3) Impact on diversity of plant and animal species: Not significant.
(4) Impact on movement into and out of feeding, spawning, breeding and nursery areas: Not significant.
(5) Impact on wetland areas having significant functions of water quality maintenance: Not applicable or not significant.
(6) Impact on areas that serve to retain natural high waters or flood waters: Not applicable.
(7) Methods to minimize turbidity: The borrow area of clean, large particles would be utilized to minimize turbidity.
(8) Methods to minimize degradation of aesthetic, recreational and economic values: The project has as its primary purposes shoreline protection and the improvement of recreational and economic features. Aesthetic enhancement would also result from project construction.

(9) Threatened and endangered species: None adversely affected. Although loggerhead sea turtle nesting habitat does not currently exist in the proposed nourishment project zone, turtle nesting activity could be expected to occur after the beach has been nourished. The proposed project will provide more than five miles of beach habitat suitable for turtle nesting. In order to avoid potential conflicts with turtle nesting, all work will be performed between October 15 and May 15 to minimize impacts to sea turtles, fish, shellfish and infauna.

(10) Investigate other measures that void degradation of aesthetic, recreational, and economic values of navigable waters: Not applicable (see 6.b and 6.c(8)).

d. Impacts on water uses as proposed disposal site (40 CFR 230.5(b)(1-10)):

(1) Municipal water supply intakes: Not applicable.
(2) Shellfish: Not significant.
(3) Fisheries: Not significant.
(4) Wildlife: Not significant.
(5) Recreation activities: Recreational activities would be greatly improved.
(6) Threatened and endangered species: None adversely affected (see 6.c(9)).
(7) Benthic life: Not significant (see 2.c(1)).
(8) Wetlands: Not applicable/not significant.
(9) Submersed vegetation: Not applicable.
(10) Size of disposal site: This project plan was chosen over others that would require more material placed over a larger area.
(11) Coastal Zone Management programs (40 CFR 230.3(e)): The proposed action is consistent with the South Carolina CZM program.

e. Considerations to minimize harmful effects (40 CFR 230.5(c)(1-7)):
(1) Water quality criteria: No legally applicable criteria would be exceeded.
(2) Investigate alternatives to open water disposal: Not applicable.

(3) Investigate physical characteristics of alternative disposal sites: Not applicable.

(4) Ocean dumping: Not applicable.

(5) Where possible, investigate covering contaminated dredged material with cleaner material: Not applicable. Material is clean.

(6) Investigate methods to minimize effect of runoff from confined areas on the aquatic environment: Not applicable.

(7) Coordinate potential monitoring activities at disposal site with EPA: Not applicable. No monitoring would be required as material is clean sand and biotic impacts would be minor.

7. Statement as to contamination of fill material if from a land source (40 CFR 230.5d): Not applicable.

8. Determine mixing zone: Not applicable.

9. Conclusions and determinations:

a. Feasible alternatives to the proposed discharge have been considered and none that are practicable will have less adverse impact on the aquatic and semi-aquatic ecosystem.

b. There are no unacceptable environmental impacts on the aquatic and semi-aquatic ecosystem as a result of the discharge.

c. The discharge of the dredged (or fill) material will be accomplished under conditions which will minimize, to the extent practicable, adverse environmental effects on the aquatic and semi-aquatic ecosystem.

10. Findings: Based on the above evaluation and determinations, the proposed discharge site for the Folly Beach Project has been specified through the application of the Section 404(b) Guidelines.

JAMES T. SCOTT
LTC, Corps of Engineers
District Engineer

FINDING OF NO SIGINIFICANT IMPACT
SHORELINE PROTECTION EXTENSION
FOLLY BEACH, SOUTH CAROLINA

The proposed Folly Beach shoreline protection extension project has been thoroughly assessed and coordinated with local, state and federal agencies. Based upon the attached environmental assessment, 404(B) evaluation, and environmental coordination, I conclude that the environmental affects of the proposed shoreline protection extension and periodic nourishment are not significant, and that the preparation of an Environmental Impact Statement is not warranted. Specific factors considered in making the determination include the following:

- An EIS was prepared and filed with CEQ in 1980 for the base nourishment project at Folly Beach. This NEPA document discusses the need, alternatives, and selected plan in detail.

- Water quality impacts would be temporary and not significant.

- Cultural resources would not be affected.

- No endangered species would be adversely affected. Conversely, over five miles of loggerhead sea turtle habitat would be created and maintained.

- Construction and renourishment activities would not significantly affect fish and wildlife.

- No significant land use changes would occur.

APR 25 1991
Date

James T. Scott
LTC, Corps of Engineers
District Engineer

Appendix 4

Agency Coordination Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

October 15, 2004

Mr. Joseph Jones
Chief, Planning Branch
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Dear Mr. Jones:

The Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (EA) Amendment and Finding of No Significant Impact for the Charleston District's Folly Beach Shore Protection Project, Charleston County, South Carolina. The proposed project consists of the re-nourishment of about 28,200 feet of beach from the old Coast Guard Station to Folly Beach County Park. Consultation under Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1543) is underway and a Biological Opinion will be provided under separate cover.

The DEA is generally adequate in its description of the existing fish and wildlife resources and the evaluation of project impacts. Service concerns related to the proposed experimental tilling protocol will be addressed in the Biological Opinion.

We appreciate the opportunity to review these documents. If you have any questions please contact Ed EuDaly at 843-727-4707 ext. 13.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/EME

South Carolina Department of
Natural Resources

John E. Frampton
Director
John V. Miglarese
Deputy Director for
Marine Resources

December 16, 2004

Mr. Shawn Boone
U. S. Army Corps of Engineers
69-A Hagood Avenue
Charleston, SC 29403-5107

REF: Draft Amendment to the Environmental Assessment (EA) and Finding of No Significant Impact for the Folly Beach Shore Protection Project

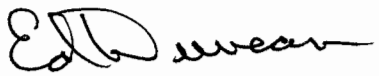
Dear Mr. Boone:

Personnel with the South Carolina Department of Natural Resources have reviewed the above referenced DEA and offer the following comments.

With a few exceptions, our department finds the submitted Draft Environmental Assessment sufficient in addressing the full range of potential environmental impacts associated with the proposed project. Of outstanding concern are potential impacts to sea turtles resulting from the project. While the DEA addresses actions to be taken to minimize impacts to turtles in the event work is conducted during turtle nesting season, it does not take into consideration the full range of potential impacts. We recommend a comprehensive sea turtle protection plan be developed and submitted for our review. Such a plan should provide for continuous monitoring of the beach during all renourishment operations conducted during the turtle nesting season. Impacts to nesting females and hatchlings resulting from on-beach lighting should also be addressed. We understand that discussions with our department concerning the proper location of offshore borrow sites are on-going. We recommend this coordination continue until the final borrow locations are selected.

Provided the above recommendations are addressed in the DEA, we concur that the proposed project will not result in significant impacts to natural resources.

Sincerely,



Robert E. Duncan
Environmental Programs Director

Cc: SCDHEC/Epps
OCRM/Joyner
USEPA/Campbell
USFWS/Hall
NMFS/Rackley

D H E C
PROMOTE PROTECT PROSPER

Office of Ocean & Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

(843) 744-5838 (843) 744-5847 (fax)

November 1, 2004

Mr. Joseph A. Jones
Chief, Planning Branch
Charleston District, Corps of Engineers
69A Hagood Ave.
Charleston, SC 29403

RE: Draft EA and Draft FONSI, Folly Beach Shore Protection Project

Dear Mr. Jones;

DHEC-OCRM has reviewed the draft EA and FONSI for the Folly Beach Shore Protection Project. We concur that the proposed project will have no significant adverse affect on human health and welfare or the environment, and that preparation of an Environmental Impact Statement is not warranted. We do offer the following comments:

1. The document states that side-scan sonar surveys and extensive vibracore sampling have identified offshore borrow sites with "beach-compatible" sand. It would be helpful to include a grain size analysis summary for the borrow sites, as compared to the native beach sand.

2. The text of the document refers to three borrow areas, but the figure and table on page 3 identify the borrow areas as A, B, C, and D. A and B are contiguous, but if they are considered to be separate borrow areas then it might be better for the text of the report to refer to four borrow areas.

3. At the top of Page 4, the document states "It is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed." Post-project monitoring of offshore borrow sites used for renourishment at Hilton Head Island and Hunting Island have revealed that these sites may actually infill with much finer-grained material. Some acknowledgement of this phenomenon should be noted in the EA.

Pease fee free to contact me if you need any additional information.

Sincerely,

William C. Eiser
Staff Oceanographer

February 4, 2005

US Army Corps of Engineers
Charleston District
69A Hagood Avenue
Charleston, SC 29403-5107
Attn: Joseph A. Jones

RE: P/N 91-2R-022;
U.S. Army Corps of Engineers
Folly Beach Shore Protection Project

Dear Mr. Jones,

This letter is in response to a request for a confirmation that the 401 Water Quality Certification is still valid for the above-mentioned project. The proposed work consists of beach renourishment by placing approximately 2,500,000 cubic yards of sand along 5.34 miles of shoreline along Folly Beach in Charleston County, South Carolina. This work was authorized by issuance of the State Certification referenced above. You originally requested to change the location of the borrow site from a location in the Folly River to a location approximately three miles off shore in the Atlantic Ocean. From this location, approximately 1.7 million cubic yards of sand was proposed to be removed from this site, however, in light of the severity of the 2004 hurricane season this amount has now been revised to 2.0 million cubic yards of sand. The original State Certification issued for this project is still valid. The Department has reasonable assurance that the proposed modification will not contravene water quality standards and the existing and classified uses of the Atlantic Ocean will not be impacted. Therefore the Department offers no objection to the proposed modification provided that all terms and conditions of the original permit are adhered to.

This letter should be attached to and made a part of the original permit issued on May 28, 1991.

If you have any questions, please feel free to call Robert H. Ridgell at (803) 898-4179 or e-mail at ridgelrh@dhec.sc.gov.

Sincerely,

M. Rheta Geddings, Director
Division of Water Quality

MRG:rhr

Cc: Curtis Joyner, OCRM
Trident District EQC Office

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

May 28, 1991

Copy

Mr. James Preacher
Charleston District, Corps of Engineers
334 Meeting Street, Room 621
P. O. Box 919
Charleston, S. C. 29402

Re: Certification in Accordance with Section 401 of the Clean Water Act, as amended.

Charleston District, Corps of Engineers
permit to perform beach nourishment by placing approximately 2,500,000 cubic yards of sand along 5.34 miles of shoreline of Folly Beach
Atlantic Ocean
Charleston County
P/N 91-2R-022, Revised

Dear Sir:

We have reviewed plans for this project and determined that there is a reasonable assurance that the proposed project will be conducted in a manner consistent with the Certification requirements of Section 401 of the Federal Clean Water Act, as amended. In accordance with the provisions of Section 401, we certify that this project, subject to the indicated conditions, is consistent with applicable provisions of Section 303 of the Federal Clean Water Act, as amended. We also hereby certify that there are no applicable effluent limitations under Sections 301(b) and 302, and that there are no applicable standards under Sections 306 and 307.

This certification is subject to the following conditions:

1. Beach nourishment must be performed between October 15th and May 15th to minimize the impacts to the benthic communities and sea turtles and to avoid disruption of commercial shrimping activity.

2. The applicant must notify Mr. Ken Moore, Manager of the Shellfish Section, SCDHEC, prior to initiation of the beach nourishment.

3. All possible efforts must be made to perform the work in a manner that will minimize increases in turbidity in the water. Temporary training dikes must be used to contain the discharge from the dredge pipeline.

4. The applicant must develop and implement a benthic monitoring plan acceptable to the SCWMRD, USFWS, NMFS, and SCDHEC for the 11,530' x 200' borrow site located in the Folly River. If the results of the benthic monitoring study indicate that there are detrimental effects on the fishery or other aquatic resources, this borrow site must be eliminated from future uses.

Sincerely,

Chester E. Sansbury

Chester E. Sansbury, Director
Division of Water Quality
and Shellfish Sanitation

CES:NJNF
cc: Charleston District, Corps of Engineers
Trident EQC District Office
SCCC
File:401022

D H E C
PROMOTE PROTECT PROSPER

Office of Ocean & Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

(843) 744-5838 (843) 744-5847 (fax)

Christopher L. Brooks, Deputy Commissioner

January 25, 2005

Mr. Joseph A. Jones
Chief, Planning Branch
Charleston District, Corps of Engineers
69A Hagood Ave.
Charleston, SC 29405

RE: Folly Beach Renourishment Project
Federal Consistency
Charleston County

Dear Mr. Jones,

The staff of the South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management has reviewed the information provided to us in your letter of January 6, 2005, regarding the Folly Beach Renourishment Project. We have also reviewed the Draft Amendment to the Environmental Assessment and Finding of No Significant Impact document for this project dated September 2004. Based on this information, the staff of the Office of Ocean and Coastal Resource Management concurs that this Federal Action is consistent with the SC Coastal Zone Management Act.

Interested parties are provided ten day from receipt of this letter to appeal this action.

Sincerely,

William C. Eiser
Project Manager

EFIS #15636

JAN 27

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702-2432

January 25, 2005

Lt. Colonel Alvin B. Lee
District Engineer, Charleston District
Department of the Army, Corps of Engineers
69A Hagood Avenue
Charleston, South Carolina 29403-5107

Dear Colonel Lee:

The National Marine Fisheries Service (NOAA Fisheries) has reviewed the supplementary information provided with your letter dated January 6, 2005, regarding the proposed Folly Island, South Carolina, Emergency Beach Restoration Project. We have also reviewed the January 12, 2005, interagency meeting minutes and action items concerning mitigation of project effects on fishery and wildlife resources. The project consists of placing approximately 2.0 million cubic yards of sand on the front beach of Folly Island. The source of sand includes four borrow sites, located approximately three miles offshore, and totaling approximately 620 acres in size. The proposed work as a part of the congressionally authorized Folly Beach Shore Protection Project. The proposed 2005 work is being pursued under the emergency preparedness, response, and recovery authority of Public Law 84-99 and is necessitated as a result of severe beach erosion experienced in late summer and fall 2004.

NOAA Fisheries does not anticipate that the project will result in long-term or severe adverse effects on fishery resources under our purview. We support the borrow site monitoring program recommended by South Carolina Department of Natural Resources at the January 12, 2005, meeting since such monitoring is needed to properly evaluate effects on living marine resources and habitats. Additionally, NOAA Fisheries should be notified of any required changes in project construction methodologies or timing since such changes could impact fishery resources and/or Essential Fish Habitat.

With regard to potential effects on species afforded protection under the Endangered Species Act, you should contact Mr. David Bernhart of our Protected Resources Division at the letterhead address, or at (727) 570-5312.

Thank you for an opportunity to provide comments on this project. Related questions or comments should be directed to the attention of Mr. Prescott Brownell at our Charleston Field

Office. He may be reached at P.O. Box 12559, Charleston, South Carolina 29422, or at (843) 953-7204.

Sincerely,

for David H. Rackley

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc:
Ed Duncan, SCDNR
Tim Hall, FWS
Rob Mikell, OCRM
Quinton Epps, SCDHEC
EPA, Atlanta
F/SER4
F/SER3

UNIVERSITY OF SOUTH CAROLINA

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

13 October 2004

Shawn Boone
Department of the Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston SC 29403-5107

Dear Mr. Boone,

This letter is in response to correspondence, including a draft EA and FONSI, dated 30 September 2004 from Joseph Jones, Chief-Planning Branch, concerning the Folly Beach renourishment project. We notice that a remote sensing survey took place using side scan sonar to document potential live bottom areas in the three borrow sites (p. 3). What about submerged cultural resources? In correspondence with Robert Chappell around April 2004, we stated the need for a submerged cultural resource survey of the three borrow sites. While sonar is good for observing potential archaeological resources protruding from the substrate, it cannot penetrate below the surface, especially in areas of sandy bottoms. The primary underwater archaeological tool for locating submerged cultural resources is the magnetometer. As long as ferro-magnetic material is present, the magnetometer will detect a buried or exposed object. The survey of these three borrow sites should include a magnetometer and any comments we have regarding the potential effect at these three sites on potential submerged cultural resources await the results of this survey. We look forward to learning the results of the survey. If you have any questions or concerns about this matter please contact Christopher Amer or me.

Sincerely,

James D. Spirek
Deputy State Underwater Archaeologist
Review and Compliance

1321 Pendleton Street • Columbia, S.C. 29208-0071 • (803) 777-8170 • 734-0567 • 799-1963 • FAX 254-1338

EASTERN SHAWNEE TRIBE
OF OKLAHOMA

P.O. Box 350 · Seneca, MO 64865 · (918) 666-2435 · FAX (918) 666-2186

January 13, 2005

Re: Construction of a Beach Renourishment Project on Folly Island, SC in Charleston South Carolina

Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, South Carolina 29403-5107

To Whom It May Concern:

Thank you for notice of the referenced project(s). The Eastern Shawnee Tribe of Oklahoma is currently unaware of any documentation directly linking Indian Religious Sites to the proposed construction. In the event any items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during construction, the Eastern Shawnee Tribe request notification and further consultation.

The Eastern Shawnee Tribe has no objection to the proposed construction. However, if any human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the construction should stop immediately, and the appropriate persons, including state and tribal NAGPRA representatives contacted.

Sincerely,

Jo Ann Beckham
Administrative Assistant

Charles Enyart, Chief
Eastern Shawnee Tribe of Oklahoma

UNIVERSITY OF SOUTH CAROLINA

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

18 February 2005

Alan Shirey
Department of the Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston SC 29403-5107

Re: Folly Beach Renourishment Project.

Dear Alan,

After review of the letter report dated 10 February 2005 from Wes Hall, archaeological contractor, to Richard Kimmel, US Army Corps of Engineers, we find that all concerns related to the protection of submerged cultural resources have been met by the results of the underwater archaeological survey off Folly Beach at Borrow Sites A and B. The results of the survey indicate the presence of a shipwreck in Borrow Site B, which through previous discussions will be avoided by the placement of a 3000-foot diameter dredging exclusion area. This exclusion zone may be reduced in diameter upon additional study of the magnetic and acoustic data. We agree with the archaeological contractor that all other areas show no obvious signs of archaeological materials and therefore are cleared for dredging operations from an archaeological perspective. We look forward to reviewing the draft report of the project's findings. Thank you for your cooperation in protecting the submerged cultural resources on the bottomlands of South Carolina.

Sincerely,

James D. Spirek
Deputy State Underwater Archaeologist
Maritime Research Division/Review and Compliance

C: Chad Long, SHPO
Richard Sidebottom, SHPO
Richard Kimmel, USACE

1321 Pendleton Street • Columbia, S.C. 29208-0071 • (803) 777-8170 • 734-0567 • 799-1963 • FAX 254-1338

Jena Band of Choctaw Indians

P. O. Box 14 • Jena, Louisiana 71342-0014 • Phone: 318-992-2717 • Fax: 318-992-8244

October 18, 2004

Department of the Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, South Carolina 29403-5107

RE: FIRST PERIODIC RE-NOURISHMENT OF THE FOLLY BEACH SHORE PROTECTION PROJECT
FOLLY BEACH, CHARLESTON COUNTY, SOUTH CAROLINA

To Whom It May Concern:

Reference is made to your letter dated September 30, 2004, concerning the above-proposed project.

After thorough review of the document submitted, it has been determined that there will be no significant impact in regards to the Jena Band of Choctaw Indians. We have no objections to its implementation.

If I may be of any further assistance, please do not hesitate to call.

Sincerely,

Lillie Strange

Lillie Strange
Environmental Director
Jena Band of Choctaw Indians
Lilliestrange72@aol.com
318-992-8258

Choctaw Nation of Oklahoma

Drawer 1210 • Durant, Oklahoma 74702-1210 • (580) 924-8280

Gregory E. Pyle
Chief

Mike Bailey
Assistant Chief

1-11-05

Shawn Boone
Department of The Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, South Carolina 29403-5107

Dear Mr. Boone:

We have reviewed the following proposed projects as to its effect on Choctaw Nation of Oklahoma concerns regarding properties, ceremonial or burial grounds.

ENTITY REQUESTING SERVICE: Department of The Army, Charleston District

PROJECT: Beach nourishment project – Folly Island

COUNTY: Charleston County

After further review of the above mentioned project, to the best of our knowledge it will not have any adverse effects on any Choctaw Nation of Oklahoma properties, and ceremonial materials. However, should construction activities expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, this office should be contacted immediately at 1- 800-522-6170, extension 2243 or 2125. A member of our staff will be sent to evaluate the significance of these remains.

Sincerely,

Olin Williams

Olin Williams
Tribal Historic Preservation Officer
Choctaw Nation of Oklahoma

Appendix 3

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

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Notice

401 Water Quality Certification Resource Reductions

State budget cuts have impacted the level of services the Department of Health and Environmental Control (Department) can provide and have resulted in the need for the Department to re-evaluate its workloads and priorities. The 401 Water Quality Certification program has been identified as an area where resource reductions are necessary.

In accordance with S.C. Regulation 61-101, Water Quality Certification, the Department can issue, deny, or waive certification for Federal licenses or permits. If the Department fails to act on a certification within a reasonable period of time, not to exceed one year, the certification requirements are waived.

In light of recent budget cuts, the Department has determined that it can no longer certify all Federal licenses and permits for which it receives applications. Thus, the Department has identified categories of projects for which the 401 Water Quality Certification will be waived as follows:

- **Nationwide Permits as issued by the US Army Corps of Engineers (Corps)**
  Every five years, the Corps issues nationwide permits (NWP) for categories of activities that have been determined to have minimal individual and cumulative adverse effects on the aquatic environment. In a Federal Register notice published on March 12, 2007, the Corps reissued the NWP, and on May 11, 2007, the Department issued both a 401 Water Quality Certification and a Coastal Zone Consistency Certification in accordance with the S.C. Coastal Zone Management Program. At the time of the May 11, 2007 certification, the Department placed conditions on a number of the NWP that would necessitate an individual permit review for those projects. In light of the need to reduce staff resources, the Department will no longer issue individual certifications for these permits. By waiving these 401 certifications, the state will rely on the initial Corps determination of minimal impacts.

- **Groins and Beach Renourishment Projects**
  Groins and beach renourishment activities have very few water quality impacts. As a general rule, the concerns and comments that the Department receives during a 401 Water Quality Certification review for these activities are directed towards the issue of threatened or endangered species. These activities will still require comments from the US Fish and Wildlife Service and/or the National Marine Fisheries Service which have jurisdiction over threatened and endangered species before the Corps can issue their 404 permit. Therefore, the Department has a reasonable assurance that these concerns will be addressed. Further, the Department's OCRM office will still continue to issue direct permits for alteration of the critical area for these activities that also provide a means to address the threatened or endangered species concerns.

These waivers apply only to the 401 Water Quality Certification. Any Coastal Zone Consistency Certifications and the Critical Area Permits issued by the Department's OCRM office are not affected by this action. In light of continuing budget reductions, the Department will periodically evaluate our project workloads to determine if other changes are necessary.

Appendix 4

South Carolina State Historic Preservation Office, South Carolina Institute for Archaeology and Anthropology Concurrence and Tribal Letters for Borrow Areas C and D

October 4, 2013

Alan Shirey
Environmental Engineer
US Army Corps of Engineers-Charleston District
69A Hagood Avenue
Charleston SC 29403-5107

Re: Folly Beach Re-nourishment, Borrow Sites C&D CRS, Draft
Charleston County, South Carolina
SHPO No: 13-ED0044

Dear Alan Shirey:

Our office has reviewed the draft report of the *Hardbottom and Cultural Resource Survey, Folly Beach Offshore Borrow Sites C and D, Charleston County, South Carolina*, prepared by Tidewater Atlantic Research, Inc. to identify and permit two sand sources for a beach re-nourishment project on Folly Island. The State Historic Preservation Office is providing comments to the U.S. Army Corps of Engineers pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR 800. Consultation with the SHPO is not a substitution for consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public.

As this report covers the underwater portion of your undertaking, our office defers to the expertise of Jim Spirek, the State Underwater Archaeologist. In his letter dated October 3, 2013, Jim stated that he has no objections from a submerged cultural resources viewpoint for dredging operations to occur in these borrow sites. SHPO and SCIAA concur with the contractor's recommendations that no historic properties will be affected and that no additional cultural investigations are required at Borrow Sites C and D.

If archaeological materials or human skeletal remains are encountered during the dredging, the procedures codified at 36 CFR 800.13(b) will apply. Archaeological materials consist of any items, fifty years old or older, which were made or used by man. These items include, but are not limited to, stone projectile points (arrowheads), ceramic sherds, bricks, worked wood, bone and stone, and metal and glass objects. The federal agency or the applicant receiving federal assistance should contact our office immediately.

If you have any questions, please contact me at (803) 896-6181 or edale@scdah.state.sc.us.

Sincerely,

Emily Dale
Staff Archaeologist/GIS Coordinator
State Historic Preservation Office

UNIVERSITY OF SOUTH CAROLINA
SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY

3 October 2013

Mr. Alan Shirey
Environmental Engineer
US Army Corps of Engineers-Charleston District
69A Hagood Avenue
Charleston SC 29403-5107

Re: Review of Folly Beach Renourishment Project report.

Dear Mr. Shirey,

Our office has reviewed the draft report of the *Hardbottom and Cultural Resource Survey, Folly Beach Offshore Borrow Sites C and D, Charleston County, South Carolina*, prepared by Tidewater Atlantic Research, Inc. to identify and permit two sand sources for a beach renourishment project on Folly Island. Our review is focused on the submerged cultural resources aspects of the project. The report provides a solid discussion of the scope, methods, research, and findings, especially the thorough documentation of shipwrecks and the maritime history of Folly Island and environs. I have been in contact with the principal author concerning some minor historical issues which she is working to amend.

We concur with the contractor's recommendations that no additional cultural investigations are required at Borrow Sites C and D. Our office has no objections from a submerged cultural resources viewpoint for dredging operations to occur in this borrow site. We do, however, request that any inadvertent discovery of potential archaeological materials, i.e., wood structure, prehistoric lithics, ceramics, etc. during dredging operations cease from that area until inspections may reveal the source of this material. Please contact my office or the SHPO for further guidance in this instance, or if plans change.

Thank you for this opportunity to review the report and your support of preserving the submerged archeological legacy in South Carolina waters. If you have any questions, comments, etc. about this matter please contact me.

Sincerely,

James D. Spirek
State Underwater Archaeologist
Maritime Research Division

1321 Pendleton Street ☐☐ Columbia, SC 29208-0071 ☐☐ (803) 576-6566 ☐☐ FAX (803) 254-1338

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

September 12, 2013

Attention: Bret Walters
Charleston District, Corps of Engineers
69 A Hagood Avenue
Charleston, SC 29403-5107

Re. THPO #	TCNS #	Project Description
2013-1-79		Perform a beach re nourishment project at Folly Beach, SC using sand from offshore State waters and sand from the OCS

Dear Mr. Walters,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Totherow at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

Caitlin Totherow for

Wenonah G. Haire
Tribal Historic Preservation Officer

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Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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082013

Bret Walters
Chief, Planning and Environmental Branch
Dept. of the Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403

Re: Folly Beach renourishment project

Mr. Walters:

The Cherokee Nation appreciates the opportunity to comment upon the "Folly Beach renourishment" project. The Cherokee Nation does not currently maintain records of cultural resources in this geographic area. Thus, we would request you conduct your inquiries with the South Carolina State Historic Preservation Office and any geographically appropriate/pertinent Tribal Historic Preservation Office(s). However, if during the conduct of these projects, items of cultural significance are discovered, the Cherokee Nation requests you recontact our Offices for further consultation. If you have any questions or require further information, please contact Mr. Pat Gwin, Administration Liaison, at 918/453-5704. Thank you.

Sincerely,

Pat Gwin, Administration Liaison

Shirey, Alan D SAC

From: Lindsey Bilyeu [lbilyeu@choctawnation.com]
Sent: Tuesday, August 20, 2013 11:30 AM
To: Shirey, Alan D SAC
Subject: [EXTERNAL] RE: Beach Renourishment Project at Folly Beach, SC

RE: Proposal to perform a beach re-nourishment project at Folly Beach, SC using sand from offshore State waters and sand from the outer-continental shelf (OCS), Charleston Co, SC

Mr. Shirey,

The Choctaw Nation of Oklahoma thanks the Charleston District of the Army Corps of Engineers for the correspondence regarding the above referenced project. Charleston Co, SC lies outside of the Choctaw Nation of Oklahoma's area of historic interest. The Choctaw Nation Historic Preservation Department respectfully defers to the other Tribes that have been contacted. If you have any questions, please call our office at 580-924-8280 Ext. 2631.

Sincerely,

Dr. Ian Thompson, Ph.D, RPA
Tribal Historic Preservation Officer
Tribal Archaeologist, NAGPRA Specialist

By: Lindsey Bilyeu
Administrative Assistant / Section 106 Reviewer
Choctaw Nation of Oklahoma
Historic Preservation Department
P.O. Box 1210
Durant, OK 74701
lbilyeu@choctawnation.com

Shirey, Alan D SAC

From: Kim Jumper [kim.jumper@shawnee-tribe.com]
Sent: Wednesday, October 23, 2013 10:44 AM
To: Shirey, Alan D SAC
Subject: [EXTERNAL] USACE Hurrican and Storm Damage Reduction Project

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project. We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume consultation under such a circumstance.

Thank you for giving us the opportunity to comment on this project.

Sincerely,
Kim Jumper, THPO
Shawnee Tribe

Appendix 5

Biological Assessment for 2013 Folly Beach Renourishment Projects

BIOLOGICAL ASSESSMENT
OF THE PROPOSED FOLLY BEACH STORM DAMAGE REDUCTION RE-NOURISHMENT PROJECT
FOLLY BEACH, SOUTH CAROLINA

DECEMBER 2013

1.0 INTRODUCTION

Folly Beach is located on the South Carolina coast in Charleston County, approximately 12 miles south of the downtown area of the City of Charleston and 9 miles southwest of Sullivan's Island (see Figure 1). The 6-mile long island reaches from the confluence of the Stono and Folly Rivers at the west end to Lighthouse Creek at the east end. The Folly Beach Storm Damage Reduction project is being conducted under authority of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). An amendment to the previous environmental assessment (EA) has been prepared to update the overall environmental impacts of the proposed project and to include the Bureau of Ocean Energy Management as a joint action agency due to the use of offshore borrow areas in Federal waters. This document re-evaluates the impact of the proposed project on threatened and endangered species and will be incorporated in the amendment to the EA.

The purpose of this project is to protect the economic resources located on Folly Island from erosion and storm events, with a secondary benefit of providing additional beach and dune area that will facilitate sea turtle nesting. The majority of Folly Island is developed in the manner of a typical suburban municipality and is a mix of residential and commercial properties. The commerce of the island is primarily associated with the tourism industry. The southern end of Folly Island is designated as a Charleston County park.

2.0 PROPOSED PROJECT DESCRIPTION

This is a periodic nourishment of an existing project. The recommended plan provides for nourishment of 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 2). 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 expected erosion rates, it is estimated that 1.4 million cubic yards of beach quality sand will be placed on the beach.

Construction will be by means of a hydraulic cutterhead dredge that will transport the sand through a pipeline. The pipeline will run parallel with the beach. Beach compatible material (sand) from the off-shore source will be pumped along the roughly 26,000 linear feet reach of the project and will be discharged as a slurry. During construction, temporary training

FIGURE 1: LOCATION OF FOLLY BEACH

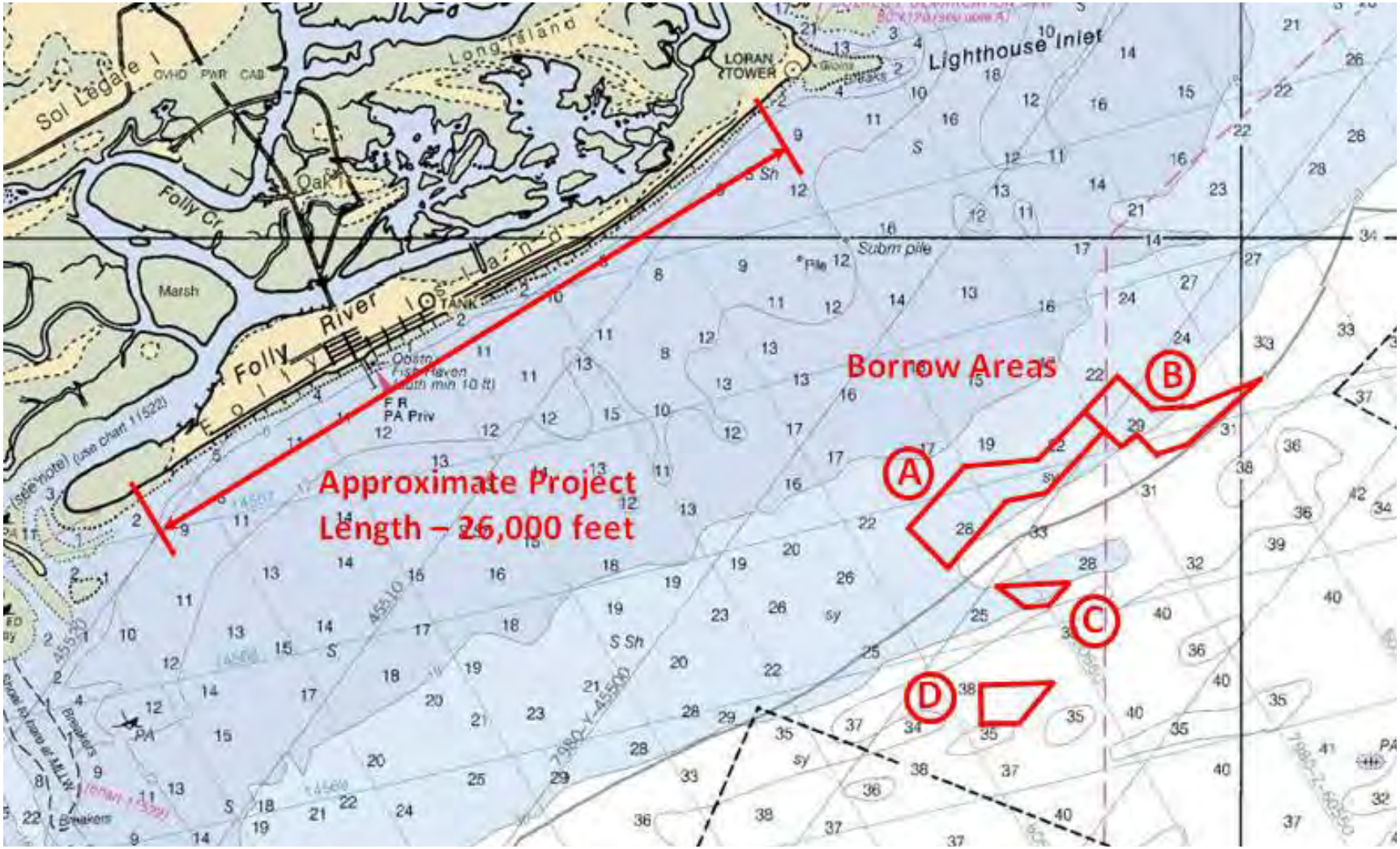


FIGURE 2: FOLLY BEACH PROJECT LIMIITS

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. It is anticipated that construction will begin in late December 2013 and will require approximately 6 months for completion. This schedule could change due to funding constraints, contractual issues, inclement weather, equipment failure, or other unforeseen difficulties.

The borrow areas being used for beach compatible sand are designated in Figure 2. These areas total approximately 620 acres. The borrow areas are located approximately three miles off-shore of the northern end of the island. None of the three borrow areas are inside any CBRA zones. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done in order to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. Larger areas had been evaluated but the above listed acreages are what remained after the Corps of Engineers evaluation process. The size, sand volume, and water depth of each borrow area are provided in Table 1.

3.0 PRIOR CONSULTATIONS

Previous Section 7 formal or informal consultations occurred in support of both the 1980 Environmental Impact Statement that and the 1991 Environmental Assessment that were prepared for the original Folly Beach nourishment project. Consultation also occurred in support of the 2005 Environmental Assessment that was prepared for the first renourishment project.

4.0 LIST OF SPECIES

Table 2 contains a list of 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.

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

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	Rufa 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.

5.0 GENERAL EFFECTS ON LISTED SPECIES/CRITCAL HABITAT

Since all aspects of the proposed work will occur either in the ocean or on an 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, and chaff-seed will not be affected by the proposed action.

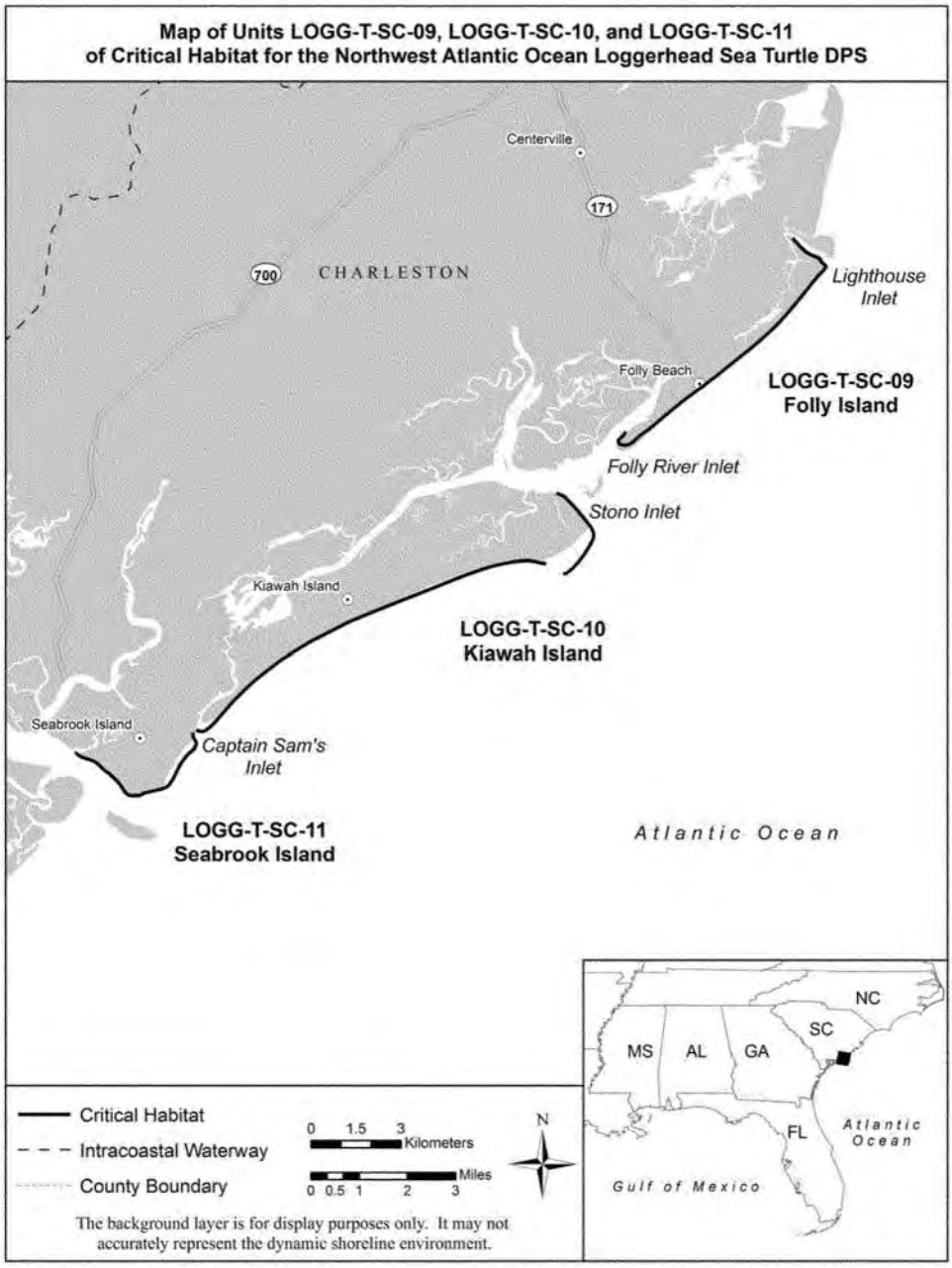
TABLE 3: NOAA FISHERIES THREATENED AND ENDANGERED SPECIES IN SOUTH CAROLINA			
Species	**Scientific Name**	**Status**	**Date Listed**
Listed Marine Mammals			
Blue whale	*Balaenoptera musculus*	E	12/2/70
Finback whale	*Balaenoptera physalus*	E	12/2/70
Humpback whale	*Megaptera novaeangliae*	E	12/2/70
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

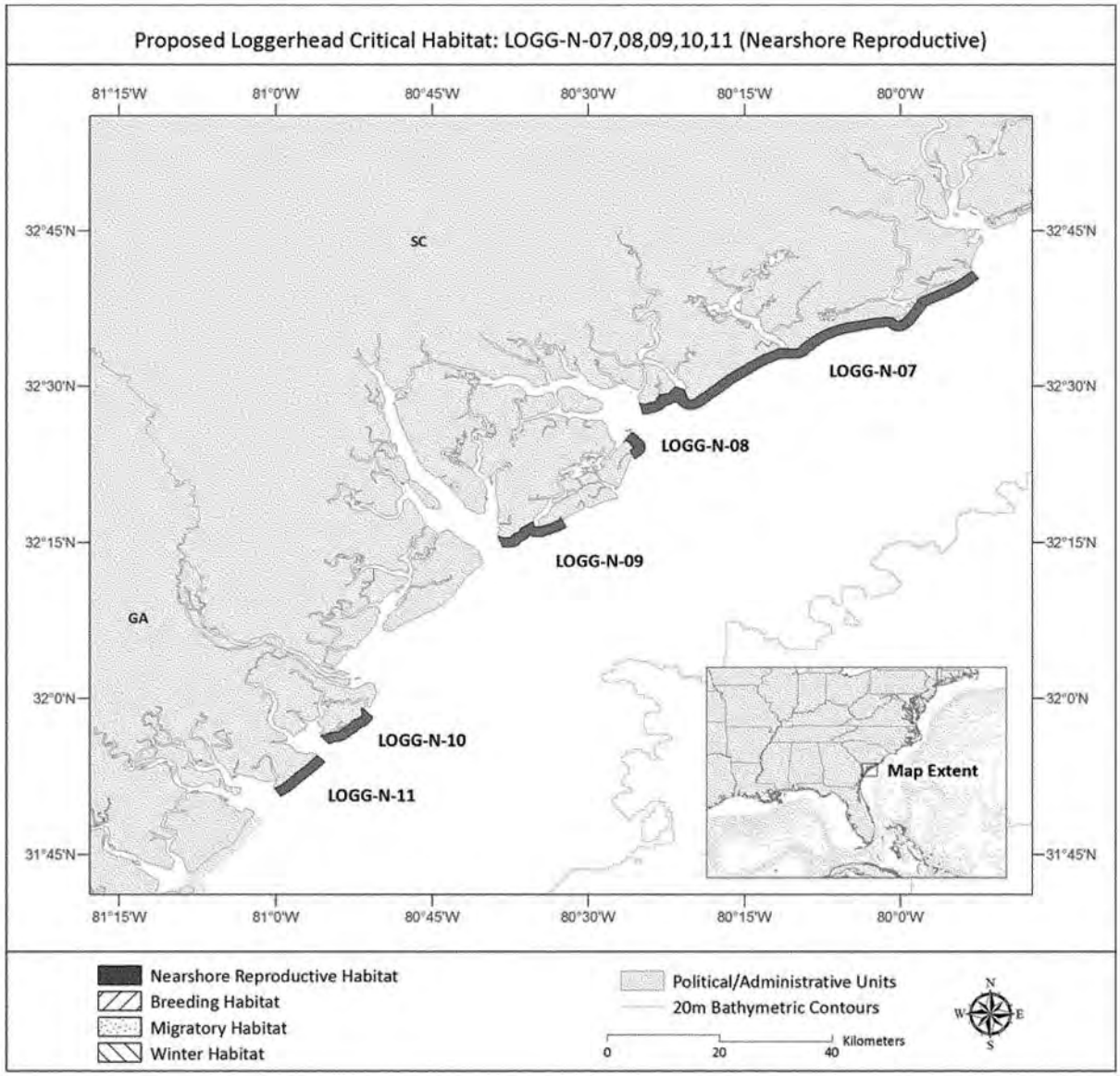
E - Federally Endangered T - Federally Threatened PCH - Proposed Critical Habitat

Species that could be present in the project area during the proposed action are the blue, finback, humpback, right, sei, and sperm whales. Also, the hawksbill, Kemp's ridley, leatherback, loggerhead, and green sea turtles could occur in the project area. However, loggerheads are the primary sea turtle nesters. Critical habitat is not currently designated in the continental United States for the five species of sea turtles identified to occur within the proposed project vicinity. However, USFWS and NOAA Fisheries have proposed listing critical habitat for high density nesting beaches and adjacent beaches and various ocean waters of the Northwest Atlantic Ocean Distinct Population Segment of the loggerhead sea turtle. Folly Beach was included in USFWS's loggerhead sea turtle critical habitat proposal due to it being adjacent to Kiawah Island (a high density nesting beach – see Figure 3). The nearshore waters (i.e., from mean high water seaward for 1.6 km) off of Folly Beach were also included in NOAA Fisheries loggerhead sea turtle critical habitat proposal (see Figure 4). 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 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 (see Figure 5). The red knot is a generally a migrant visitor with a few birds wintering in the area. The southern terminus of sea-beach amaranth range is Folly Island; however, there are currently no known populations of sea-beach amaranth that occur on the island.



LOGG–T–SC–09—Folly Island, Charleston County: This unit consists of 11.2 km (7.0 miles) of island shoreline along the Atlantic Ocean. The island is separated from the mainland by the Atlantic Intracoastal Waterway, Folly River, a network of coastal islands, and salt marsh. The unit extends from Lighthouse Inlet to Folly River Inlet. The unit includes lands from the MHW line to the toe of the secondary dune or developed structures. Land in this unit is in State, and private and other ownership (see Table 1). The Lighthouse Inlet Heritage Preserve, is owned by the County, with a 10 percent undivided interest from the South Carolina Department of Natural Resource. The Folly Beach County Park is owned by the County. Both are managed by the Charleston County Park and Recreation Commission. This unit was occupied at the time of listing and is currently occupied. This unit supports expansion of nesting from an adjacent unit (LOGG–T–SC–10) that has high-density nesting by loggerhead sea turtles in South Carolina. This unit contains all of the PBFs and PCEs. The PBF in this unit may require special management considerations or protections to ameliorate the threats of recreational use, beach sand placement activities, inwater and shoreline alterations, coastal development, beach erosion, climate change, artificial lighting, humancaused disasters, and response to disasters. The City of Folly Beach has a beach management plan that includes measures to protect nesting and hatchling loggerhead sea turtles from anthropogenic disturbances (City of Folly Beach 1991, pp. 32–35). These measures apply to both the private and other lands within this critical habitat unit.

FIGURE 3: U.S. FISH &WILDLIFE SERVICE LOGGERHEAD SEA TURTLE CRITICAL HABITAT



LOGG-N-7—Folly, Kiawah, Seabrook, Botany Bay Islands, Botany Bay Plantation, Interlude Beach, and Edingsville Beach, Charleston County, South Carolina; Edisto Beach State Park, Edisto Beach, and Pine and Otter Islands, Colleton County, South Carolina. This unit contains nearshore reproductive habitat only. The unit consists of nearshore area from Lighthouse Inlet to Saint Helena Sound (crossing Folly River, Stono, Captain Sam's, North Edisto, Frampton, Jeremy, South Edisto and Fish Creek Inlets) from the MHW line seaward 1.6 km.

FIGURE 4: NOAA FISHERIES LOGGERHEAD SEA TURTLE CRITICAL HABITAT

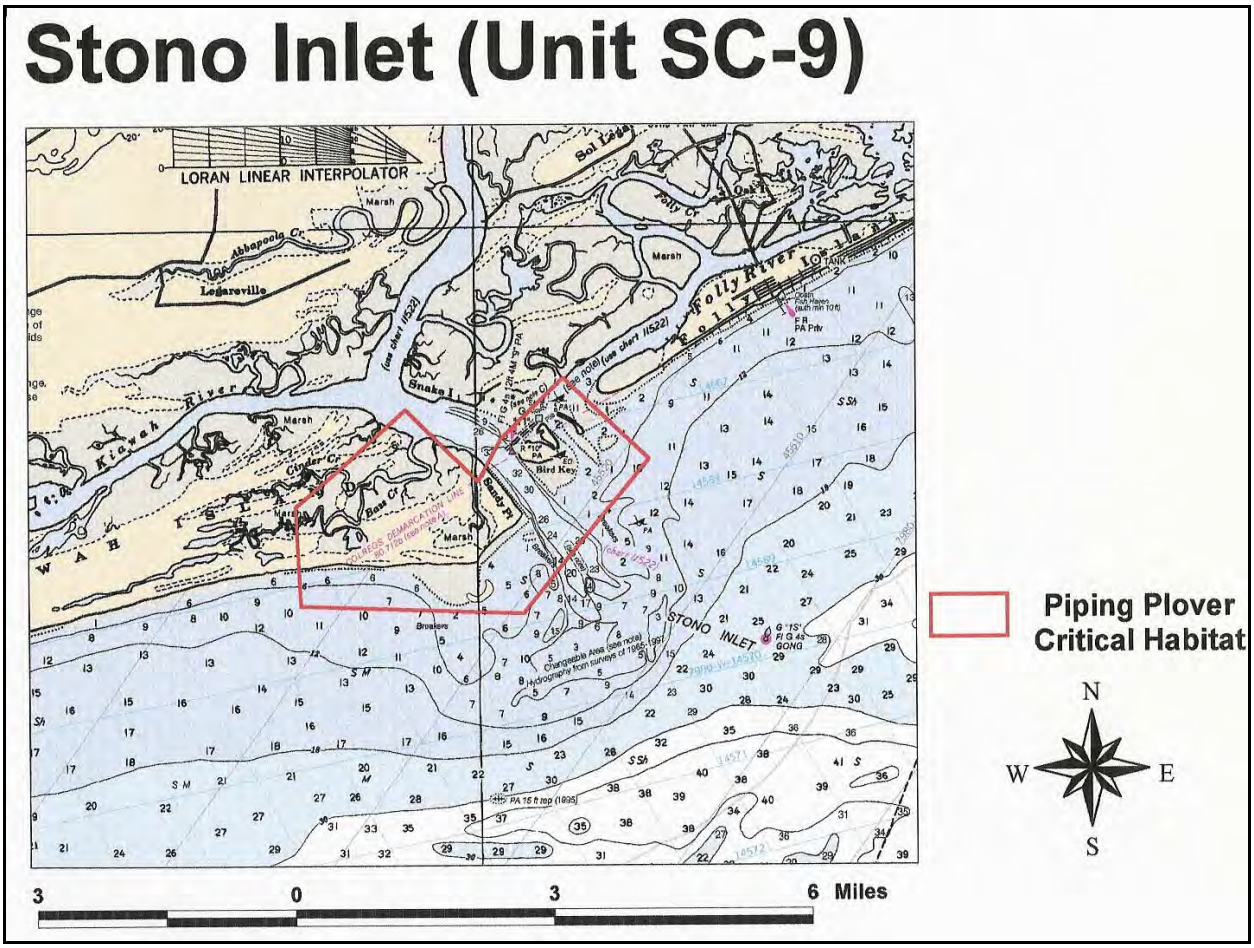


FIGURE 5: PIPING PLOVER CRITICAL HABITAT IN STONO INLET

6.0 SPECIES ASSESSMENTS

6.1 Blue, finback, humpback, right, sei, and sperm whales

The blue whale may be the largest mammal ever to inhabit the earth. It may reach lengths of up to 100 feet—roughly the length of a basketball court. Blue whales weigh up to 160 tons. They feed on small shrimp-like crustaceans. The whales consume up to eight tons of these animals a day during their feeding period. A blue whale produced the loudest sound ever recorded from an animal, and some scientists have speculated that they may be able to remain in touch with each other over hundreds of miles. The number of blue whales in the southern hemisphere was severely depleted by whaling. Due to commercial whaling the size of the population is less than ten percent of what it was originally.

The finback whale is the second largest whale, reaching lengths of up to 88 feet and weighing up to 76 tons. The finback whale because of its crescent-shaped dorsal fin, and obvious characteristic, is easily seen at sea. Depending on where they live, finback whales eat

both fish and small pelagic crustaceans, and squids. It sometimes leaps clear of the water surface, yet it is also a deeper diver than some of the other baleen whales. The finback's range is in the Atlantic from the Arctic Circle to the Greater Antilles, including the Gulf of Mexico. In the Pacific Ocean the Finback ranges from the Bering Sea to Cape San Lucas, Baja California.

The humpback whale reaches a maximum length of about 50 feet and a maximum weight of about 37½ tons. They are mostly black, but the belly is sometimes white. Flippers and undersides of the flukes are nearly all white. They are migratory. They eat krill and schooling fish. In the Atlantic they migrate from Northern Iceland and Western Greenland south to the West Indies, including the Northern and Eastern Gulf of Mexico. In the Pacific Ocean they migrate from the Bering Sea to Southern Mexico. The humpback is one of the most popular whales for whale watching on both the east and west coasts. Scientists estimate that there are 10,000 humpbacks worldwide, only about 8% of its estimated initial population.

The sei whale is one of the largest whales. It can reach a length of 60 feet and a weight of 32 tons. They feed primarily on krill and other small crustaceans, but also feed at times on small fish. The sei whale is the fastest of the baleen whales and can reach speeds of more than 20 miles per hour. In the Atlantic Ocean the Sei whale ranges from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the Sei whale may range from the Bering Sea to Southern Mexico. The Sei whale is endangered due to past commercial whaling.

Unlike the other great whales on the endangered species list, the sperm whale is a toothed whale. It is the largest of the toothed whales reaching a length of 60 feet in males and 40 feet in females. Sperm whales are noted for their dives that can last up to an hour and a half and go as deep as 2 miles under the surface. It is the most abundant of all the endangered whales, with an estimated population of two million. Sperm whales feed mainly on squid, including the giant squid. They range in the Atlantic Ocean from the Arctic Circle to the Gulf of Mexico. In the Pacific Ocean the sperm whale ranges from the Bering Sea to Southern Mexico. The sperm whale was almost hunted to extinction for its oil (spermaceti). This oil was used in the manufacture of ointments, cosmetics, and candles. The sperm whales usually inhabit the offshore waters.

The right whale is the most endangered species of whale off of the U.S. coasts. The right whale got its name because it was the "right" whale to hunt. It was slow moving and floated after being killed. Current estimates indicate that presently no more than a few hundred exist. Right whales can reach a length of 60 feet and a weight of 100 tons. Although the species has been internationally protected since 1937, it has failed to show any signs of recovery.

Right whales have been observed along the eastern coast of North America from the Florida Keys north to the Gulf of St. Lawrence in Canada. They are found in relatively large numbers around Massachusetts and near Georges Bank in the spring, and then they migrate to two areas in Canadian waters by mid-summer. Most cows that give birth in any given year travel in the winter to the coastal waters of Georgia and Florida to calve and raise their young for the first three months. The Bay of Fundy, between Maine and Nova Scotia, appears to serve as the primary summer and fall nursery hosting mothers and their first-year calves. The calf will stay with its mother through the first year and it is believed that weaning occurs sometime in the fall.

Calves become sexually mature in about 8 years. Females are believed to calve about every three to four years. Sightings of right whales and their occurrence in the inshore waters of the State, although rare, are generally assumed to represent individuals seen during this migration.

Right whales feed primarily on copepods and euphausids. They swim very close to the shoreline, often noted only a few hundred meters offshore. Because of their habit of traveling near the coast, there is concern over impacts resulting from collisions with boats and ships. Some right whales have been observed to bear propeller scars on their backs resulting from collisions with boats (NMFS, 1984). Destruction or pollution of right whale habitat is not known to be a problem in the project area. There is no designation of critical habitat for whales in SC.

Effect Determination

Of these six species of whales being considered, only the right whale would normally be expected to occur within the project area during the construction period; therefore the other species of whales are not likely to be affected by the proposed project. The majority of right whale sightings in the project area occur from December through February. The presence of a slow moving hydraulic cutterhead pipeline dredge in this area should pose no direct impacts to the right whale; however, when relocating, the dredge and any supporting vessels are required to alter course and stop if necessary to avoid approaching whales. If whales are spotted during the day within 10 miles of the dredging operation, then the dredge is required to reduce transit speed at night, should it need to relocate during that time period. Corps contract specifications expressly require avoidance of right whales. For these reasons, it has been determined that the project as proposed is **not likely to adversely affect the right whale**. (The 29 October 1997 "National Marine Fisheries Service, Regional Biological Opinion on Hopper Dredging along the South Atlantic Coast" has jurisdiction on right whale effects)

6.2 West Indian Manatee

West Indian manatees are massive fusiform-shaped animals with skin that is uniformly dark grey, wrinkled, sparsely haired, and rubber-like. Manatees possess paddle-like forelimbs, no hind limbs, and a spatulate, horizontally flattened tail. Females have two axillary mammae, one at the base of each forelimb. Their bones are massive and heavy with no marrow cavities in the ribs or long bones of the forearms (Odell 1982). Adults average about 11.5 feet in length and 2,200 pounds in weight, but may reach lengths of up to 15 feet (Gunter 1941) and weigh as much as 3,570 pounds (Rathburn *et al*. 1990). Newborns average 4 to 4½ feet in length and about 66 pounds (Odell 1981).

The West Indian manatee (*Trichechus manatus*) was listed as endangered on March 11, 1967, under a law that preceded the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.). Additional Federal protection is provided for this species under the Marine Mammal Protection Act of 1972, as amended (16 USC 1461 et seq.) The manatee population in the United States is confined during the winter months to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia (USFWS, 1996). However, during the summer months, they may migrate as far north as coastal

Virginia on the East Coast and as far west as Louisiana on the Gulf of Mexico (USFWS, 1991). The manatee is an infrequent visitor to the South Carolina coast with some visual reports in various locations along the coast.

Effect Determination

Most of the proposed work is currently scheduled to occur during the time of year when manatees are generally not visiting the area; however, the project is expected to extend into the warmer months when manatees may occur in the project area. During the warmer months, precautions will be taken to ensure that any manatees in the vicinity are not harmed or harassed. In addition, since the proposed work is to be performed with a hydraulic cutterhead pipeline dredge (dredge plants that are slow moving) and since manatees are uncommon in the vicinity of Folly Island, no impacts to the manatee are anticipated. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the West Indian manatee**.

6.3 Kemp's ridley, leatherback, loggerhead, green, and hawksbill sea turtles

There are five species of sea turtles on the Atlantic Coast, Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas)*, and the hawksbill sea turtle (*Eretmochelys imbricata*). These five species of sea turtles are protected by the Convention on International Trade in Endangered Species (CITES). They are also listed as endangered or vulnerable in the Red Data Book by the International Union for the Conservation of Nature (IUCN). The hawksbill, Kemp's ridley and leatherback were listed as endangered by the U. S. Endangered Species Act in 1973. The green turtle and the loggerhead were added to the list as threatened in 1978.

Sea turtles vary in size from an average of 75 pounds for the olive ridley (does not occur in the project area) to the giant leatherback, which may exceed 800 pounds. Modified for living in the open ocean, they have paddle-like front limbs for swimming. The thick neck and head cannot be drawn back into the body. Sea turtles also have special respiratory mechanisms and organs to excrete excess salt taken in with seawater when they feed.

The leatherback is very different from the other sea turtle species. Instead of plates (scutes) on the shell, the leatherback's carapace has seven hard longitudinal ridges along the length of the back. Its rubber-like covering is black with white spots and a pinkish-white underside. The average length of its shell is 5 feet. The green turtle is the second largest sea turtle and the loggerhead the third. Green turtles get their name from the color of their fat, not their shells, which are grayish in older animals. The smallest sea turtle that may be present in the area of the proposed project is the Kemp's ridley; it has a drab olive to grayish-black shell. Loggerheads have rich reddish-brown shells and yellow on their undersides. The loggerhead's large skull provides for the attachment of strong jaw muscles for crushing conchs and crabs. The hawksbill has a patterned shell of brown and yellow with scutes that overlap like shingles on a roof. Its long, narrow head and beak enable it to feed among coral reefs.

Sea turtles occupy different habitats, depending upon their species, sex and age (size). Hatchlings and smaller juvenile loggerheads appear to live in floating mats of sargassum in the open ocean. This seaweed offers cover, protection from predators and a source of food. Larger juveniles are generally seen in the same coastal habitat as the adults, especially during the summer.

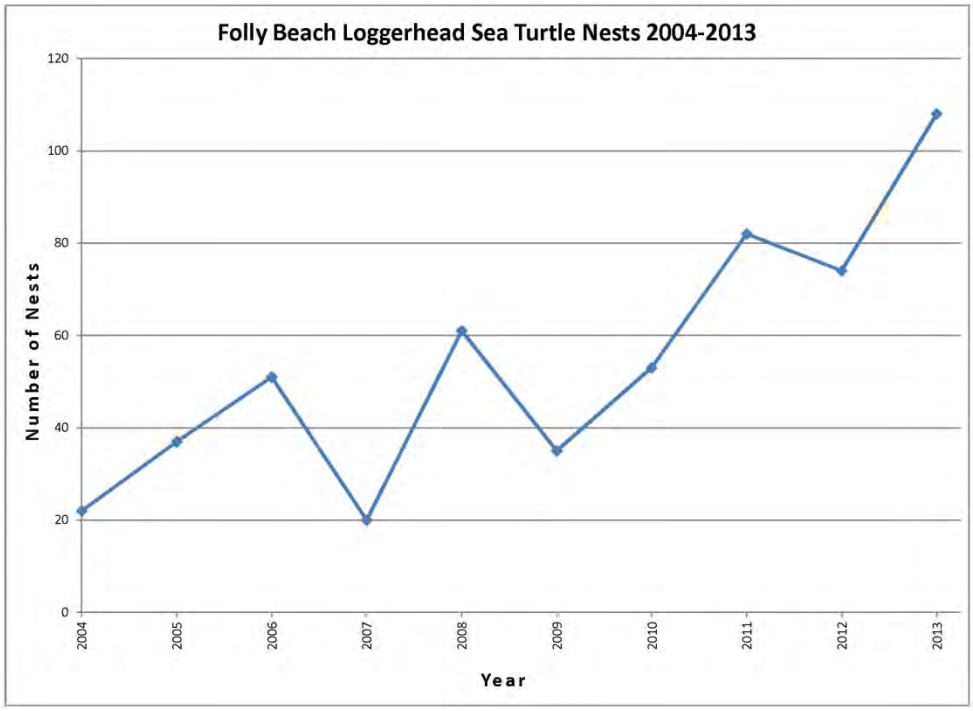
Leatherbacks feed entirely on jellyfish, and they often travel long distances to keep up with large concentrations of this food source drifting in the ocean currents. Green turtles are herbivorous and remain near pastures of turtle-preferred grasses. Often these pastures are not near their nesting beaches, so these turtles may migrate hundreds of miles to nest. Loggerheads usually leave the cold, coastal waters in the winter and are often seen along the edge of the Gulf Stream. Hawksbills live on coral reefs almost year-round, feeding on sponges, sea squirts and other bottom organisms. Although the Kemp's ridley nests only on Mexico's Gulf Coast, small juveniles of this species and the green turtle occur along the South Carolina coast during the summer.

Very little is known about male sea turtles since they almost never come ashore. Male loggerheads are seen in near-shore waters during the spring and early summer breeding season but apparently move back offshore once breeding is completed. Since the reproductive cycles of all sea turtles are similar, a generalized version encompasses all. Mating takes place offshore, and the turtles must only mate once to fertilize all eggs laid during the nesting season. When nesting, the female crawls onto the beach, usually at night, and digs a hole in the sand with her hind flippers. After laying about 100 (number of eggs vary among species) white, leathery eggs, she covers them and returns to the sea. A single female may nest several times a season, usually at 2-week intervals. The eggs incubate about 60 days, depending on the weather. Hatchlings dig out of the sand at night and make their way to the sea using light cues for guidance. Destruction of nests and hatchling mortality at sea are usually high. It appears sea turtles' high number of eggs per clutch and several nestings per season offset this high mortality rate. Nesting habits of the Kemp's ridley deviate from those of other sea turtles. The Kemp's ridley is the only species that nests during the day. Most sea turtles do not nest every year. They return on either a 2- or 3-year cycle to the same general area or beach. Of these five species, only the loggerhead is considered to be a regular nester in SC. However, over the past 10 years (i.e., 2004 thru 2013) both green sea turtles, leatherback sea turtles, and a single Kemp’s ridley sea turtle have nested on South Carolina beaches, including two leatherback nests on Folly Beach (see Table 4). Due to the small number of non-loggerhead nests on Folly Beach, for purposes of this assessment, the loggerhead is considered to be the only species likely to nest in the project area. There is no critical habitat designation for sea turtles in SC; however, as noted above, both USFWS and NOAA Fisheries have proposed listing critical habitat for nesting beaches and various ocean waters for the loggerhead sea turtle.

Loggerhead Sea Turtle. The loggerhead sea turtle has a worldwide distribution and is found in temperate and subtropical waters. Major nesting areas in North America occur along the Southeast Coast from North Carolina to Florida. Loggerhead sea turtles regularly nest along the southern coast of South Carolina from Georgetown south, usually from mid-May to August. Over the last 10 years loggerhead sea turtle nests have been trending upward on both Folly Beach and in South Carolina as a whole (see Figures 6 and 7). Nesting is preferred on remote

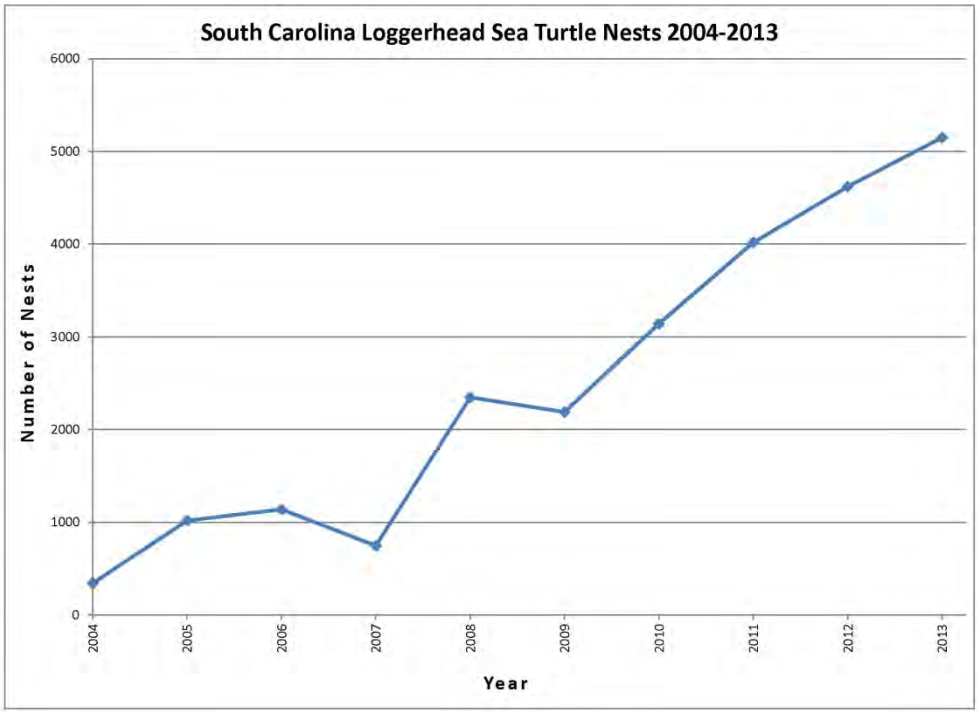
TABLE 4: NON-LOGGERHEAD SEA TURTLE NESTS IN SOUTH CAROLINA - 2004-2013		
Nesting Year	**Non-loggerhead Sea Turtle Nests**	**Island/Beach**
2013	5 greens	4 - Myrtle Beach 1 - Hobcaw Beach
2012	7 greens	5 Garden City Beach 1 Kiawah Island 1 North Island
	1 leatherback	Kiawah Island
2011	3 greens	1 Sand Island 1 Huntington Beach 1 Cape Island
	4 leatherbacks	3 Hilton Head Island 1 Hunting Island
2010	6 greens	4 Garden City Beach 1 Surfside Beach 1 Myrtle Beach State Park
	3 leatherbacks	1 Hunting Island 1 Hilton Head Island 1 Folly Beach
2009	1 green	Waites Island
	2 leatherbacks	Edisto Beach
2008	1 green	South Island
	5 leatherbacks	1 Kiawah Island 1 Garden City Beach 1 Folly Beach 1 Bull Island 1 Cape Island
	1 Kemp's ridley	South Litchfield Beach
2007	2 greens	1 Pawleys Island 1 Cape Island
2006	2 greens	1 Cape Island 1 Garden City Beach
	1 leatherback	Hilton Head Island
2005	1 leatherback	Cape Island
2004	1 green	Garden City Beach

Data Source: seaturtle.org



Data Source: seaturtle.org

FIGURE 6: FOLLY BEACH LOGGERHEAD NEST DATA



Data Source: seaturtle.org

FIGURE 7: SOUTH CAROLINA LOGGERHEAD NEST DATA

beaches-and juveniles preferring bays and estuaries. An omnivore, crustaceans, molluscs, squid, jellyfish, fish, and plant materials are desirable foods. Stranding data reveals that up to 70% of all stranded sea turtles are loggerheads with the majority of strandings occurring from May to August. Therefore, it can be surmised that the potential presence of loggerheads in the project area would most-likely occur at this time. In Georgia, South Carolina and North Carolina the nesting season generally begins in mid-May and ends by mid-August. Nesting activity is greatest, however, in June and July. Loggerheads are known to nest from one to seven times within a nesting season; the mean is approximately 4.1. The internesting interval varies around a mean of about 14 days. There is general agreement that females mate prior to the nesting season (and possibly only once) and then lay multiple clutches of fertile eggs throughout some portion of the nesting season. Mean clutch size varies from about 100 to 125 along the southeastern United States coast. Loggerheads are nocturnal nesters, but exceptions to the rule do occur infrequently. Multi-annual remigration intervals of two and three years are most common in loggerheads, but the number can vary from one to six years. The length of the incubation period is related to nest temperature. Sex determination in loggerhead hatchlings is temperature dependent and the species apparently lacks sex chromosomes. Loggerhead hatchlings engage in a "swimming frenzy" for about 20 hours after they enter the sea and that frenzy takes them about 22 to 28 kilometers offshore. At some point thereafter they become associated with sargassum rafts and/or debris at current gyres. Upon reaching about 45 cm mean straight carapace length (sCL), they abandon their pelagic existence and migrate to near-shore and estuarine waters of the eastern United States, the Gulf of Mexico and the Bahamas and begin the subadult stage. As adults, loggerheads become migratory for the purpose of breeding. Reported tag recoveries suggest a "migratory path" from Georgia to Cape Hatteras, North Carolina with a single recovery of a Georgia tagged female on the Florida Gulf Coast (Tampa Bay). Little else is known of the scheduled travels of Georgia, South Carolina, and North Carolina nesters outside of the nesting season (NMFS, USFWS, 1991).

Affected sea turtle environment. The areas of affected environment for this proposed project are the four marine areas (an approximate 625 acre total area) proposed for borrow material dredging (see Figure 2) and the placement of an estimated 1,400,000 cubic yards of sand along 26,000 feet of beach. This sand placement will result in an increase in the size of the dry beach; conversion of existing intertidal beach to dry beach and shifting the intertidal zone seaward from its existing location; and conversion of some subtidal beach to intertidal beach and shifting the subtidal zone seaward from its existing location. Due to erosion, these acreages and the shifting of the intertidal and subtidal zones will change over time.

Current rangewide conditions for sea turtles. It is not possible, at present, to estimate the size of the loggerhead population in United States territorial waters if one includes subadults. There is, however, general agreement that enumeration of nesting females provides a useful index to population size and stability. It is estimated that 14,150 females nest per year in the southeastern United States. This estimate was based on aerial survey data from 1983 has been accepted as the best current approximation. Given a stochastically derived mean number of nests per female (4.1), this figure provides an estimate of approximately 58,000 nests deposited per year in the Southeast. Based on more extensive ground and aerial surveys throughout the Southeast in recent years (1987 to 1990), it is estimated that approximately 50,000-70,000 nests are deposited annually. These totals constitute about 35 to 40 percent of the loggerhead nesting

known worldwide and clearly rank the southeastern United States aggregation as the second largest in the world, with the somewhat larger Oman assemblage being the only other truly large group remaining anywhere (NMFS, USFWS, 1991).

A recent review considered consequences of life tables and population models; mortality rates in the Southeast; population declines in South Carolina and Georgia; and estimates of annual mean clutch production per female. It was concluded that the stock of loggerheads represented by females that nest in the Southeast is continuing to decline (NMFS, USFWS, 1991).

Factors Impacting Nesting Success in the Area

In general, no other factor contributes to egg mortality more than nest predation. A variety of natural and introduced predators such as raccoons, foxes, ghost crabs and ants prey on incubating eggs and hatchling sea turtles. Normally, it is expected that the raccoon (*Procyon lotor*) would be the principal predator, as it is throughout the coast, followed by fox and ghost crabs. Raccoons are known to patrol primary dune lines at night and dig up nests after they were buried in the dune. Raccoons may take up to 96 percent of all nests deposited on a beach if there is no intervention. These nests may be empty or only have a few eggs remaining after predation. Any remaining eggs can be cleaned and then relocated, however, these small nests normally exhibit very low hatching success. In addition to the destruction of eggs, other predators may take considerable numbers of hatchlings just prior to or upon emergence from the sand (NMFS, USFWS, 1991).

Cumulative effects of actions in project area on sea turtles. Very little is known about sea turtle diseases or natural mortality rates. However, it is believed that declines in populations are a direct result of human actions. Erosion of nesting beaches can result in partial or total loss of suitable nesting habitat. Dynamic coastal processes, including sea level rise, influence erosion rates. Man's interference with these natural processes through coastal development and associated activities has resulted in accelerated erosion rates and interruption of natural shoreline migration. Where beachfront development occurs the site is often fortified to protect the property from erosion. Virtually all shoreline engineering is carried out to save structures, not dry sandy beaches, and ultimately, this results in environmental damage. One type of shoreline engineering, collectively referred to as beach armoring, includes sea walls, rock revetments, riprap, sandbag installations, groins and jetties. Beach armoring can result in permanent loss of a dry nesting beach through accelerated erosion and prevention of natural beach/dune accretion and can prevent or hamper nesting females from accessing suitable nesting sites. Clutches deposited seaward of these structures may be inundated at high tide or washed out entirely by increased wave action near the base of these structures. As these structures fail and break apart they spread debris on the beach that may further impede access to suitable nesting sites (resulting in higher incidences of false crawls) and trap hatchlings and nesting turtles. Sandbags are particularly susceptible to rapid failure and result in extensive debris on nesting beaches. Rock revetments, riprap and sand bags can cause nesting turtles to abandon nesting attempts or to

construct improperly, sized and shaped egg cavities when inadequate amounts of sand cover these structures. Approximately 21 percent (234 km) of Florida's, 10 percent (18 km) of Georgia's and 10 percent (30 km;) of South Carolina's beaches are armored (NMFS, USFWS, 1991).

Groins and jetties are designed to trap sand during transport in longshore currents or to keep sand from flowing into channels in the case of the latter. These structures prevent normal sand transport and accrete beaches on one side of the structure while starving neighboring beaches on the other side thereby resulting in severe beach erosion and corresponding degradation of suitable nesting habitat. Beach nourishment consists of pumping, trucking or scraping sand onto the beach to rebuild what has been lost to erosion. Beach nourishment can impact turtles through direct burial of nests and by disturbance to nesting turtles if conducted during the nesting season. Sand sources may be dissimilar from native beach sediments and can affect nest site selection, digging behavior, incubation temperature (and hence sex ratios), gas exchange parameters within incubating nests, hydric environment of the nest, hatching success and hatchling emergence success. Beach nourishment can result in severe compaction or concretion of the beach. Trucking of sand onto project beaches may increase the level of compaction (NMFS, USFWS, 1991).

Significant reductions in nesting success have been documented on severely compacted nourished beaches. Compaction levels that have been evaluated at ten re-nourished east coast Florida beaches concluded that 50 percent were hard enough to inhibit nest digging, 30 percent were questionable as to whether their hardness affected nest digging and 20 percent were probably not hard enough to affect nest digging. In general, beaches nourished from offshore borrow sites are harder than natural beaches, and, while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more. However, it is not known if these conclusions on Florida beaches are applicable to South Carolina beaches, since informal observations and sporadic cone penetrometer testing throughout the state has shown nesting occurring where sand compaction is over 500 pounds per square inch. In light of this limited amount of information, the Charleston District proposes to test sea turtle (loggerheads) nesting preferences by tilling only alternate sections of the beach after sand placement, as described in the Effect Determination Section. Nourished beaches often result in severe escarpments along the mid-beach and can hamper or prevent access to nesting sites. Nourishment projects result in heavy machinery, pipelines, increased human activity and artificial lighting on the project beach. These activities are normally conducted on a 24-hour basis and can adversely affect nesting and hatching activities. Pipelines and heavy machinery can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls (non-nesting emergences). Increased human activity on the project beach at night may cause further disturbance to nesting females. Artificial lights along the project beach and in the nearshore area of the borrow site may deter nesting females and disorient or misorient emergent hatchlings from adjacent non-project beaches (NMFS, USFWS, 1991).

Beach nourishment projects require continual maintenance (subsequent nourishment) as beaches erode and hence their potential negative impacts to turtles are repeated on a regular basis. Beach nourishment projects conducted during the nesting season can result in the loss of

some nests which may be inadvertently missed or misidentified as false crawls during daily patrols conducted to identify and relocate nests deposited on the project beach. Nourishment of highly eroded beaches (especially those with a complete absence of dry beach) can be beneficial to nesting turtles if conducted properly. Careful consideration and advance planning and coordination must be carried out to ensure timing, methodology and sand sources are compatible with nesting and hatching requirements (NMFS, USFWS, 1991).

Extensive research has demonstrated that the principal component of the sea finding behavior of emergent hatchlings is a visual response to light. Artificial beachfront lighting from buildings, streetlights, dune crossovers, vehicles and other types of beachfront lights has been documented in the disorientation (loss of bearings) and misorientation (incorrect orientation) of hatchling turtles. The results of disorientation or misorientation are often fatal. As hatchlings head toward lights or meander along the beach their exposure to predators and likelihood of desiccation is greatly increased. Misoriented hatchlings can become entrapped in vegetation or debris, and many hatchlings are found dead on nearby roadways and in parking lots after being struck by vehicles. Hatchlings that successfully find the water may be misoriented after entering the surf zone or while in nearshore waters. Intense artificial lighting can even draw hatchlings back out of the surf (NMFS, USFWS, 1991).

The problem of artificial beachfront lighting is not restricted to hatchlings. It has been indicated that adult loggerhead emergence patterns were correlated with variations in beachfront lighting in south Brevard County, Florida, and that nesting females avoided areas where beachfront lights were the most intense. It has also been noted that loggerheads aborted nesting attempts at a greater frequency in lighted areas. Problem lights may not be restricted to those placed directly on or in close proximity to nesting beaches. The background glow associated with intensive inland lighting, such as that emanating from nearby large metropolitan areas, may deter nesting females and disorient or misorient hatchlings navigating the nearshore waters. Cumulatively, along the heavily developed beaches of the southeastern United States, the negative effects of artificial lights are profound (NMFS, USFWS, 1991).

Residential and tourist use of developed (and developing) nesting beaches can also result in negative impacts to nesting turtles, incubating egg clutches and hatchlings. The most serious threat caused by increased human presence on the beach is the disturbance to nesting females. Night-time human activity can cause nesting females to abort nesting attempts at all stages of the behavioral process. It has been reported that disturbance can cause turtles to shift their nesting beaches, delay egg laying, and select poor nesting sites. Heavy utilization of nesting beaches by humans (pedestrian traffic) may result in lowered hatchling emergence success rates due to compaction of sand above nests and pedestrian tracks can interfere with the ability of hatchlings to reach the ocean. Campfires and the use of flashlights on nesting beaches misorient hatchlings and can deter nesting females (NMFS, USFWS, 1991).

Nest loss due to erosion or inundation and accretion of sand above incubating nests appear to be the principal abiotic factors that may negatively affect incubating egg clutches. While these factors are often widely perceived as contributing significantly to nest mortality or lowered hatching success, few quantitative studies have been conducted. Studies on a relatively undisturbed nesting beach indicated that, excepting a late season severe storm event, erosion and

inundation played a relatively minor role in destruction of incubating nests. Inundation of nests and accretion of sand above incubating nests as a result of the late season storm played a major role in destroying nests from which hatchlings had not yet emerged. Severe storm events (e.g., tropical storms and hurricanes) may result in significant nest loss, but these events are typically aperiodic rather than annual occurrences. In the southeastern United States, severe storm events are generally experienced after the peak of the hatching season and hence would not be expected to affect the majority of incubating nests. Erosion and inundation of nests are exacerbated through coastal development and shoreline engineering. These threats are discussed above under beach armoring (NMFS, USFWS, 1991).

The effects of dredging are evidenced through the degradation of habitat and incidental take of marine turtles. Channelization of inshore and nearshore habitat and the disposal of dredged material in the marine environment can destroy or disrupt resting or foraging grounds (including grass beds and coral reefs) and may affect nesting distribution through the alteration of physical features in the marine environment. Hopper dredges are responsible for incidental take and mortality of marine turtles during dredging operations. Other types of dredges (clamshell dredges and hydraulic cutterhead pipeline dredges) have not been implicated in incidental take (NMFS, USFWS, 1991). Incidental takes of sea turtles by hopper dredges comes under the jurisdiction of NOAA Fisheries and is covered by a separate Biological Opinion (NMFS, 1997).

Of all commercial and recreational fisheries conducted in the United States, shrimp trawling is the most damaging to the recovery of marine turtles. The estimated number of loggerheads killed annually by the offshore shrimping fleet in the southeastern United States Atlantic and Gulf of Mexico is 5,000 to 50,000. Incidental capture and drowning in shrimp trawls is believed to be the largest single source of mortality on juvenile through adult stage marine turtles in the southeastern United States. Most of these turtles are juveniles and subadults, the age and size classes most critical to the stability and recovery of marine turtle populations. Quantitative estimates of turtle take by shrimp trawlers in inshore waters have not been developed, but the level of trawling effort expended in inshore waters along with increasing documentation of the utilization of inshore habitat by loggerhead turtles suggest that capture and mortality may be significant. Trawlers targeting species other than shrimp tend to use larger nets than shrimp trawlers and probably also take sea turtles, although capture levels have not been developed. These fisheries include, but are not limited to bluefish, croaker, flounder, calico scallops, blue crab and whelk. Of these, the bluefish, croaker and flounder trawl fisheries likely pose the most serious threats. The harvest of sargassum by trawlers can result in incidental capture of post hatchlings and habitat destruction (NMFS, USFWS, 1991).

Effect Determination

Loggerhead sea turtle nesting activities have been recorded within the project area on Folly Island. The placement of sand and construction activities associated with the placement of that sand on this reach of beach could adversely affect any existing sea turtle nests and sea turtles attempting to nest. Placement of the dredged material is currently scheduled to occur during the months of January through June. When construction work occurs during sea turtle nesting season, the following precautions will be taken to minimize the effects to sea turtles:

- If any construction of the project occurs during the period between May 1 and November 30, 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 December 1 to April 30, no nesting surveys will be performed.

- For construction activities occurring during the period May 1 through November 30, 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 May 1 through November 30, 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 perform cone penetrometer compaction testing of the newly constructed sand berm. This compaction testing will be repeated 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 (psi), then the following tilling protocol will be performed:

> For a period of 3 years, starting at the most northern reach of the project, the sand placed on the beach will be tilled/untilled in alternating sections of 500 feet each. Sea turtle nesting data and false crawls will be monitored for this 3-year period and analyzed to determine if tilling (or lack of tilling) has an effect on nesting behavior.

This tilling protocol is being proposed because informal observations and sporadic cone penetrometer testing throughout the State of South Carolina has frequently shown nesting occurring where sand compaction is much greater than 500 psi. Since most previous turtle nesting/sand compaction research has been done in Florida, it is questionable as to whether those test results are applicable to South Carolina's shores. This tilling protocol, when combined with other data being collected in the state, should help answer the question of whether tilling is necessary on re-nourished beaches.

Visual surveys for escarpments along the project area will be made immediately after completion of the project and 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.

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. However, because of the possibility of missing a sea turtle nest during the nest monitoring program or inadvertently breaking eggs during relocation, it has been determined that the proposed project **may adversely affect the loggerhead sea turtle** and **is not likely to adversely modify proposed critical habitat (either terrestrial or marine) for loggerhead sea turtles**. Since all in water dredging activities are addressed and covered by reference in the 1997 NMFS SARBO, no additional sea turtle consultation with NMFS is required.

6.4 Shortnose sturgeon

The Shortnose Sturgeon occurs in Atlantic seaboard rivers from southern New Brunswick, Canada to northeastern Florida, USA. They typically inhabit estuarine and riverine habitats and are not often found offshore. SCDNR reports that in SC they inhabit Winyah Bay Rivers, those that drain into Lake Marion, The Santee, Cooper and Savannah rivers, and the ACE Basin. Within the Cooper River, shortnose sturgeons are mostly found near the freshwater-saltwater interface, where the adult and sub-adult shortnose sturgeons are known to inhabit that area during spring through fall.

Studies have shown that the shortnose sturgeon exists in many of the large coastal river systems in South Carolina. Little is known about the shortnose sturgeon population level, life history or ecology. Their status is probably due to exploitation, damming of rivers and deterioration of water quality. Because there is no coastal river associated with this project, there is a lack of suitable freshwater spawning areas for the sturgeon in the immediate project area.

The shortnose sturgeon is principally a riverine species and is known to use three distinct portions of river systems: (1) non-tidal freshwater areas for spawning and occasional over wintering; (2) tidal areas in the vicinity of the fresh/saltwater mixing zone, year-round as juveniles and during the summer months as adults; and (3) high salinity estuarine areas (15 ppt salinity or greater) as adults during the winter. Habitat conditions suitable for juvenile and adult shortnose sturgeon could occur within the estuaries behind the project area; however, spawning habitat should lie well outside of the project area and should not be affected by this project. The presence of juvenile shortnose sturgeon is not likely due to high salinity. Adults are found in shallow to deep water (6 to 30 feet) and, if present, would be expected to occupy the deeper waters during the day and the shallower areas adjacent to the deeper waters during the night.

The shortnose sturgeon is a bottom feeder, consuming various invertebrates and stems and leaves of macrophytes. Adult foraging activities normally occur at night in shallow water areas adjacent to the deep-water areas occupied during the day. Juveniles are not known to leave deep-water areas and are expected to feed there. The foraging ecology of the shortnose sturgeon

is not known for any portion of its range, and little information exists on the animal's food habits. Dredging for this project will occur at a borrow site located offshore; therefore, shallow water feeding areas will not be affected by the project.

Effect Determination

It is unlikely that the shortnose sturgeon occurs in the project area, however, should it occur, its habitat would be only minimally altered by the proposed project. Any shortnose sturgeons in the area should be able to avoid being taken by a slow moving hydraulic cutterhead pipeline dredge. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the shortnose sturgeon**.

6.5 Atlantic Sturgeon

Although specifics vary latitudinally, the general life history pattern of Atlantic sturgeon is that of a long lived, late maturing, estuarine dependent, anadromous species. The species' historic range included major estuarine and riverine systems that spanned from Hamilton Inlet on the coast of Labrador to the Saint Johns River in Florida.

Atlantic sturgeon spawn in freshwater, but spend most of their adult life in the marine environment. Spawning adults generally migrate upriver in the spring/early summer; February-March in southern systems, April-May in mid-Atlantic systems, and May-July in Canadian systems. In some southern rivers, a fall spawning migration may also occur. Comprehensive information on current or historic abundance of Atlantic sturgeon is lacking for most river systems. Atlantic sturgeon spawning is believed to occur in flowing water between the salt front and fall line of large rivers, where optimal flows are 46-76 cm/s and deep depths of 11-27 meters. Sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces (e.g., cobble).

Juveniles spend several years in the freshwater or tidal portions of rivers prior to migrating to sea. Upon reaching a size of approximately 76-92 cm, the subadults may move to coastal waters, where populations may undertake long range migrations. Tagging and genetic data indicate that subadult and adult Atlantic sturgeon may travel widely once they emigrate from rivers. Subadult Atlantic sturgeon wander among coastal and estuarine habitats, undergoing rapid growth. These migratory subadults, as well as adult sturgeon, are normally captured in shallow (10-50m) near shore areas dominated by gravel and sand substrate. Coastal features or shorelines where migratory Atlantic sturgeon commonly aggregate include the Bay of Fundy, Massachusetts Bay, Rhode Island, New Jersey, Delaware, Delaware Bay, Chesapeake Bay, and North Carolina, which presumably provide better foraging opportunities.

According to the Atlantic sturgeon status review (Atlantic Sturgeon Status Review Team, 2007), projects that may adversely affect sturgeon include dredging, pollutant or thermal discharges, bridge construction/removal, dam construction, removal and relicensing, and power plant construction and operation. Potential direct and indirect impacts associated with dredging that may adversely impact sturgeon include entrainment and/or capture of adults, juveniles, larvae, and eggs by dredging and closed net sea turtle relocation trawling activities, short-term impacts to foraging and refuge habitat, water quality, and sediment quality, and disruption of migratory pathways.

Effect Determination

It is unlikely that the Atlantic sturgeon occurs in the immediate project area, however, should it occur, its habitat would be only minimally altered by the proposed project. Any Atlantic sturgeons in the area should be able to avoid being taken by a slow moving hydraulic cutterhead pipeline dredge. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the Atlantic sturgeon**.

6.6 Piping plover

Piping plovers (*Charadrius melodus*) are small shorebirds approximately six inches long with sand-colored plumage on their backs and crown and white under parts. Breeding birds have a single black breast band, a black bar across the forehead, bright orange legs and bill, and a black tip on the bill. During the winter, the birds lose the black bands, the legs fade to pale yellow, and the bill becomes mostly black.

The piping plover breeds on the northern Great Plains, in the Great Lakes, and along the Atlantic coast (Newfoundland to North Carolina); and winters on the Atlantic and Gulf of Mexico coasts from North Carolina to Mexico, and in the Bahamas West Indies.

Piping plovers nest along the sandy beaches of the Atlantic Coast from Newfoundland to North Carolina, the gravelly shorelines of the Great Lakes, and on river sandbars and alkali wetlands throughout the Great Plains region. They prefer to nest in sparsely vegetated areas that are slightly raised in elevation (like a beach berm). Piping plover breeding territories generally include a feeding area, such as a dune pond or slough, or near the lakeshore or ocean edge. The piping plover winters along the coast, preferring areas with expansive sand or mudflats (feeding) in close proximity to a sandy beach (roosting). The primary threats to the piping plover are habitat modification and destruction, and human disturbance to nesting adults and flightless chicks. A lack of undisturbed habitat has been cited as a reason for the decline of other shorebirds such as the black skimmer and least tern (USFWS, 1996a).

The piping plover is an occasional visitor along the South Carolina coast during the winter months and individuals are occasionally sighted in the project area. However, there are no large wintering concentrations in the state. Piping plovers are considered threatened species under the Endangered Species Act of 1973, as amended, when on their wintering grounds. The species is not known to nest in the project area.

Effect Determination

Placement of the dredged material is currently scheduled to occur during the months of January through June. Direct loss of nests from the disposal of the dredged material should not occur, as the species is not known to nest in the project area. Piping plover foraging distribution on the beach during the winter months may be altered as beach food resources may be affected by placement of material along the project area. Such disruptions will be temporary and of minor significance. Any shorebird habitat area originally existing along the length of the island

has suffered severe erosion. Dredged material will likely help restore the habitat lost to erosion in this area while the protective berm is being constructed. The placement of dredged material into the intertidal zone will provide additional foraging habitat for the wintering piping plover. For these reasons, it has been determined that the proposed project is **not likely to adversely affect the piping plover**. It has also been determined that the proposed project is **not likely to adversely modify critical habitat for wintering piping plovers**.

6.7 Rufa Red Knot

Rufa red knots (*Calidris canutus rufa*) are medium-sized shorebirds approximately 9 to 11 inches long. Red knots have a proportionately small head, small eyes, and short neck, and a black bill that tapers from a stout base to a relatively fine tip. The bill length is not much longer than head length. Legs are short and typically dark gray to black, but sometimes greenish in juveniles or older birds in nonbreeding plumage. Nonbreeding plumage is dusky gray above and whitish below. Juveniles resemble nonbreeding adults, but the feathers of the scapulars (shoulders) and wing coverts (small feathers covering base of larger feathers) are edged with white and have narrow, dark bands, giving the upperparts a scalloped appearance. Breeding plumage of red knots is a distinctive rufous (red). The face, prominent stripe above the eye, breast, and upper belly are a rich rufous-red to a brick or salmon red, sometimes with a few scattered light feathers mixed in. The feathers of the lower belly and under the tail are whitish with dark flecks. Upperparts are dark brown with white and rufous feather edges; outer primary feathers are dark brown to black. Females are similar in color to males, though the rufous colors are typically less intense, with more buff or light gray on the dorsal (back) parts (USFWS, 2013a).

Each year red knots make one of the longest distance migrations known in the animal kingdom, traveling up to 19,000 mi annually. This migration occurs between the red knot's breeding grounds in the Canadian Arctic and several wintering areas, including the Southeast United States, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America ("Winter" is used to refer to the nonbreeding period of the red knot life cycle when the birds are not undertaking migratory movements.). During both the northbound (spring) and southbound (fall) migrations, red knots use key staging and stopover areas to rest and feed. Southbound red knots tend to be less concentrated than during either their northbound migrations and in their wintering areas (USFWS, 2013).

Red knots undertake long flights that may span thousands of miles without stopping. As red knots prepare to depart on long migratory flights, they undergo several physiological changes. Before takeoff, the birds accumulate and store large amounts of fat to fuel migration and undergo substantial changes in metabolic rates. In addition, leg muscles, gizzard, stomach, intestines, and liver all decrease in size, while pectoral muscles and heart increase in size. Due to these physiological changes, red knots arriving from lengthy migrations are not able to feed maximally until their digestive systems regenerate, a process that may take several days. Because stopovers are time-constrained, red knots require stopovers rich in easily digested food to achieve adequate weight gain (USFWS, 2013a).

Red knots generally nest in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation. Breeding areas are located inland, but near arctic coasts. Nests may be scraped into patches of mountain avens (*Dryas octopetala*) plants, or in low spreading vegetation on hummocky ground containing lichens, leaves, and moss. Female red knots lay only one clutch (group of eggs) per season, and, as far as is known, do not lay a replacement clutch if the first is lost. The usual clutch size is four eggs, though three-egg clutches have been recorded. The incubation period lasts approximately 22 days from the last egg laid to the last egg hatched, and both sexes participate equally in egg incubation. After the eggs hatch, red knot chicks and adults quickly move away from high nesting terrain to lower, wetland habitats. Young are precocial, leaving the nest within 24 hours of hatching and foraging for themselves. Females are thought to leave the breeding grounds and start moving south soon after the chicks hatch in mid-July. Thereafter, parental care is provided solely by the males, but about 25 days later (around August 10) they also abandon the newly fledged juveniles and move south. Not long after, they are followed by the juveniles (USFWS, 2013a).

Red knots are a specialized molluscivore, eating hard-shelled mollusks, sometimes supplemented with easily accessed softer invertebrate prey, such as shrimp and crab-like organisms, marine worms, and horseshoe crab eggs. Red knots do not necessarily prefer hard-shelled mollusks (in fact they do not, when given the choice), but they are specialized in finding and processing such prey. Due to this specialization, red knots have less ability to find the actively crawling soft-bodied worms and small crustaceans on which other sandpiper species specialize. Foraging activity is largely dictated by tidal conditions, as red knots rarely wade in water more than 0.8 to 1.2 in deep. Due to bill morphology, red knots are is limited to foraging on only shallow-buried prey, within the top 0.8 to 1.2 in of sediment. Red knots and other shorebirds that are long-distance migrants must take advantage of seasonally abundant food resources at migration stopovers to build up fat reserves for the next non-stop, long-distance flight. During the migration period, although foraging red knots can be found widely distributed in small numbers within suitable habitats, birds tend to concentrate in those areas where abundant food resources are consistently available from year to year. A prominent departure from typical prey items occurs each spring when red knots feed on the eggs of horseshoe crabs, particularly during the key migration stopover within the Delaware Bay of New Jersey and Delaware. The Delaware Bay serves as the principal spring migration staging area for the red knot because of the abundance and availability of horseshoe crab eggs. Horseshoe crab eggs are a superabundant source of easily digestible food. Horseshoe crabs occur along the Atlantic coast from Maine to Florida, along Florida's Gulf coast, and along Mexico's Yucatan Peninsula. Within this geographic range, horseshoe crabs are most abundant between Virginia and New Jersey, with the largest population occurring in Delaware Bay. Each spring, adult horseshoe crabs migrate from deep bay waters and the Atlantic continental shelf to spawn on intertidal sandy beaches. Beaches within estuaries are preferred spawning areas because they are low energy environments and are protected from the surf. Horseshoe crab spawning generally occurs from March through July, with the peak spawning activity occurring around the evening new and full moon high tides in May and June. Horseshoe crabs and surface egg availability are not found in similar densities in other areas on the Atlantic coast, which may explain why shorebirds concentrate in the Delaware Bay. Besides supporting red knots, Delaware Bay supports high numbers of other shorebird species, and ranks among the 10 largest shorebird migration staging sites in the Western Hemisphere. Outside of Delaware Bay, horseshoe crab eggs are eaten

opportunistically when available in nonbreeding habitats but are not considered a primary food resource for red knots in these areas. Delaware Bay provides the final Atlantic coast stopover for a significant majority (50 to 80 percent) of the red knot population making its way to the arctic breeding grounds each spring. Red knots stopping in Delaware Bay depend on horseshoe crab eggs to achieve remarkable rates of weight gain. No single stopover area is more important for the red knot than the Delaware Bay because the nutritive yield of the bay is so high. The timing of the arrival of red knots and other shorebirds in Delaware Bay typically coincides with the annual peak of the horseshoe crab spawning period. Red knots in Delaware Bay rely almost entirely on horseshoe crab eggs to support their very high rates of weight gain. Research has provided strong evidence that a majority of red knots stop at the Delaware Bay during the spring migration, and that these birds are highly reliant on a superabundance of horseshoe crab eggs to gain weight during their stopover period. On the breeding grounds, the red knot's diet consists mostly of terrestrial invertebrates, though early in the season, before insects and other macroinvertebrates are active and accessible, red knots will eat grass shoots, seeds, and other vegetable matter (USFWS, 2013a).

Red knots are restricted to ocean coasts during winter, and occur primarily along the coasts during migration. Habitats used by red knots in migration and wintering areas are similar in character, generally coastal marine and estuarine (partially enclosed tidal area where fresh and salt water mixes) habitats with large areas of exposed intertidal sediments. In North America, red knots are commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks. In the southeastern U.S., red knots forage along sandy beaches during spring and fall migration from Maryland through Florida. In addition to the sandy beaches, red knots also forage along peat banks and tidal mudflats during migration. Along the Atlantic coast, dynamic and ephemeral features are important red knot habitats, including sand spits, islets, shoals, and sandbars, often associated with inlets. From South Carolina to Florida, red knots are found in significantly higher numbers at inlets than at other coastal sites (USFWS, 2013a).

Red knots occupy all known wintering areas from December to February, but may be present in some wintering areas as early as September or as late as May. Wintering areas for the red knot include the Atlantic coasts of Argentina and Chile (particularly the island of Tierra del Fuego that spans both countries), the north coast of Brazil (particularly in the State of Maranhão), the Northwest Gulf of Mexico (discussed below) from the Mexican State of Tamaulipas through Texas (particularly at Laguna Madre) to Louisiana, and the Southeast United States from Florida (particularly the central Gulf coast) to North Carolina. Smaller numbers of knots winter in the Caribbean, and along the central Gulf coast (Alabama, Mississippi), the mid-Atlantic, and the Northeast United States. The core of the Southeast wintering area (i.e., that portion of this large region supporting the majority of birds) is thought to shift from year to year among Florida (particularly the central Gulf coast), Georgia, and South Carolina. However, the geographic limits of this wintering region are poorly defined. Although only small numbers are known, wintering knots extend along the Atlantic coast as far north as Virginia, Maryland, and New Jersey. Still smaller numbers of red knots have been reported between December and February from Long Island, New York, through Massachusetts and as far north as Nova Scotia, Canada. Small numbers of red knots also winter along the central Gulf coast (Florida Panhandle, Alabama, Mississippi, and eastern Louisiana). Red knots occupy the

southernmost wintering areas, in Tierra del Fuego, from late October to February, with some birds arriving as early as late September. Birds wintering in the Caribbean or the United States typically stay later, through March or even May. Birds wintering in the Southeast seem to arrive in November, while birds wintering in Texas seem to arrive much earlier, in late July or August. Major spring stopover areas along the Atlantic coast include Río Gallegos, Península Valdés, and San Antonio Oeste (Patagonia, Argentina); Lagoa do Peixe (eastern Brazil, State of Rio Grande do Sul); Maranhão (northern Brazil); the Virginia barrier islands; and Delaware Bay. However, large and small groups of red knots, sometimes numbering in the thousands, may occur in suitable habitats all along the Atlantic and Gulf coasts from Argentina to Massachusetts (USFWS, 2013a).

Some red knots from the Southeast-Caribbean wintering area, and from South American wintering areas, utilize spring stopovers along the Southeast United States, from Florida to North Carolina. The length of stopover at these locations is generally believed to be brief; although data exist showing that some stopovers last for several weeks. Red knots typically use mid-Atlantic stopovers from late April through late May or early June. The stopover time in Delaware Bay is about 10 to 14 days. From Delaware Bay and other mid-Atlantic stopovers, birds tend to fly overland directly northwest to the central Canadian breeding grounds, with many stopping briefly along the shores of James and Hudson Bays. Knots that winter in Tierra del Fuego tend to work their way up the South America Atlantic coast, using stopover sites in Argentina and Uruguay before departing from Brazil (USFWS, 2013a).

Important fall stopover sites include southwest Hudson Bay (including the Nelson River delta), James Bay, the north shore of the St. Lawrence River, the Mingan Archipelago, and the Bay of Fundy in Canada; the coasts of Massachusetts and New Jersey and the mouth of the Altamaha River in Georgia; the Caribbean (especially Puerto Rico and the Lesser Antilles); and the northern coast of South America from Brazil to Guyana. However, birds can occur all along the coasts in suitable habitat. In the mid-Atlantic, southbound red knots start arriving in July. Numbers of adults peak in mid-August and most depart by late September, although data shows that some birds stay through November. Migrant juveniles begin to appear along the U.S. Atlantic coast in mid-August, occurring in much lower numbers and scattered over a much wider area than adults. Several studies suggest that adult red knots fly directly to South America from the eastern seaboard of the United States, arriving in northern South America in August (USFWS, 2013a).

The primary threats to the red knot are loss of both breeding and non-breeding habitat; reduced prey availability throughout the non-breeding range; potential for disruption of natural predator cycles on the breeding grounds; and increasing frequency and severity of asynchronies (i.e., mismatches) in the timing of their annual migratory cycle relative to favorable food and weather conditions (USFWS, 2013b).

The red knot is a regular visitor along the South Carolina coast during both the spring and fall migrations. Flocks of over 1000 birds have been observed in the spring with lesser numbers being observed in the fall. The red knot also uses the South Carolina coast as a wintering area. In the general project area, red knots are most abundant during the spring, northward migration with most sightings occurring on Kiawah Island and on the beaches, sand flats, and mud flats in

Stono Inlet approximately 4000 feet south of the project and on the beaches, sand flats, and mud flats in Lighthouse inlet approximately 2000 feet north of the project. In the immediate area of the project where sand will actually be placed on the beach, red knots are less abundant (SCDNR, 2013 and ebird.org, 2013).

Effect Determination

Placement of the dredged material is currently scheduled to occur during the months of January through June. Direct loss of nests from the disposal of the dredged material will not occur, since the species does not nest in the project area. Red knot foraging distribution on the beach during the spring and fall migrations and winter months may be altered as beach food resources may be affected by placement of material along the project area; however, this impact is expected to be minor since most birds use areas outside of the immediate project area. In addition, previous studies of beach nourishment projects (including Folly Beach) have shown a short term impact to the beach and surf zone infauanal community with a recovery within six months (SCDNR, 2009). Due to the expected short term impacts to the beach infaunal community and since the number of red knots in the immediate project area is limited, it has been determined that the proposed project is **not likely to adversely affect the rufa red knot**.

6.8 Seabeach Amaranth

Seabeach amaranth (*Amaranthus pumilus*) is an annual plant historically native to the barrier island beaches of the Atlantic coast from Massachusetts to South Carolina. No other vascular plant occurs closer to the ocean. The species was Federally listed as threatened by the U.S. Fish and Wildlife Service in 1993. Seabeach amaranth is listed as threatened and of national concern in South Carolina.

Germination takes place over a relatively long period of time, generally beginning in April and continuing at least through July. Upon germinating, this plant initially forms a small-unbranched sprig but soon begins to branch profusely into a clump, often reaching a foot in diameter and consisting of 5 to 20 branches. Occasionally a clump may get as large as a yard of more across, with hundreds of branches. The stems are fleshy and pink-red or reddish, with small rounded leaves that are 1.3 to 2.5 centimeters in diameter. The leaves are clustered toward the tip of the stem, are normally a somewhat shiny, spinach-green color, and have a small notch at the rounded tip. Flowers and fruits are relatively inconspicuous and are borne in clusters along the stems. Flowering begins as soon as plants have reached sufficient size, sometimes as early as June in the Carolinas but more typically commencing in July and continuing until their death in late fall or early winter. Seed production begins in July or August and reaches a peak in most years in September; it likewise continues until the plant dies.

Seabeach amaranth occurs on barrier island beaches, where its primary habitat consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of non-eroding beaches. It occasionally establishes small temporary populations in other habitats, including sound side beaches, blowouts in foredunes, and in dredged material placed for beach re-nourishment or disposal. Seabeach amaranth appears to be intolerant of competition and does not occur on well-vegetated sites. The species appears to need extensive areas of barrier island

beaches and inlets, functioning in a relatively natural and dynamic manner. These characteristics allow it to move around in the landscape as a fugitive species, occupying suitable habitat as it becomes available.

Seabeach amaranth is a "fugitive" species that cannot compete with dense perennial beach vegetation and only occurs in the newly-disturbed habitat of a high-energy beach. It occurs on barren or sparsely-vegetated sand above the high water line, an area classified as marine wetland. This habitat usually disappears completely when seawalls or other hard structures are built along the shoreline. This loss of habitat from seawall construction and global sea level rise are thought to be major factors in the species' extirpation throughout parts of its historic range. It has been postulated that estuarine and coastal shore plants will suffer some of the most significant impacts as a result of global climate changes. Coastal development will prevent these species from migrating up slope to slightly higher ground if sea levels rise. To a large extent, this is already occurring as beaches are being fortified to prevent erosion. Beach re-nourishment projects eliminate existing plants if conducted during the summer and may bury the seed needed to reestablish the plant the following year if conducted during the winter. However, beach re-nourishment projects often rebuild the habitat this species requires. Fortification with seawalls and other stabilization structures or heavy vehicular traffic may eliminate seabeach amaranth populations locally. Any given site will become unsuitable at some time because of natural forces. However, if a seed source is no longer available in adjacent areas, seabeach amaranth will be unable to reestablish itself when the site is once again suitable or new favorable habitat is created. In this way, it can be progressively eliminated even from generally favorable stretches of habitat surrounded by permanently unfavorable areas.

Historically, seabeach amaranth occurred in 31 counties in 9 states from Massachusetts to South Carolina. It has been eliminated from six of the States in its historic range. The only remaining large populations are in New York and North Carolina. Surveys in South Carolina found that the number of plants along the coast dropped by 90% (from 1,800 to 188) as a result of Hurricane Hugo, subsequent winter storms and beach rebuilding projects that occurred in its wake. South Carolina populations are still low and exhibit a further downward trend although 1998 and 2003 were better years than most with 279 plants identified along the coast in 1998 and 1381 identified in 2003. The remaining populations in areas with suitable habitat are in constant danger of extirpation from hurricanes, webworm predation, and other natural and anthropogenic factors. At the present time, there are no known populations of seabeach amaranth in the project area.

Effect Determination

Because there are no know populations of seabeach amaranth in the project area, there is also no viable seed source. As such, the proposed project is **not likely to adversely affect seabeach amaranth**.

7.0 SUMMARY OF PROTECTIVE MEASURES

West Indian Manatee

When work occurs during the manatee migration period, personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing manatees. The Contractor may be held responsible for any manatee harmed, harassed, or killed as a result of vessel collisions or construction activities. Failure of the Contractor to follow these specifications is a violation of the Endangered Species Act and could result in prosecution of the Contractor under the Endangered Species Act or the Marine Mammals Protection Act. The standard manatee conditions will be implemented from 1 April to 31 October. The Contractor will be instructed to take necessary precautions to avoid any contact with manatees. If manatees are sighted within 100 yards of the dredging area, all appropriate precautions will be implemented to insure protection of the manatee. The Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than 100 yards of the manatee. Operation of equipment closer than 50 feet to a manatee will necessitate immediate shutdown of that equipment.

Right Whales

Since the construction is anticipated to be scheduled during the right whale migration period, personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing right whales. The Contractor may be held responsible for any whale harmed, harassed, or killed as a result of vessel collisions or construction activities. Failure of the Contractor to follow these specifications is a violation of the Endangered Species Act and could result in prosecution of the Contractor under the Endangered Species Act or the Marine Mammals Protection Act. The time when most right whale sightings occur is December, January, and February. The Contractor will be instructed to take necessary precautions to avoid any contact with whales. If whales are sighted within 1000 feet of the borrow area, all appropriate precautions will be implemented to insure protection of the whale. In addition, the Contractor will stop, alter course, or maneuver as necessary to avoid operating moving equipment (including watercraft) any closer than this distance.

Sea Turtles

When work occurs during the sea turtle nesting period, in order to minimize impacts to nesting sea turtles a beach monitoring and nest relocation program for sea turtles will be implemented. This program will include daily patrols of sand placement areas at sunrise, relocation of any nests laid in areas to be impacted by sand placement, and monitoring of hatching success of the relocated nests. Sea turtle nests will be relocated to an area suitable to both the USFWS and the SCDNR. The Corps will perform any necessary maintenance of beach profile (tilling and shaping or knocking down escarpments) during construction and prior to each nesting season.

During construction of this project, staging areas for construction equipment will be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all dredge pipes that are placed on the beach will be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes will be off the beach to the maximum extent possible. Temporary storage of pipes on the beach will be in such a manner so as to impact the least amount of nesting habitat and will likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline will be recommended as the method of storage).

During construction of this project, all on-beach lighting associated with the project will be limited to the immediate area of active construction only. Such lighting will be shielded, low-pressure sodium vapor lights to minimize illumination of the nesting beach and nearshore waters. Red filters will be placed over vehicle headlights (i.e., bulldozers, front end loaders). Lighting on offshore equipment will be similarly minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements. Shielded, low pressure sodium vapor lights will be highly recommended for lights on any offshore equipment that cannot be eliminated.

8.0 SUMMARY OF EFFECT DETERMINATIONS

This assessment has examined the potential impacts of the proposed project on the 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. Critical habitat has not been designated for whales, manatees, sea turtles, or sturgeon in South Carolina; therefore, none would be affected. Based on this analysis, the following determinations have been made.

- It has been determined that the proposed project is not likely to adversely affect the blue, finback, humpback, right, sei, or sperm whales.
- It has been determined that the proposed project is not likely to adversely affect the West Indian manatee.
- It has been determined that the proposed project is not likely to adversely affect Kemp's ridley, leatherback, green, or hawksbill sea turtles.
- It has been determined that the proposed project is not likely to adversely affect the shortnose sturgeon.
- It has been determined that the proposed project is not likely to adversely affect the Atlantic sturgeon.
- It has been determined that the proposed project is not likely to adversely affect the piping plover.
- It has been determined that the proposed project is not likely to adversely modify critical habitat for wintering piping plovers.
- 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 is not likely to adversely affect seabeach amaranth.

- It has been determined that the proposed project may adversely affect the nesting loggerhead sea turtle.
- It has been determined that the proposed project is not likely to adversely modify proposed critical habitat (either terrestrial or marine) for the loggerhead sea turtle.

9.0 REFERENCES

eBird.org. 2013. eBird: An online database of bird distribution and abundance [web application]. Cornell Lab of Ornithology, Ithaca, New York and National Audubon Society, New York, NY. Available at *http://ebird.org*.

Hopkins-Murphy, Sally R., Charlotte P. Hope, and Margaret E. Hoyle, 1999. A History of Research and Management of the Loggerhead Turtle (Caretta caretta) on the South Carolina Coast. Final Report to the U.S. Fish and Wildlife Service.

Hopkins, J. Stephen, Richard D. Hamilton II, (SCDNR) and Stephen D. Roff (SCPRT) 1999. 1999 Research Plan: Development of Restoration Techniques for Seabeach Amaranth (*Amaranthus pumilus*) in South Carolina

National Marine Fisheries Service, Office of Protected Species. 1997. Regional Biological Opinion for Hopper Dredging Along South Atlantic Coast. Silver Spring, Maryland.

National Marine Fisheries Service, 1984. Marine Fisheries Review, The Status of Endangered Whales. National Marine Fisheries Service, Scientific Publications Office, Seattle, Washington.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery Plan for U.S. Population of Loggerhead Turtle. National Marine Fisheries Service, Washington, D.C.

seaturtle.org. 2013. Available at *http://www.seaturtle.org*.

South Carolina Department of Natural Resources. 2009. Using Historical Data and Meta-analyses to Improve Monitoring and Management of Beach Nourishment in South Carolina: Final Report. Charleston, SC

South Carolina Department of Natural Resources. 2013. Red Knot Prey Availability: Project Report. Charleston, SC.

U.S. Fish and Wildlife Service. 1995. Florida Manatee Recovery Plan Second Revision. U.S. Fish and Wildlife Service, Atlanta, Georgia. 160 pp.

U.S. Fish and Wildlife Service. 1996a. Piping Plover *(Charadrius melodus)*, Atlantic Coast Population, Revised Recovery Plan. Hadley Massachusetts. 258 pp.

U.S. Fish and Wildlife Service. 1996b. Recovery Plan for Seabeach Amaranth (*Amaranthus pumilus*) Rafinesque. Atlanta, Georgia

U.S. Fish and Wildlife Service. 2013a. Rufa Red Knot Ecology and Abundance. Supplement 2 to Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*). New Jersey Field Office, Pleasantville, New Jersey.

U.S. Fish and Wildlife Service. 2013b. Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Rufa Red Knot (*Calidris canutus rufa*). New Jersey Field Office, Pleasantville, New Jersey.

Appendix 6

Resource Agency/Public Coordination and Comments Received

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

August 12, 2013

Planning and Environmental Branch

Dr. Pace Wilbur
NOAA Fisheries Service
217 Fort Johnson Road
Charleston, South Carolina 29412-9110

Dear Dr. Wilbur:

The U.S. Army Corps of Engineers, Charleston District (USACE) and the Bureau of Ocean Energy Management (BOEM) are proposing to perform a beach renourishment project at Folly Beach, South Carolina using sand from offshore State waters and sand from the outer-continental shelf (OCS).

The proposed project is a periodic renourishment of a previously approved USACE Hurricane and Storm Damage Reduction Project. The project provides for re-nourishment of approximately 26,000 linear feet (~4.9 linear miles) of shoreline 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. The exact quantity of sand that will be placed on the beach during re-nourishment will be dependent on the 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 will be placed on the beach. The initial nourishment of the Folly Beach Hurricane and Storm Damage Reduction Project was performed by USACE in 1993 using sand from the Folly River. Renourishment efforts were performed by USACE in 2005 and 2007 using sand from offshore State waters. The currently proposed project is the first time that OCS sand will be used for renourishing the beach.

Enclosed, please find a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for your review and comment. This Draft EA and Draft FONSI were prepared for both USACE's and BOEM's compliance with the National Environmental

Policy Act (NEPA). Our preliminary findings are that the proposed project does not significantly adversely affect human health and welfare or the environment, and, therefore, preparation of an Environmental Impact Statement is not warranted. Please provide any comments by September 12, 2013.

If you have any questions about the proposed project, please contact Mr. Alan Shirey of my staff by telephone at (843) 329-8166 or by e-mail at *alan.d.shirey@usace.army.mil*.

Respectfully,

Bret L. Walters
Chief, Planning and Environmental Branch

Enclosure

Cc: Jaclyn Daly (w/o enclosure)

Culbertson, Jennifer <jennifer.culbertson@boem.gov>

Re: FW: Folly Beach, SC Renourishment Project

1 message

Culbertson, Jennifer <jennifer.culbertson@boem.gov> Mon, Mar 10, 2014 at 2:49 PM
To: "Jennifer B. Culbertson" <Jennifer.Culbertson@boem.gov>

From: Shirey, Alan D SAC
Sent: Tuesday, December 17, 2013 10:59 PM
To: 'robert.hoffman@noaa.gov'; Bernhart, David
Subject: Folly Beach, SC Renourishment Project

Bob and Dave,

I'm thinking y'all are the proper people for me to send this to, if not please let me know.

We are getting ready to start a beach renourishment project at Folly Beach, SC. The project involves dredging sand from approximately 3 miles offshore onto the beach. Some of the borrow areas are located in Federal waters, so we are cooperating with the Bureau of Ocean Energy Management on this project.

We will be using a hydraulic pipeline cutterhead dredge, so threats to listed sea turtles and sturgeon are limited. However, regardless of the threat to listed species, based on previous discussions between the Corps and y'all we have concluded that this work falls under the South Atlantic Regional Biological Opinion; therefore, additional formal consultation is not required.

The offshore waters of Folly Beach were included in the recent proposed marine critical habitat for loggerhead sea turtles. Based on the analysis in the attached Biological Assessment, we have concluded that the project is not likely to adversely modify the proposed critical habitat. Based on this, we have concluded that consultation/conference is not required.

Since we've concluded that formal consultation and/or conference is not required, this e-mail is essentially for information purposes.

If you have any questions or would like to discuss our conclusions, please don't hesitate to call me or respond to this e-mail.

Thanks,

Alan.

Alan Shirey

Environmental Engineer

U.S. Army Corps of Engineers

Charleston District

69A Hagood Avenue

Charleston, SC 29403

(843) 329-8166

Justice: We get what we deserve. Mercy: We don't get what we deserve. Grace: We get what we do not deserve.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

December 10, 2013

Lt. Colonel John T. Litz
District Engineer
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Re: Folly Beach Storm Damage Reduction
Charleston County, South Carolina
FWS Log No. 2014-F-0080

Dear Colonel Litz:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) December 5, 2013, receipt of the U.S. Army Corps of Engineers' December 4, 2013, Biological Assessment (BA) and request to initiate formal Section 7 consultation on the loggerhead sea turtle (*Caretta caretta*) under the Endangered Species Act, as amended (16 U.S.C. §1531 *et seq.*).

The Service has concerns about the timeline of this consultation because the BA outlines a potential project start date of December 2013, which is the same month that we received your BA and initiation request. The proposed construction schedule does not allow ample time to complete this consultation and issue our Biological Opinion (BO) before the proposed construction date. According to 50 CFR §402.14(e) Interagency Cooperation, the Service is allowed up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our Biological Opinion (BO) for a total of 135 days. Although we strive to complete formal consultations within 90 days or less, our current workload will likely result in a consultation completion date closer to 135 days. Therefore, we expect to provide you with our BO on or before April 19, 2014.

As of December 10, 2013, we have all of the information required to initiate consultation. However, the BA does not include all of the project minimization measures required for this project (i.e., lighting surveys, night monitors, removal of incompatible beach material) since it will extend into the nesting season. These additional measures will be included in our BO. Should the Corps decide to start project construction before this consultation is complete and our BO is issued, it is your agency's responsibility to ensure that the necessary funding is available for monitoring and the monitoring is implemented to ensure compliance with the

non-discretionary Reasonable and Prudent Measures and Terms and Conditions of the BO. Failure to comply with the conditions set forth in the BO may result in the lapse of protective coverage of take under Section 7(o)(2) for construction occurring during the 2014 nesting season.

Your staff initially contacted the Service on March 27, 2013, about this project and discussed a potential start date in the fall of 2013. We were told in August 2013, that the BA would be completed that month, but we did not receive it until December 2013. We attempted to be proactive by making multiple documented inquiries about the status of the BA and request to initiate consultation in the interest of preventing the situation your agency is now facing. Please note that your agency's obligations under Section 7 will not be satisfied until the consultation is completed and our BO is issued, which should occur before starting project construction for future projects. As a professional courtesy, we request that your future projects incorporate appropriate consultation timeframes as outlined in 50 CFR 402 into your planning process. In the interest of streamlining future interagency cooperation to accomplish both agency missions, we respectfully request that the Corps review the procedures and timeframes outlined in 50 CFR 402 (enclosed).

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Ms. Melissa Bimbi of my staff at (843) 727-4707 ext. 217, and reference FWS Log No. 2014-F-0080.

Sincerely,

Thomas D. McCoy

Thomas D. McCoy
Acting Field Supervisor

TDM/MKB

Enclosure

cc: S.A. Aaron Brown, USFWS
Mr. Bret Walters, USACE
Mr. Alan Shirey, USACE
Ms. Michelle Pate, SCDNR
Ms. Susan Davis, SCDNR

§ 401.22 Civil rights.

Each application for Federal assistance, grant-in-aid award, or project agreement shall be supported by a statement of assurances executed by the Cooperator providing that the project will be carried out in accordance with title VI, Nondiscrimination in federally Assisted Programs of the Civil Rights Act of 1964 and with the Secretary's regulations promulgated thereunder.

§ 401.23 Audits.

The State is required to conduct an audit at least every two years in accordance with the provisions of Attachment P OMB Circular A–102. Failure to conduct audits as required may result in withholding of grant payments or such other sanctions as the Secretary may deem appropriate.

[49 FR 30074, July 26, 1984]

PART 402—INTERAGENCY COOPERATION—ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Subpart A—General

Subpart B—Consultation Procedures

Subpart C—Counterpart Regulations For Implementing the National Fire Plan

Subpart D—Counterpart Regulations Governing Actions by the U.S. Environmental Protection Agency Under the Federal Insecticide, Fungicide and Rodenticide Act

AUTHORITY: 16 U.S.C. 1531 *et seq.*

SOURCE: 51 FR 19957, June 3, 1986, unless otherwise noted.

Subpart A—General

§ 402.01 Scope.

(a) This part interprets and implements sections 7(a)–(d) [16 U.S.C. 1536(a)–(d)] of the Endangered Species Act of 1973, as amended ("Act"). Section 7(a) grants authority to and imposes requirements upon Federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and habitat of such species that has been designated as critical ("critical habitat"). Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to utilize their authorities to further the purposes of the Act by carrying out conservation programs for listed species. Such affirmative conservation programs must comply with applicable permit requirements (50 CFR parts 17, 220, 222, and 227) for listed species and should be coordinated with the appropriate Secretary. Section 7(a)(2) of the Act requires every Federal agency, in consultation with and with the assistance of the Secretary, to insure that

any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. Section 7(a)(3) of the Act authorizes a prospective permit or license applicant to request the issuing Federal agency to enter into early consultation with the Service on a proposed action to determine whether such action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. Section 7(a)(4) of the Act requires Federal agencies to confer with the Secretary on any action that is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat. Section 7(b) of the Act requires the Secretary, after the conclusion of early or formal consultation, to issue a written statement setting forth the Secretary's opinion detailing how the agency action affects listed species or critical habitat Biological assessments are required under section 7(c) of the Act if listed species or critical habitat may be present in the area affected by any major construction activity as defined in § 404.02. Section 7(d) of the Act prohibits Federal agencies and applicants from making any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation or implementation of reasonable and prudent alternatives which would avoid jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat. Section 7(e)–(o)(1) of the Act provide procedures for granting exemptions from the requirements of section 7(a)(2). Regulations governing the submission of exemption applications are found at 50 CFR part 451, and regulations governing the exemption process are found at 50 CFR parts 450, 452, and 453.

(b) The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) share responsibilities for administering the Act. The Lists of Endangered and Threatened Wildlife and Plants are found in 50 CFR 17.11 and 17.12 and the designated critical habitats are found in 50 CFR 17.95 and 17.96 and 50 CFR part 226. Endangered or threatened species under the jurisdiction of the NMFS are located in 50 CFR 222.23(a) and 227.4. If the subject species is cited in 50 CFR 222.23(a) or 227.4, the Federal agency shall contact the NMFS. For all other listed species the Federal Agency shall contact the FWS.

§ 402.02 Definitions.

Act means the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 *et seq.*

Action means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to:

(a) actions intended to conserve listed species or their habitat;

(b) the promulgation of regulations;

(c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or

(d) actions directly or indirectly causing modifications to the land, water, or air.

Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

Applicant refers to any person, as defined in section 3(13) of the Act, who requires formal approval or authorization from a Federal agency as a prerequisite to conducting the action.

Biological assessment refers to the information prepared by or under the direction of the Federal agency concerning listed and proposed species and designated and proposed critical habitat that may be present in the action area and the evaluation potential effects of the action on such species and habitat.

Biological opinion is the document that states the opinion of the Service as to whether or not the Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Conference is a process which involves informal discussions between a Federal agency and the Service under section

7(a)(4) of the Act regarding the impact of an action on proposed species or proposed critical habitat and recommendations to minimize or avoid the adverse effects.

Conservation recommendations are suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information.

Critical habitat refers to an area designated as critical habitat listed in 50 CFR parts 17 or 226.

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.

Designated non-Federal representative refers to a person designated by the Federal agency as its representative to conduct informal consultation and/or to prepare any biological assessment.

Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.

Director refers to the Assistant Administrator for Fisheries for the National Oceanic and Atmospheric Administration, or his authorized representative; or the Fish and Wildlife Service regional director, or his authorized representative, for the region where the action would be carried out.

Early consultation is a process requested by a Federal agency on behalf of a prospective applicant under section 7(a)(3) of the Act.

Effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

Formal consultation is a process between the Service and the Federal agency that commences with the Federal agency's written request for consultation under section 7(a)(2) of the Act and concludes with the Service's issuance of the biological opinion under section 7(b)(3) of the Act.

Incidental take refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant.

Informal consultation is an optional process that includes all discussions, correspondence, etc., between the Service and the Federal agency or the designated non-Federal representative prior to formal consultation, if required.

Jeopardize the continued existence of means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

Listed species means any species of fish, wildlife, or plant which has been determined to be endangered or threatened under section 4 of the Act. Listed species are found in 50 CFR 17.11–17.12.

Major construction activity is a construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act [NEPA, 42 U.S.C. 4332(2)(C)].

Preliminary biological opinion refers to an opinion issued as a result of early consultation.

Proposed critical habitat means habitat proposed in the FEDERAL REGISTER to be designated or revised as critical habitat under section 4 of the Act for any listed or proposed species.

Proposed species means any species of fish, wildlife, or plant that is proposed in the FEDERAL REGISTER to be listed under section 4 of the Act.

Reasonable and prudent alternatives refer to alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

Reasonable and prudent measures refer to those actions the Director believes necessary or appropriate to minimize the impacts, *i.e.*, amount or extent, of incidental take.

Recovery means improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the Act.

Service means the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, as appropriate.

§ 402.03 Applicability.

Section 7 and the requirements of this part apply to all actions in which there is discretionary Federal involvement or control.

§ 402.04 Counterpart regulations.

The consultation procedures set forth in this part may be superseded for a particular Federal agency by joint counterpart regulations among that agency, the Fish and Wildlife Service, and the National Marine Fisheries Service. Such counterpart regulations shall be published in the FEDERAL REGISTER in proposed form and shall be subject to public comment for at least 60 days before final rules are published.

§ 402.05 Emergencies.

(a) Where emergency circumstances mandate the need to consult in an expedited manner, consultation may be conducted informally through alternative procedures that the Director determines to be consistent with the requirements of sections 7(a)–(d) of the Act. This provision applies to situations involving acts of God, disasters, casualties, national defense or security emergencies, etc.

(b) Formal consultation shall be initiated as soon as practicable after the emergency is under control. The Federal agency shall submit information on the nature of the emergency action(s), the justification for the expedited consultation, and the impacts to endangered or threatened species and their habitats. The Service will evaluate such information and issue a biological opinion including the information and recommendations given during the emergency consultation.

§ 402.06 Coordination with other environmental reviews.

(a) Consultation, conference, and biological assessment procedures under section 7 may be consolidated with interagency cooperation procedures required by other statutes, such as the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*, implemented at 40 CFR Parts 1500–1508) or the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661 *et seq.*). Satisfying the requirements of these other statutes, however, does not in itself relieve a Federal agency of its obligations to comply with the procedures set forth in this part or the substantive requirements of section 7. The Service will attempt to provide a coordinated review and analysis of all environmental requirements.

(b) Where the consultation or conference has been consolidated with the interagency cooperation procedures required by other statutes such as NEPA or FWCA, the results should be included in the documents required by those statutes.

§ 402.07 Designation of lead agency.

When a particular action involves more than one Federal agency, the consultation and conference responsibilities may be fulfilled through a lead agency. Factors relevant in determining an appropriate lead agency include the time sequence in which the agencies would become involved, the magnitude of their respective involvement, and their relative expertise with respect to the environmental effects of the action. The Director shall be notified of the designation in writing by the lead agency.

§ 402.08 Designation of non-Federal representative.

A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment by giving written notice to the Director of such designation. If a permit or license applicant is involved and is not the designated non-Federal representative, then the applicant and Federal agency must agree on the choice of the designated non-Federal representative. If a biological assessment is prepared by the designated non-Federal representative, the Federal agency shall furnish guidance and supervision and shall independently review and evaluate the scope and contents of the biological assessment. The ultimate responsibility for compliance with section 7 remains with the Federal agency.

§ 402.09 Irreversible or irretrievable commitment of resources.

After initiation or reinitiation of consultation required under section 7(a)(2) of the Act, the Federal agency and any applicant shall make no irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives which would avoid violating section 7(a)(2). This prohibition is in force during the consultation process and continues until the requirements of section 7(a)(2) are satisfied. This provision does not apply to the conference requirement for proposed species or proposed critical habitat under section 7(a)(4) of the Act.

Subpart B—Consultation Procedures

§ 402.10 Conference on proposed species or proposed critical habitat.

(a) Each Federal agency shall confer with the Service on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat. The conference is designed to assist the Federal agency and any applicant in identifying and resolving potential conflicts at an early stage in the planning process.

(b) The Federal agency shall initiate the conference with the Director. The Service may request a conference if, after a review of available information, it determines that a conference is required for a particular action.

(c) A conference between a Federal agency and the Service shall consist of informal discussions concerning an action that is likely to jeopardize the continued existence of the proposed species or result in the destruction or adverse modification of the proposed critical habitat at issue. Applicants may be involved in these informal discussions to the greatest extent practicable. During the conference, the Service will make advisory recommendations, if any, on ways to minimize or avoid adverse effects. If the proposed species is subsequently listed or the proposed critical habitat is designated prior to completion of the action, the Federal agency must review the action to determine whether formal consultation is required.

(d) If requested by the Federal agency and deemed appropriate by the Service, the conference may be conducted in accordance with the procedures for formal consultation in § 402.14. An opinion issued at the conclusion of the conference may be adopted as the biological opinion when the species is listed or critical habitat is designated, but only if no significant new information is developed (including that developed during the rulemaking process on the proposed listing or critical habitat designation) and no significant changes to the Federal action are made that would alter the content of the opinion. An incidental take statement provided with

a conference opinion does not become effective unless the Service adopts the opinion once the listing is final.

(e) The conclusions reached during a conference and any recommendations shall be documented by the Service and provided to the Federal agency and to any applicant. The style and magnitude of this document will vary with the complexity of the conference. If formal consultation also is required for a particular action, then the Service will provide the results of the conference with the biological opinion.

§402.11 Early consultation.

(a) *Purpose.* Early consultation is designed to reduce the likelihood of conflicts between listed species or critical habitat and proposed actions and occurs prior to the filing of an application for a Federal permit or license. Although early consultation is conducted between the Service and the Federal agency, the prospective applicant should be involved throughout the consultation process.

(b) *Request by prospective applicant.* If a prospective applicant has reason to believe that the prospective action may affect listed species or critical habitat, it may request the Federal agency to enter into early consultation with the Service. The prospective applicant must certify in writing to the Federal agency that (1) it has a definitive proposal outlining the action and its effects and (2) it intends to implement its proposal, if authorized.

(c) *Initiation of early consultation.* If the Federal agency receives the prospective applicant's certification in paragraph (b) of this section, then the Federal agency shall initiate early consultation with the Service. This request shall be in writing and contain the information outlined in §402.14(c) and, if the action is a major construction activity, the biological assessment as outlined in §402.12.

(d) *Procedures and responsibilities.* The procedures and responsibilities for early consultation are the same as outlined in §402.14(c)–(j) for formal consultation, except that all references to the "applicant" shall be treated as the "prospective applicant" and all references to the "biological opinion" or the "opinion" shall be treated as the "preliminary biological opinion" for the purpose of this section.

(e) *Preliminary biological opinion.* The contents and conclusions of a preliminary biological opinion are the same as for a biological opinion issued after formal consultation except that the incidental take statement provided with a preliminary biological opinion does not constitute authority to take listed species.

(f) *Confirmation of preliminary biological opinion as final biological opinion.* A preliminary biological opinion may be confirmed as a biological opinion issued after formal consultation if the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the early consultation. A written request for confirmation of the preliminary biological opinion should be submitted after the prospective applicant applies to the Federal agency for a permit or license but prior to the issuance of such permit or license. Within 45 days of receipt of the Federal agency's request, the Service shall either:

(1) Confirm that the preliminary biological opinion stands as a final biological opinion; or

(2) If the findings noted above cannot be made, request that the Federal agency initiate formal consultation.

§402.12 Biological assessments.

(a) *Purpose.* A biological assessment shall evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and is used in determining whether formal consultation or a conference is necessary.

(b) *Preparation requirement.* (1) The procedures of this section are required for Federal actions that are "major construction activities"; provided that a contract for construction was not entered into or actual construction was not begun on or before November 10, 1978. Any person, including those who may wish to apply for an exemption from section 7(a)(2) of the Act, may prepare a biological assessment under

the supervision of the Federal agency and in cooperation with the Service consistent with the procedures and requirements of this section. An exemption from the requirements of section 7(a)(2) is not permanent unless a biological assessment has been prepared.

(2) The biological assessment shall be completed before any contract for construction is entered into and before construction is begun.

(c) *Request for information.* The Federal agency or the designated non-Federal representative shall convey to the Director either (1) a written request for a list of any listed or proposed species or designated or proposed critical habitat that may be present in the action area; or (2) a written notification of the species and critical habitat that are being included in the biological assessment.

(d) *Director's response.* Within 30 days of receipt of the notification of, or the request for, a species list, the Director shall either concur with or revise the list or, in those cases where no list has been provided, advise the Federal agency or the designated non-Federal representative in writing whether, based on the best scientific and commercial data available, any listed or proposed species or designated or proposed critical habitat may be present in the action area. In addition to listed and proposed species, the Director will provide a list of candidate species that may be present in the action area. Candidate species refers to any species being considered by the Service for listing as endangered or threatened species but not yet the subject of a proposed rule. Although candidate species have no legal status and are accorded no protection under the Act, their inclusion will alert the Federal agency of potential proposals or listings.

(1) If the Director advises that no listed species or critical habitat may be present, the Federal agency need not prepare a biological assessment and further consultation is not required. If only proposed species or proposed critical habitat may be present in the action area, then the Federal agency must confer with the Service if required under § 402.10, but preparation of a biological assessment is not required unless the proposed listing and/or designation becomes final.

(2) If a listed species or critical habitat may be present in the action area, the Director will provide a species list or concur with the species list provided. The Director also will provide available information (or references thereto) regarding these species and critical habitat, and may recommend discretionary studies or surveys that may provide a better information base for the preparation of an assessment. Any recommendation for studies or surveys is not to be construed as the Service's opinion that the Federal agency has failed to satisfy the information standard of section 7(a)(2) of the Act.

(e) *Verification of current accuracy of species list.* If the Federal agency or the designated non-Federal representative does not begin preparation of the biological assessment within 90 days of receipt of (or concurrence with) the species list, the Federal agency or the designated non-Federal representative must verify (formally or informally) with the Service the current accuracy of the species list at the time the preparation of the assessment is begun.

(f) *Contents.* The contents of a biological assessment are at the discretion of the Federal agency and will depend on the nature of the Federal action. The following may be considered for inclusion:

(1) The results of an on-site inspection of the area affected by the action to determine if listed or proposed species are present or occur seasonally.

(2) The views of recognized experts on the species at issue.

(3) A review of the literature and other information.

(4) An analysis of the effects of the action on the species and habitat, including consideration of cumulative effects, and the results of any related studies.

(5) An analysis of alternate actions considered by the Federal agency for the proposed action.

(g) *Incorporation by reference.* If a proposed action requiring the preparation of a biological assessment is identical, or very similar, to a previous action for which a biological assessment was prepared, the Federal agency may fulfill

the biological assessment requirement for the proposed action by incorporating by reference the earlier biological assessment, plus any supporting data from other documents that are pertinent to the consultation, into a written certification that:

(1) The proposed action involves similar impacts to the same species in the same geographic area;

(2) No new species have been listed or proposed or no new critical habitat designated or proposed for the action area; and

(3) The biological assessment has been supplemented with any relevant changes in information.

(h) *Permit requirements.* If conducting a biological assessment will involve the taking of a listed species, a permit under section 10 of the Act (16 U.S.C. 1539) and part 17 of this title (with respect to species under the jurisdiction of the FWS) or parts 220, 222, and 227 of this title (with respect to species under the jurisdiction of the NMFS) is required.

(i) *Completion time.* The Federal agency or the designated non- Federal representative shall complete the biological assessment within 180 days after its initiation (receipt of or concurrence with the species list) unless a different period of time is agreed to by the Director and the Federal agency. If a permit or license applicant is involved, the 180-day period may not be extended unless the agency provides the applicant, before the close of the 180-day period, with a written statement setting forth the estimated length of the proposed extension and the reasons why such an extension is necessary.

(j) *Submission of biological assessment.* The Federal agency shall submit the completed biological assessment to the Director for review. The Director will respond in writing within 30 days as to whether or not he concurs with the findings of the biological assessment. At the option of the Federal agency, formal consultation may be initiated under §402.14(c) concurrently with the submission of the assessment.

(k) *Use of the biological assessment.* (1) The Federal agency shall use the biological assessment in determining whether formal consultation or a conference is required under §402.14 or §402.10, respectively. If the biological assessment indicates that there are no listed species or critical habitat present that are likely to be adversely affected by the action and the Director concurs as specified in paragraph (j) of this section, then formal consultation is not required. If the biological assessment indicates that the action is not likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat, and the Director concurs, then a conference is not required.

(2) The Director may use the results of the biological assessment in (i) determining whether to request the Federal agency to initiate formal consultation or a conference, (ii) formulating a biological opinion, or (iii) formulating a preliminary biological opinion.

§402.13 Informal consultation.

(a) Informal consultation is an optional process that includes all discussions, correspondence, etc., between the Service and the Federal agency or the designated non-Federal representative, designed to assist the Federal agency in determining whether formal consultation or a conference is required. If during informal consultation it is determined by the Federal agency, with the written concurrence of the Service, that the action is not likely to adversely affect listed species or critical habitat, the consultation process is terminated, and no further action is necessary.

(b) During informal consultation, the Service may suggest modifications to the action that the Federal agency and any applicant could implement to avoid the likelihood of adverse effects to listed species or critical habitat.

§402.14 Formal consultation.

(a) *Requirement for formal consultation.* Each Federal agency shall review its actions at the earliest possible time to determine whether any action may affect listed species or critical habitat. If such a determination is made, formal consultation is required, except as noted in paragraph (b) of this section. The Director may request a Federal agency to enter into consultation if he

identifies any action of that agency that may affect listed species or critical habitat and for which there has been no consultation. When such a request is made, the Director shall forward to the Federal agency a written explanation of the basis for the request.

(b) *Exceptions.* (1) A Federal agency need not initiate formal consultation if, as a result of the preparation of a biological assessment under §402.12 or as a result of informal consultation with the Service under §402.13, the Federal agency determines, with the written concurrence of the Director, that the proposed action is not likely to adversely affect any listed species or critical habitat.

(2) A Federal agency need not initiate formal consultation if a preliminary biological opinion, issued after early consultation under §402.11, is confirmed as the final biological opinion.

(c) *Initiation of formal consultation.* A written request to initiate formal consultation shall be submitted to the Director and shall include:

(1) A description of the action to be considered;

(2) A description of the specific area that may be affected by the action;

(3) A description of any listed species or critical habitat that may be affected by the action;

(4) A description of the manner in which the action may affect any listed species or critical habitat and an analysis of any cumulative effects;

(5) Relevant reports, including any environmental impact statement, environmental assessment, or biological assessment prepared; and

(6) Any other relevant available information on the action, the affected listed species, or critical habitat.

Formal consultation shall not be initiated by the Federal agency until any required biological assessment has been completed and submitted to the Director in accordance with §402.12. Any request for formal consultation may encompass, subject to the approval of the Director, a number of similar individual actions within a given geographical area or a segment of a comprehensive plan. This does not relieve the Federal agency of the requirements for considering the effects of the action as a whole.

(d) *Responsibility to provide best scientific and commercial data available.* The Federal agency requesting formal consultation shall provide the Service with the best scientific and commercial data available or which can be obtained during the consultation for an adequate review of the effects that an action may have upon listed species or critical habitat. This information may include the results of studies or surveys conducted by the Federal agency or the designated non-Federal representative. The Federal agency shall provide any applicant with the opportunity to submit information for consideration during the consultation.

(e) *Duration and extension of formal consultation.* Formal consultation concludes within 90 days after its initiation unless extended as provided below. If an applicant is not involved, the Service and the Federal agency may mutually agree to extend the consultation for a specific time period. If an applicant is involved, the Service and the Federal agency may mutually agree to extend the consultation provided that the Service submits to the applicant, before the close of the 90 days, a written statement setting forth:

(1) The reasons why a longer period is required,

(2) The information that is required to complete the consultation, and

(3) The estimated date on which the consultation will be completed.

A consultation involving an applicant cannot be extended for more than 60 days without the consent of the applicant. Within 45 days after concluding formal consultation, the Service shall deliver a biological opinion to the Federal agency and any applicant.

(f) *Additional data.* When the Service determines that additional data would provide a better information base from which to formulate a biological opinion, the Director may request an extension of formal consultation and request that the Federal agency obtain additional data to determine how or to what extent the action may affect listed species or critical habitat. If formal consultation is extended by mutual agreement according to §402.14(e), the

Federal agency shall obtain, to the extent practicable, that data which can be developed within the scope of the extension. The responsibility for conducting and funding any studies belongs to the Federal agency and the applicant, not the Service. The Service's request for additional data is not to be construed as the Service's opinion that the Federal agency has failed to satisfy the information standard of section 7(a)(2) of the Act. If no extension of formal consultation is agreed to, the Director will issue a biological opinion using the best scientific and commercial data available.

(g) *Service responsibilities.* Service responsibilities during formal consultation are as follows:

(1) Review all relevant information provided by the Federal agency or otherwise available. Such review may include an on-site inspection of the action area with representatives of the Federal agency and the applicant.

(2) Evaluate the current status of the listed species or critical habitat.

(3) Evaluate the effects of the action and cumulative effects on the listed species or critical habitat.

(4) Formulate its biological opinion as to whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

(5) Discuss with the Federal agency and any applicant the Service's review and evaluation conducted under paragraphs (g)(1) through (3) of this section, the basis for any finding in the biological opinion, and the availability of reasonable and prudent alternatives (if a jeopardy opinion is to be issued) that the agency and the applicant can take to avoid violation of section 7(a)(2). The Service will utilize the expertise of the Federal agency and any applicant in identifying these alternatives. If requested, the Service shall make available to the Federal agency the draft biological opinion for the purpose of analyzing the reasonable and prudent alternatives. The 45-day period in which the biological opinion must be delivered will not be suspended unless the Federal agency secures the written consent of the applicant to an extension to a specific date. The applicant may request a copy of the draft opinion from the Federal agency. All comments on the draft biological opinion must be submitted to the Service through the Federal agency, although the applicant may send a copy of its comments directly to the Service. The Service will not issue its biological opinion prior to the 45-day or extended deadline while the draft is under review by the Federal agency. However, if the Federal agency submits comments to the Service regarding the draft biological opinion within 10 days of the deadline for issuing the opinion, the Service is entitled to an automatic 10-day extension on the deadline.

(6) Formulate discretionary conservation recommendations, if any, which will assist the Federal agency in reducing or eliminating the impacts that its proposed action may have on listed species or critical habitat.

(7) Formulate a statement concerning incidental take, if such take may occur.

(8) In formulating its biological opinion, any reasonable and prudent alternatives, and any reasonable and prudent measures, the Service will use the best scientific and commercial data available and will give appropriate consideration to any beneficial actions taken by the Federal agency or applicant, including any actions taken prior to the initiation of consultation.

(h) *Biological opinions.* The biological opinion shall include:

(1) A summary of the information on which the opinion is based;

(2) A detailed discussion of the effects of the action on listed species or critical habitat; and

(3) The Service's opinion on whether the action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (a "jeopardy biological opinion"); or, the action is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (a "no jeopardy" biological opinion). A "jeopardy" biological opinion shall include reasonable and prudent alternatives, if any. If the Service is unable to develop such alternatives, it will indicate that

to the best of its knowledge there are no reasonable and prudent alternatives.

(i) *Incidental take.* (1) In those cases where the Service concludes that an action (or the implementation of any reasonable and prudent alternatives) and the resultant incidental take of listed species will not violate section 7(a)(2), and, in the case of marine mammals, where the taking is authorized pursuant to section 101(a)(5) of the Marine Mammal Protection Act of 1972, the Service will provide with the biological opinion a statement concerning incidental take that:

(i) Specifies the impact, i.e., the amount or extent, of such incidental taking on the species;

(ii) Specifies those reasonable and prudent measures that the Director considers necessary or appropriate to minimize such impact;

(iii) In the case of marine mammals, specifies those measures that are necessary to comply with section 101(a)(5) of the Marine Mammal Protection Act of 1972 and applicable regulations with regard to such taking;

(iv) Sets forth the terms and conditions (including, but not limited to, reporting requirements) that must be complied with by the Federal agency or any applicant to implement the measures specified under paragraphs (i)(1)(ii) and (i)(1)(iii) of this section; and

(v) Specifies the procedures to be used to handle or dispose of any individuals of a species actually taken.

(2) Reasonable and prudent measures, along with the terms and conditions that implement them, cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes.

(3) In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. The reporting requirements will be established in accordance with 50 CFR 13.45 and 18.27 for FWS and 50 CFR 220.45 and 228.5 for NMFS.

(4) If during the course of the action the amount or extent of incidental taking, as specified under paragraph (i)(1)(i) of this Section, is exceeded, the Federal agency must reinitiate consultation immediately.

(5) Any taking which is subject to a statement as specified in paragraph (i)(1) of this section and which is in compliance with the terms and conditions of that statement is not a prohibited taking under the Act, and no other authorization or permit under the Act is required.

(j) *Conservation recommendations.* The Service may provide with the biological opinion a statement containing discretionary conservation recommendations. Conservation recommendations are advisory and are not intended to carry any binding legal force.

(k) *Incremental steps.* When the action is authorized by a statute that allows the agency to take incremental steps toward the completion of the action, the Service shall, if requested by the Federal agency, issue a biological opinion on the incremental step being considered, including its views on the entire action. Upon the issuance of such a biological opinion, the Federal agency may proceed with or authorize the incremental steps of the action if:

(1) The biological opinion does not conclude that the incremental step would violate section 7(a)(2);

(2) The Federal agency continues consultation with respect to the entire action and obtains biological opinions, as required, for each incremental step;

(3) The Federal agency fulfills its continuing obligation to obtain sufficient data upon which to base the final biological opinion on the entire action;

(4) The incremental step does not violate section 7(d) of the Act concerning irreversible or irretrievable commitment of resources; and

(5) There is a reasonable likelihood that the entire action will not violate section 7(a)(2) of the Act.

(l) *Termination of consultation.* (1) Formal consultation is terminated with the issuance of the biological opinion.

(2) If during any stage of consultation a Federal agency determines that its proposed action is not likely to occur, the consultation may be terminated by written notice to the Service.

(3) If during any stage of consultation a Federal agency determines, with the concurrence of the Director, that

its proposed action is not likely to adversely affect any listed species or critical habitat, the consultation is terminated.

[51 FR 19957, June 3, 1986, as amended at 54 FR 40350, Sept. 29, 1989]

§ 402.15 Responsibilities of Federal agency following issuance of a biological opinion.

(a) Following the issuance of a biological opinion, the Federal agency shall determine whether and in what manner to proceed with the action in light of its section 7 obligations and the Service's biological opinion.

(b) If a jeopardy biological opinion is issued, the Federal agency shall notify the Service of its final decision on the action.

(c) If the Federal agency determines that it cannot comply with the requirements of section 7(a)(2) after consultation with the Service, it may apply for an exemption. Procedures for exemption applications by Federal agencies and others are found in 50 CFR part 451.

§ 402.16 Reinitiation of formal consultation.

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and:

(a) If the amount or extent of taking specified in the incidental take statement is exceeded;

(b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

(c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

(d) If a new species is listed or critical habitat designated that may be affected by the identified action.

Subpart C—Counterpart Regulations for Implementing the National Fire Plan

SOURCE: 68 FR 68264, Dec. 8, 2003, unless otherwise noted.

§ 402.30 Definitions.

The definitions in § 402.02 are applicable to this subpart. In addition, the following definitions are applicable only to this subpart.

Action Agency refers to the Department of Agriculture Forest Service (FS) or the Department of the Interior Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Fish and Wildlife Service (FWS), or National Park Service (NPS).

Alternative Consultation Agreement (ACA) is the agreement described in § 402.33 of this subpart.

Fire Plan Project is an action determined by the Action Agency to be within the scope of the NFP as defined in this section.

National Fire Plan (NFP) is the September 8, 2000, report to the President from the Departments of the Interior and Agriculture entitled "Managing the Impact of Wildfire on Communities and the Environment" outlining a new approach to managing fires, together with the accompanying budget requests, strategies, plans, and direction, or any amendments thereto.

Service Director refers to the FWS Director or the Assistant Administrator for Fisheries for the National Oceanic and Atmospheric Administration.

§ 402.31 Purpose.

The purpose of these counterpart regulations is to enhance the efficiency and effectiveness of the consultation process under section 7 of the ESA for Fire Plan Projects by providing an optional alternative to the procedures found in §§ 402.13 and 402.14(b) of this part. These regulations permit an Action Agency to enter into an Alternative Consultation Agreement (ACA) with the Service, as described in § 402.33, which will allow the Action Agency to determine that a Fire Plan Project is "not likely to adversely affect" (NLAA) a listed species or designated critical habitat without formal

or informal consultation with the Service or written concurrence from the Service. An NLAA determination for a Fire Plan Project made under an ACA, as described in § 402.33, completes the Action Agency's statutory obligation to consult with the Service for that Project. In situations where the Action Agency does not make an NLAA determination under the ACA, the Action Agency would still be required to conduct formal consultation with the Service when required by § 402.14. This process will be as protective to listed species and designated critical habitat as the process established in subpart B of this part. The standards and requirements for formal consultation under subpart B for Fire Plan Projects that do not receive an NLAA determination are unchanged.

§ 402.32 Scope.

(a) Section 402.33 establishes a process by which an Action Agency may determine that a proposed Fire Plan Project is not likely to adversely affect any listed species or designated critical habitat without conducting formal or informal consultation or obtaining written concurrence from the Service.

(b) Section 402.34 establishes the Service's oversight responsibility and the standard for review under this subpart.

(c) Nothing in this subpart C precludes an Action Agency at its discretion from initiating early, informal, or formal consultation as described in §§ 402.11, 402.13, and 402.14, respectively.

(d) The authority granted in this subpart is applicable to an Action Agency only where the Action Agency has entered into an ACA with the Service. An ACA entered into with one Service is valid with regard to listed species and designated critical habitat under the jurisdiction of that Service whether or not the Action Agency has entered into an ACA with the other Service.

§ 402.33 Procedures.

(a) The Action Agency may make an NLAA determination for a Fire Plan Project without informal consultation or written concurrence from the Director if the Action Agency has entered into and implemented an ACA. The Action Agency need not initiate formal consultation on a Fire Plan Project if the Action Agency has made an NLAA determination for the Project under this subpart. The Action Agency and the Service will use the following procedures in establishing an ACA.

(1) *Initiation:* The Action Agency submits a written notification to the Service Director of its intent to enter into an ACA.

(2) *Development and Adoption of the Alternative Consultation Agreement:* The Action Agency enters into an ACA with the Service Director. The ACA will, at a minimum, include the following components:

(i) A list or description of the staff positions within the Action Agency that will have authority to make NLAA determinations under this subpart C.

(ii) Procedures for developing and maintaining the skills necessary within the Action Agency to make NLAA determinations, including a jointly developed training program based on the needs of the Action Agency.

(iii) A description of the standards the Action Agency will apply in assessing the effects of the action, including direct and indirect effects of the action and effects of any actions that are interrelated or interdependent with the proposed action.

(iv) Provisions for incorporating new information and newly listed species or designated critical habitat into the Action Agency's effects analysis of proposed actions.

(v) A mutually agreed upon program for monitoring and periodic program evaluation to occur at the end of the first year following signature of the ACA and periodically thereafter.

(vi) Provisions for the Action Agency to maintain a list of Fire Plan Projects for which the Action Agency has made NLAA determinations. The Action Agency will also maintain the necessary records to allow the Service to complete the periodic program evaluations.

(3) *Training:* Upon completion of the ACA, the Action Agency and the Service will implement the training program outlined in the ACA to the mutual satisfaction of the Action Agency and the Service.

(b) The Action Agency may, at its discretion, allow any subunit of the Action Agency to implement this subpart as soon as the subunit has fulfilled the training requirements of the ACA, upon written notification to the Service. The Action Agency shall at all times have responsibility for the adequacy of all NLAA determinations it makes under this subpart.

(c) The ACA and any related oversight or monitoring reports shall be made available to the public through a notice of availability in the FEDERAL REGISTER.

§402.34 Oversight.

(a) Through the periodic program evaluation set forth in the ACA, the Service will determine whether the implementation of this subpart by the Action Agency is consistent with the best available scientific and commercial information, the ESA, and section 7 regulations.

(b) The Service Director may use the results of the periodic program evaluation described in the ACA to recommend changes to the Action Agency's implementation of the ACA. If and as appropriate, the Service Director may suspend any subunit participating in the ACA or exclude any subunit from the ACA.

(c) The Service Director retains discretion to terminate the ACA if the Action Agency fails to comply with the requirements of this subpart, section 7 of the ESA, or the terms of the ACA. Termination, suspension, or modification of an ACA does not affect the validity of any NLAA determinations made previously under the authority of this subpart.

Subpart D—Counterpart Regulations Governing Actions by the U.S. Environmental Protection Agency Under the Federal Insecticide, Fungicide and Rodenticide Act

SOURCE: 69 FR 47759, Aug. 5, 2004, unless otherwise noted.

§402.40 Definitions.

The definitions in §402.02 are applicable to this subpart. In addition, the following definitions are applicable only to this subpart.

(a) *Alternative consultation agreement* is the agreement described in §402.45.

(b) *Effects determination* is a written determination by the U.S. Environmental Protection Agency (EPA) addressing the effects of a FIFRA action on listed species or critical habitat. The contents of an effects determination will depend on the nature of the action. An effects determination submitted under §402.46 or §402.47 shall contain the information described in §402.14(c)(1)–(6) and a summary of the information on which the determination is based, detailing how the FIFRA action affects the listed species or critical habitat. EPA may consider the following additional sections for inclusion in an effects determination:

(1) A conclusion whether or not the FIFRA action is likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat and a description of any reasonable and prudent alternatives that may be available;

(2) A description of the impact of any anticipated incidental taking of such listed species resulting from the FIFRA action, reasonable and prudent measures considered necessary or appropriate to minimize such impact, and terms and conditions necessary to implement such measures; and

(3) A summary of any information or recommendations from an applicant. An effects determination shall be based on the best scientific and commercial data available.

(c) *FIFRA action* is an action by EPA to approve, permit or authorize the sale, distribution or use of a pesticide under sections 136–136y of the Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. 136 *et seq.* (FIFRA). In any consultation under this subpart, EPA shall determine the nature and scope of a FIFRA action.

(d) *Listed species* is a species listed as endangered or threatened under section 4 of the Act.

(e) *Partial biological opinion* is the document provided under §402.47(a), pending the conclusion of consultation under §402.47(b), stating the opinion of the Service as to whether or not a

FIFRA action is likely to jeopardize the continued existence of one or more listed species or result in the destruction or adverse modification of one or more critical habitats, and describing the impact of any anticipated incidental taking of such listed species resulting from the FIFRA action, reasonable and prudent measures considered necessary or appropriate to minimize such impact, and terms and conditions necessary to implement such measures.

(f) *Service Director* refers to the Director of the U.S. Fish and Wildlife Service or the Assistant Administrator for Fisheries for the National Oceanic and Atmospheric Administration.

(g) *Service Representative* is the person or persons designated to participate in advance coordination as provided in this subpart.

§ 402.41 Purpose.

The purpose of these counterpart regulations is to enhance the efficiency and effectiveness of the existing consultation process under section 7 of the Endangered Species Act (Act), 16 U.S.C. 1531 *et seq.*, by providing Fish and Wildlife Service and the National Marine Fisheries Service (referred to jointly as "Services" and individually as "Service") and EPA with additional means to satisfy the requirements of section 7(a)(2) of the Act for certain regulatory actions under FIFRA. These additional means will permit the Services and EPA to more effectively use the scientific and commercial data generated through the FIFRA regulatory process as part of the best scientific and commercial data available to protect listed species and critical habitat. The procedures authorized by these counterpart regulations will be as protective of listed species and critical habitat as the process established in subpart B of this part.

§ 402.42 Scope and applicability.

(a) *Available consultation procedures.* This subpart describes consultation procedures available to EPA to satisfy the obligations of section 7(a)(2) of the Act in addition to those in subpart B of this part for FIFRA actions authorized, funded, or carried out by EPA in which EPA has discretionary Federal involvement or control. EPA retains discretion to initiate early, informal, or formal consultation as described in §§ 402.11, 402.13, and 402.14 for any FIFRA action. The procedures in this subpart may be employed for FIFRA actions as follows:

(1) Interagency exchanges of information under § 402.43 and advance coordination under § 402.44 are available for any FIFRA action.

(2) Alternative consultation under § 402.45 is available for a listed species or critical habitat if EPA determines the FIFRA action is not likely to adversely affect the listed species or critical habitat.

(3) Optional formal consultation under § 402.46 is available for any FIFRA action with respect to any listed species or critical habitat.

(4) The special procedures in § 402.47 are available for consultations on FIFRA actions that will be unusually complex due to factors such as the geographic area or number of species that may be affected by the action.

(5) EPA shall engage in consultation as to all listed species and critical habitat that may be affected by a FIFRA action, and may in its discretion employ more than one of the available consultation procedures for a FIFRA action that may affect more than one listed species or critical habitat.

(6) EPA shall engage in consultation on actions involving requests for emergency exemptions under section 18 of FIFRA that may affect listed species or critical habitat, and may choose to do so under § 402.05 or other provisions of this subpart or subpart B of this part. Any required formal consultation shall be initiated as soon as practicable after the emergency is under control. For the purposes of § 402.05(b) the definition of formal consultation in § 402.02 includes the procedures in § 402.46.

(7) EPA must prepare a biological assessment for a FIFRA action to the extent required by § 402.12.

(8) EPA must comply with § 402.15 for all FIFRA actions.

(9) After a consultation under this subpart has been concluded, EPA shall reinitiate consultation as required by § 402.16 as soon as practicable after a circumstance requiring reinitiation occurs, and may employ the procedures

in this subpart or subpart B of this part in any reinitiated consultation.

(b) *Exchanges of scientific information.* As part of any of the additional consultation procedures provided in this subpart, EPA and the Services shall establish mutually-agreeable procedures for regular and timely exchanges of scientific information to achieve accurate and informed decision-making under this subpart and to ensure that the FIFRA process considers the best scientific and commercial data available on listed species and critical habitat in a manner consistent with the requirements of FIFRA and ESA.

§ 402.43 Interagency exchanges of information.

EPA may convey to the Service a written request for a list of any listed species or critical habitat that may be present in any area that may be affected by a FIFRA action. Within 30 days of receipt of such a request the Service shall advise EPA in writing whether, based on the best scientific and commercial data available, any listed species or critical habitat may be present in any such area. EPA may thereafter request the Service to provide available information (or references thereto) describing the applicable environmental baseline for each species or habitat that EPA determines may be affected by a FIFRA action, and the Service shall provide such information within 30 days of the request.

§ 402.44 Advance coordination for FIFRA actions.

(a) *Advance coordination.* EPA may request the Service to designate a Service Representative to work with EPA in the development of an effects determination for one or more listed species or critical habitat. EPA shall make such a request in writing and shall provide sufficient detail as to a FIFRA action planned for consultation to enable the Service to designate a representative with appropriate training and experience who shall normally be available to complete advance coordination with EPA within 60 days of the date of designation. Within 14 days of receiving such a request, the Service shall advise EPA of the designated Service Representative.

(b) *Participation of Service Representative in preparation of effects determination.* The Service Representative designated under paragraph (a) of this section shall participate with EPA staff in the preparation of the effects determination identified under paragraph (a) of this section. EPA shall use its best efforts to include the designated Service Representative in all relevant discussions on the effects determination, to provide the designated Service Representative with access to all documentation used to prepare the effects determination, and to provide the designated Service Representative office and staff support sufficient to allow the Service Representative to participate meaningfully in the preparation of the effects determination. EPA shall consider all information timely identified by the designated Service Representative during the preparation of the effects determination.

§ 402.45 Alternative consultation on FIFRA actions that are not likely to adversely affect listed species or critical habitat.

(a) *Consultation obligations for FIFRA actions that are not likely to adversely affect listed species or critical habitat when alternative consultation agreement is in effect.* If EPA and the Service have entered into an alternative consultation agreement as provided below, EPA may make a determination that a FIFRA action is not likely to adversely affect a listed species or critical habitat without informal consultation or written concurrence from the Director, and upon making such a determination for a listed species or critical habitat, EPA need not initiate any additional consultation on that FIFRA action as to that listed species or critical habitat. As part of any subsequent request for formal consultation on that FIFRA action under this subpart or subpart B of this part, EPA shall include a list of all listed species and critical habitat for which EPA has concluded consultation under this section.

(b) *Procedures for adopting and implementing an alternative consultation agreement.* EPA and the Service may enter into an alternative consultation

agreement using the following procedures:

(1) *Initiation.* EPA submits a written notification to the Service Director of its intent to enter into an alternative consultation agreement.

(2) *Required contents of the alternative consultation agreement.* The alternative consultation agreement will, at a minimum, include the following components:

(i) *Adequacy of EPA Determinations under the ESA.* The alternative consultation agreement shall describe actions that EPA and the Service have taken to ensure that EPA's determinations regarding the effects of its actions on listed species or critical habitat are consistent with the ESA and applicable implementing regulations.

(ii) *Training.* The alternative consultation agreement shall describe actions that EPA and the Service intend to take to ensure that EPA and Service personnel are adequately trained to carry out their respective roles under the alternative consultation agreement. The alternative consultation agreement shall provide that all effects determinations made by EPA under this subpart have been reviewed and concurred on by an EPA staff member who holds a current certification as having received appropriate training under the alternative consultation agreement.

(iii) *Incorporation of new information.* The alternative consultation agreement shall describe processes that EPA and the Service intend to use to ensure that new information relevant to EPA's effects determinations is timely and appropriately considered.

(iv) *Incorporation of scientific advances.* The alternative consultation agreement shall describe processes that EPA and the Service intend to use to ensure that the ecological risk assessment methodologies supporting EPA's effects determinations incorporate relevant scientific advances.

(v) *Oversight.* The alternative consultation agreement shall describe the program and associated record keeping procedures that the Service and EPA intend to use to evaluate EPA's processes for making effects determinations consistent with these regulations and the alternative consultation agreement. The alternative consultation agreement shall provide that the Service's oversight will be based on periodic evaluation of EPA's program for making effects determinations under this subpart. Periodic program evaluation will occur at the end of the first year following signature of the alternative consultation agreement and should normally occur at least every five years thereafter.

(vi) *Records.* The alternative consultation agreement shall include a provision for EPA to maintain a list of FIFRA actions for which EPA has made determinations under this section and to provide the list to the Services on request. EPA will also maintain the necessary records to allow the Service to complete program evaluations.

(vii) *Review of Alternative Consultation Agreement.* The alternative consultation agreement shall include provisions for regular review and, as appropriate, modification of the agreement by EPA and the Service, and for departure from its terms in a particular case to the extent deemed necessary by both EPA and the Service.

(3) *Training.* After EPA and the Service enter into the alternative consultation agreement, EPA and the Service will implement the training program outlined in the alternative consultation agreement to the mutual satisfaction of EPA and the Service.

(4) *Public availability.* The alternative consultation agreement and any related oversight or monitoring reports shall be made available to the public to the extent provided by law.

(c) *Oversight of alternative consultation agreement implementation.* Through the program evaluations set forth in the alternative consultation agreement, the Service will determine whether the implementation of this section by EPA is consistent with the best scientific and commercial information available, the ESA, and applicable implementing regulations. The Service Director may use the results of the program evaluations described in the alternative consultation agreement to recommend changes to EPA's implementation of

the alternative consultation agreement. The Service Director retains discretion to terminate or suspend the alternative consultation agreement if, in using the procedures in this subpart, EPA fails to comply with the requirements of this subpart, section 7 of the ESA, or the terms of the alternative consultation agreement. Termination, suspension, or modification of an alternative consultation agreement does not affect the validity of any NLAA determinations made previously under the authority of this subpart.

§402.46 Optional formal consultation procedure for FIFRA actions.

(a) *Initiation of consultation.* EPA may initiate consultation on a FIFRA action under this section by delivering to the Service a written request for consultation. The written request shall be accompanied by an effects determination as defined in §402.40(b) and a list or summary of all references and data relied upon in the determination. All such references and data shall be made available to the Service on request and shall constitute part of the Service's administrative record for the consultation. The time for conclusion of the consultation under section 7(b)(1) of the Act is calculated from the date the Service receives the written request from EPA. Any subsequent interchanges regarding EPA's submission, including interchanges about the completeness of the effects determination, shall occur during consultation and do not extend the time for conclusion of the consultation unless EPA withdraws the request for consultation.

(b) *Additional information determination.* For an effects determination prepared without advance coordination under §402.44, the Service may determine that additional available information would provide a better information base for the effects determination, in which case the Service Director shall notify the EPA Administrator within 45 days of the date the Service receives the effects determination. The notification shall describe such additional information in detail, and shall identify a means for obtaining that information within the time period available for consultation. EPA shall provide a copy of the Service Director's notification to any applicant. EPA may thereafter revise its effects determination, and may resubmit the revised effects determination to the Service. If EPA advises the Service it will not resubmit a revised effects determination to the Service, its initiation of consultation on the effects determination is deemed withdrawn.

(c) *Service responsibilities.* (1) Within the later of 90 days of the date the Service receives EPA's written request for consultation or 45 days of the date the Service receives an effects determination resubmitted under paragraph (b) of this section, and consistent with section 7(b)(1) of the Act, the Service shall take one of the following actions:

(i) If the Service finds that the effects determination contains the information required by §402.40(b) and satisfies the requirements of section 7(b)(4) of the Act, and the Service concludes that the FIFRA action that is the subject of the consultation complies with section 7(a)(2) of the Act, the Service will issue a written statement adopting the effects determination; or

(ii) The Service will provide EPA a draft of a written statement modifying the effects determination, which shall meet the requirements of §402.14(i), and as modified adopting the effects determination, and shall provide a detailed explanation of the scientific and commercial data and rationale supporting any modification it makes; or

(iii) The Service will provide EPA a draft of a biological opinion finding that the FIFRA action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat, and describing any reasonable and prudent alternatives if available.

(2) If the Service acts under paragraphs (c)(1)(ii) or (c)(1)(iii) of this section, EPA shall, on request from an applicant, provide the applicant a copy of the draft written statement or draft biological opinion received from the Service. The Service shall at the request of EPA or an applicant discuss with EPA and the applicant the Service's review and evaluation under this section, and the basis for its findings. EPA and any applicant may submit written comments to the Service within 30 days after EPA receives the draft

written statement or opinion from the Service unless the Service, EPA and any applicant agree to an extended deadline consistent with section 7(b)(1) of the Act.

(3) The Service will issue a final written statement or final biological opinion within 45 days after EPA receives the draft statement or opinion from the Service unless the deadline is extended under section 7(b)(1) of the Act.

(d) *Opinion of the Secretary.* The written statement or opinion by the Service under paragraphs (c)(1) or (c)(3) of this section shall constitute the opinion of the Secretary and the incidental take statement, reasonable and prudent measures, and terms and conditions under section 7(b) of the Act.

(e) *Delegation of Authority for Service decisions.* Any written statement modifying an effects determination or any biological opinion issued under this section shall be signed by the Service Director and such authority may not be delegated below the level of Assistant Director for Endangered Species (FWS) or Director of Office of Protected Resources (NOAA Fisheries).

§ 402.47 Special consultation procedures for complex FIFRA actions.

(a) *Successive effects determinations.* If EPA determines after conferring with the Service that consultation on a FIFRA action will be unusually complex due to factors such as the geographic area or number of species that may be affected by the action, EPA may address the effects of the action through successive effects determinations under this subpart addressing groupings or categories of species or habitats as established by EPA. EPA may initiate consultation based upon each such effects determination using the procedure in § 402.46(a), and the provisions of § 402.46(b) and (c) shall apply to any such consultation. When consultation is conducted under this section, the written statement or opinion provided by the Service under § 402.46(c) constitutes a partial biological opinion as to the species or habitats that are the subject of the consultation. While not constituting completion of consultation under section 7(a)(2), EPA retains authority to use such a partial biological opinion along with other available information in making a finding under section 7(d) of the Act.

(b) *Opinion of the Secretary.* After conclusion of all consultation on the FIFRA action, the partial biological opinions issued under paragraph (a) of this section shall then collectively constitute the opinion of the Secretary and the incidental take statement, reasonable and prudent measures, and terms and conditions under section 7(b) of the Act except to the extent a partial biological opinion is modified by the Service in accordance with the procedures in § 402.46(c). The Service shall so advise EPA in writing upon issuance of the last partial biological opinion for the consultation.

§ 402.48 Conference on proposed species or proposed critical habitat.

EPA may employ the procedures described in § 402.10 to confer on any species proposed for listing or any habitat proposed for designation as critical habitat. For the purposes of § 402.10(d), the procedures in § 402.46 are a permissible form of formal consultation.

PART 403—TRANSFER OF MARINE MAMMAL MANAGEMENT AUTHORITY TO STATES

Sec.

AUTHORITY: 16 U.S.C. 1361 *et seq.*, as amended by Pub. L. 97-58.

SOURCE: 48 FR 22456, May 18, 1983, unless otherwise noted.

§ 403.01 Purpose and scope of regulations.

The regulations contained in this part implement section 109 of the Act which, upon a finding by the Secretary

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

March 11, 2005

Mr. Joseph A. Jones
Chief, Planning Branch
Department of the Army
U.S. Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Attn: Alan Shirey

Re: Folly Beach Renourishment
Charleston County, South Carolina
FWS Log No. 4-6-04-F-111R

Dear Mr. Jones:

This document is the Fish and Wildlife Service's (Service) revised biological opinion based on additional information obtained regarding the original incidental take statement and on our review of the proposed sand relocation project located in the waters of the Atlantic Ocean along the shoreline of Folly Beach in Charleston County, South Carolina, and its effects on the loggerhead sea turtle (*Caretta caretta*), the leatherback sea turtle (*Dermochelys coriacea*), the piping plover (*Charadrius melodus*) and designated critical habitat, and the seabeach amaranth (*Amaranthus pumilus*) per section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your September 30, 2004, request for formal consultation was received on December 9, 2004.

This biological opinion is based on information provided in the September 30, 2004, biological assessment, the September 30, 2004, draft environmental assessment, the January 12, 2005, re-nourishment meeting, other sources of information, and further communication with related parties. A complete administrative record of this consultation is on file at the Charleston Field Office, 176 Croghan Spur Road, Suite 200, Charleston, South Carolina 29407.

CONSULTATION HISTORY

September 30, 2004 - The Service received the biological assessment.

December 9, 2004 – The Service provided a letter to the Department of the Army that acknowledged receipt of all information necessary to initiate formal consultation on the proposed action, as required in the regulations governing interagency consultations (50 (Code of Federal Regulations [CFR] 402.14)

January 10, 2005 - The Service received a letter from the Department of the Army that informed us of changes to the authority, quantity of sand, and time frame for the proposed project.

January 12, 2005 - The Service attended a meeting with other state and local agencies at the U.S. Army Corps of Engineers (Corps) to discuss the changes addressed in the letter received on January 10, 2005.

FWS Log No: 4-6-04-F-111
Application No: PL84-99
Date Started: December 9, 2004
Ecosystem: 75j
Applicant: Town of Folly Beach
Action Agency: Corps and Federal Emergency Management Administration
Project Title: Folly Beach Renourishment
County: Charleston

Table 1. Species and critical habitat evaluated for effects and those where the Service has concurred with a "not likely to be adversely affected" determination.

SPECIES or CRITICAL HABITAT	PRESENT IN ACTION AREA
Piping plover	No
Piping plover critical habitat	No
Seabeach amaranth	No

The above species and critical habitat not impacted by this action will not be discussed further in this biological opinion.

Also, this opinion does not address potential impacts of this project on loggerhead or leatherback sea turtles while in the open ocean. The Service's endangered species jurisdiction only extends to nesting turtles. Turtles in the open ocean are the jurisdiction of the Department of Commerce's National Marine Fisheries Service (NMFS).

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Project Description

The proposed project consists of the nourishment of 28,200 linear feet (5.34 linear miles) of shoreline. The project extends from just below the U.S. Coast Guard Base and extends to the Charleston County Park on the west end of Folly Island. 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 expected erosion rates, it is estimated that two million cubic yards of beach quality sand will be placed on the beach.

Construction will be by means of hydraulic cutterhead dredge that will transport the sand through a pipeline. The pipeline will run parallel with the beach. Beach compatible material (sand) from the off-shore source will be pumped along the roughly 28,000 linear feet reach 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. It is anticipated that construction will begin in March 2005 and will require from six to eight months for completion.

The borrow areas being used for beach compatible sand are about 620 acres and are located about three miles off-shore of the northern end of the island. None of the three borrow areas are inside any CBRA zones. The borrow areas have been surveyed by side-scan sonar, followed by the collection of numerous vibracore samples in each of the potential borrow sites. This was done to avoid hard/live bottom areas during dredging, and to ensure that adequate quantities of beach compatible sand were available in the three areas. The size, sand volume (based on dredging to a depth of six feet), and water depth of each borrow area are as follows:

Borrow Area	Area (Acres)	Volume (Cubic yards)	Water Depth (Feet)
A	~310	3,130,000	26-36
B	~210	2,030,000	32-40
C	~30	320,000	34
D	~70	400,000	40

Sand will be removed from the borrow areas to a depth of six to eight feet. Because of the dynamic nature of the coastal area and the constant movement of sand, it is expected that the borrow areas will fill with sand of the same grain size after the dredging has been completed.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle (*Caretta caretta*), listed as a threatened species on July 28, 1978, (Federal Register [FR] 1978), inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson, 1984).

No critical habitat has been designated for the loggerhead sea turtle.

Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea*) listed as an endangered species on June 2, 1970, (FR 1970), nests on shores of the Atlantic, Pacific, and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard, 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (NMFS and Service, 1992; National Research Council [NRC], 1990a).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (NMFS and Service, 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (Murphy, 1996; Winn, 1996; Boettcher, 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff, 1990; Florida Fish and Wildlife Conservation Commission; unpublished data); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff, 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands.

Life history

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert et al., 1980; Richardson and Richardson, 1982; Lenarz et al., 1981); the mean is about 4.1 (Murphy and Hopkins, 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd, 1988). Mean clutch size varies from about 100 to 126 along the southeastern United States coast (NMFS and Service, 1991b). Nesting migration intervals of two to three years are most common in loggerheads, but the number can vary from one to seven years (Dodd, 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group [TWEG], 1998).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (NMFS and Service, 1992). The interval between nesting events within a season is about nine to ten days. Clutch size averages 101 eggs on Hutchinson Island, Florida (Martin, 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton, 1996). Leatherbacks are believed to reach sexual maturity in six to ten years (Zug and Parham, 1996).

Population dynamics

Loggerhead Sea Turtle

Total estimated nesting in the Southeast is approximately 68,000 to 90,000 nests per year (Florida Fish and Wildlife Conservation Commission statewide nesting database, 2002; Georgia Department of Natural Resources statewide nesting database, 2002; South Carolina Department of Natural Resources [SCDNR] statewide nesting database, 2002; North Carolina Wildlife Resources Commission statewide nesting database, 2002). In 1998, there were over 80,000 nests in Florida alone. From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross, 1982; Ehrhart, 1989; NMFS and Service, 1991b). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) is cause for considerable concern (Meylan et al., 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (NMFS and Service, 1991b). About 80% of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (NMFS and Service, 1991b).

Leatherback Sea Turtle

Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually (Spotila *et al.*, 1996). The largest nesting populations at present occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year) and Colombia (estimated several thousand nests annually), and in the western Pacific in West Papua (formerly Irian Jaya) and Indonesia (about 600 to 650 females nesting/year). In the United States, small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year).

Status and distribution

Loggerhead Turtle

Genetic research involving analysis of mitochondrial DNA has identified five different loggerhead subpopulations/nesting aggregations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Dry Tortugas, Florida, Subpopulation, (4) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (5) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen, 1994; 1995; Bowen et al., 1993; Encalada et al., 1998; Pearce, 2001). These data indicate that gene flow between these five regions is limited. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting subpopulation. The Northern Subpopulation has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (TEWG, 1998; 2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating that the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 2002. Nesting surveys in the Dry Tortugas, Northwest Florida, and Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group 1998, 2000).

Threats include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65% of worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings.

The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Analysis of the Species/Critical Habitat Likely to be Affected

Loggerhead and Leatherback Sea Turtle

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting, behavior modification of nesting females due to escarpment formation within the project area during a nesting season resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. The quality of the placed sand could affect the ability of female turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated in the continental United States; therefore, the proposed action would not result in an adverse modification.

ENVIRONMENTAL BASELINE

Status of the species within the action area

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for South Carolina beaches extends from May 1st through November 30th. Incubation ranges from about 45 to 95 days. Loggerhead turtle nesting along South Carolina beaches varies from less than one nest per 0.62 miles at Turtle Island to more than 200 nests per 0.62 miles at Cape Island (Hopkins and Richardson 1984). Loggerhead nesting at Folly Beach averages 47 nests/year (unpublished data).

Leatherback Sea Turtle

The leatherback sea turtle nesting and hatchling season for South Carolina beaches extends from April 15th through September 30th. Leatherback turtle nesting is rare in Georgia, South Carolina, and North Carolina (Murphy 1996; Winn 1996; Boettcher, 1998). In 2003, there was one successful leatherback nest on Folly Beach (unpublished data).

EFFECTS OF THE ACTION

Factors to be considered

Proximity of the action

The proposed project is in the immediate vicinity of habitats important to nesting loggerhead sea turtles. Specifically, the proposed project will potentially impact habitat for the loggerhead sea turtles from the Northern subpopulation. In addition, the proposed action has the potential to directly impact 28,200 feet of shoreline (including pipeline placement and fill).

Distribution

Disturbance activities that will impact listed species will primarily occur on the ocean front shoreline of Folly Beach and the Atlantic Ocean. As mobile species, sea turtles may also be affected in nearby waterways and on adjacent islands by intraspecific competition, excessive energy expenditure, and marginally suitable habitat selection.

Timing

The timing of the proposed project will result in direct impacts occurring during the nesting season of loggerhead and leatherback sea turtles.

Nature of the Effect

The effects of the action are likely to destroy, alter, or diminish the nesting success of sea turtles. Any reduction in productivity and/or survival rate will contribute to a vulnerability to extinction in sea turtles.

Duration

The duration of the direct impacts resulting from construction operations could be short-term, lasting about six to eight months.

Analyses for effects of the action

Loggerhead Sea Turtle

Beneficial Effects

The placement of sand on a beach with reduced dry fore-dune habitat may increase sea turtle nesting habitat if the placed sand is compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project.

Direct Effects

Placement of sand on a beach in and of itself may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Nourishment construction during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program or a nest mark and avoidance program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, and/or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about seven percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (1994).

1. Nest relocation

Project construction is likely to occur during the sea turtle nesting season, therefore, sea turtle nest relocation is likely during the estimated six to eight month project construction window. Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement, particularly if eggs are not relocated within 12 hours of deposition (Limpus *et al.* 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al.*, 1979; Ackerman, 1980; Parmenter, 1980; Spotila *et al.*, 1983; McGehee, 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al.*, 1984), mobilization of calcium (Packard and Packard, 1986), mobilization of yolk nutrients (Packard *et al.*, 1985), hatchling size (Packard *et al.*, 1981, McGehee, 1990), energy reserves in the yolk at hatching (Packard *et al.*, 1988), and locomotory ability of hatchlings (Miller *et al.*, 1987).

Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21% decrease to a nine percent increase for relocated nests (Florida Department of Environmental Protection, unpublished data). Comparisons of emergence success between relocated and *in situ* nests have also noted significant variation ranging from a 23% decrease to a five percent increase for relocated nests (DEP, unpublished data). A 1994 Florida Department of Environmental Protection study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01% (range = 7.19% increase to 16.31% decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range = 3.6 to 23.36%) (Meylan, 1995).

2. Equipment

The placement of pipelines and the use of heavy machinery or equipment on the beach during a construction project may also have adverse effects on sea turtles. They can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. The equipment can also create impediments to hatchling sea turtles as they crawl to the ocean.

3. Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr, 1967; Mrosovsky and Shettleworth, 1968; Dickerson and Nelson, 1989; Witherington and Bjorndal, 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean

(Philibosian, 1976; Mann 1977; DEP, unpublished data). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington, 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

Indirect Effects

Many of the direct effects of beach nourishment may persist over time and become indirect impacts. These indirect effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, future sand migration, and accelerated downdrift erosion.

1. Increased susceptibility to catastrophic events

Nest relocation may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn, 1998; Wyneken *et al.*, 1998).

2. Increased beachfront development

Pilkey and Dixon (1996) state that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also notes that the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami during 1982, investment in new and updated facilities substantially increased tourism there (NRC, 1995). Increased building density immediately adjacent to the beach often resulted as older buildings were replaced by much larger ones that accommodated more beach users. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (NRC, 1990a), and can also result in greater adverse effects due to artificial lighting, as discussed above.

3. Changes in the physical environment

Beach nourishment may result in changes in sand density or compaction, beach shear resistance or hardness, beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson, 1987; Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al.*, 1987; Nelson and Dickerson, 1988a). Significant reductions in nesting success (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer, 1980; Raymond, 1984; Nelson and Dickerson, 1987, Nelson *et al.*, 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson, 1988c). Nelson and Dickerson (1988b) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for ten years or more. These impacts can be minimized by using suitable sand and by tilling compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson, 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to one year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure that project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

4. Escarpment formation

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center, 1984; Nelson *et al.*, 1987). In addition, escarpments may develop on the crenulate beaches located between groins as the beaches equilibrate to their final positions. These escarpments can hamper or prevent access to nesting sites (Nelson and

Blihovde, 1998). Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Species' Response to the Proposed Action

Loggerhead Sea Turtle

Ernest and Martin (1999) conducted a comprehensive study to assess the effects of beach nourishment on loggerhead sea turtle nesting and reproductive success. The following findings illustrate sea turtle responses to and recovery from a sediment disposal project. A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on Control or pre-nourished beaches. This reduction in nesting success was most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the sediment disposal project (e.g., beach profile, sediment grain size, beach compaction, frequency and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on the untilled, hard-packed sands of one treatment area increased significantly relative to control and background conditions. However, in another treatment area, tilling was effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to background levels.

During the first post-construction year, nests on the nourished beaches were deposited significantly farther from both the toe of the dune and the tide line than nests on control beaches. Furthermore, nests were distributed throughout all available habitat and were not clustered near the dune as they were in the Control. As the width of nourished beaches decreased during the second year, among-treatment differences in nest placement diminished. More nests were washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped beaches of the Control. This phenomenon persisted through the second post-construction year monitoring and resulted from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrated to a more natural contour.

Ernest and Martin (1999) found that the principal effect of sediment disposal on sea turtle reproduction was a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin indicate that changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a more natural beach

profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Beach bulldozing and sandbagging (i.e., above the high tide line and not requiring a Federal permit) by private individuals or local groups and governments is another activity that may adversely affect sea turtles using project area beaches. The purpose of the proposed beach disposal is to protect beachfront buildings; however, the effort creates the impression that beachfront property will be protected from time to time by government action. Sandbagging while sea turtle nests are present on action area beaches has the potential to destroy these nests or create artificial barriers that prohibit hatchlings from reaching the shore. In addition, beach bulldozing activities could create escarpments and sandbags could create barriers that hinder females from accessing suitable nesting habitat.

CONCLUSION

After reviewing the current status of the loggerhead and leatherback sea turtle, the environmental baseline for the action area, the effects of the proposed Folly Beach renourishment project and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence the loggerhead or leatherback sea turtle. No critical habitat has been designated for the loggerhead or leatherback sea turtle in South Carolina; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental

to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions or (2) fails to require a contractor to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Loggerhead and Leatherback Sea Turtles

The Service expects incidental take of sea turtles will occur on 28,200 feet of sea turtle nesting beach but will be difficult to detect for the following reasons:

(1) the turtles nest primarily at night and all nests are not found because
[a] natural factors, such as rainfall, wind, and tides may obscure crawls and
[b] human-caused factors, such as pedestrian traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program;
(2) the total number of hatchlings per undiscovered nest is unknown;
(3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown;
(4) an unknown number of females may avoid the project beach and be forced to nest in another area;
(5) lights may misdirect an unknown number of hatchlings and cause death; and
(6) escarpments may form and prevent an unknown number of females from nesting.

However, the level of take of these species can be anticipated by the disturbance of renourishment construction because: (1) turtles nest within the project site; (2) beach nourishment construction will likely occur during a portion of the nesting season; (3) beach nourishment will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting may misdirect nesting females and hatchlings.

The take is expected to be in the form of: (1) destruction of some nests and eggs that may be missed by a nest survey and marking program; (2) destruction of some nests deposited after nest surveys and marking programs are completed; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of

disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches; (5) misdirection of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females due to escarpment formation within the project area; and (7) destruction of nests from escarpment leveling within a nesting season.

Table 2 below represents the level of take that could occur if the reasonable and prudent measures were not implemented. However, due to the implementation of the sea turtle protection measures, we anticipate that the take will not exceed seven percent of the nesting average in the project area. According to Schroeder, 1994, there is an average survey error of seven percent; therefore, there is a possibility that some of the nests on Folly Beach may be missed. This number is not the level of incidental take exempted, because the exact number cannot be predicted nor can the level of incidental take be monitored.

Table 2. The average number of sea turtle nests, based on the best available commercial and scientific information.

SPECIES	NESTS**	TAKE TYPE	CRITICAL HABITAT AFFECTED
Loggerhead sea turtle	37*	Harm/Harassment	None
Leatherback sea turtle	1	Harm/Harassment	None

* This number is the average number of nests within the project area
**Not the parameter that will be monitored for tracking compliance with the Incidental Take Statement

Table 3 below represents the amount of turtle nesting habitat that will be affected by the project.

Table 3. Monitoring the incidental take for the proposed project will be done by amount of habitat affected

SPECIES	CRITICAL HABITAT AFFECTED	HABITAT AFFECTED
Loggerhead sea turtle	None	28,200 feet of nesting
Leatherback sea turtle	None	28,200 feet of nesting

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the loggerhead or leatherback sea turtle. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and minimize impacts of incidental take of the Loggerhead and Leatherback sea turtle:

1. Only beach compatible sand should be deposited on Folly Beach as part of this project.

2. Sea turtle protection measures, as defined in the following terms and conditions, must be employed to minimize the likelihood of take.

3. Immediately after completion of the project and prior to the next three nesting seasons, beach compaction will be monitored.

4. After completion of the project and prior to the next three nesting seasons, monitoring must be conducted to determine if escarpments are present, and escarpments must be leveled as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.

5. The applicant must make sure that contractors conducting the nourishment construction work fully understand the sea turtle protection measures detailed in this incidental take statement.

6. During the sea turtle nesting, construction equipment and materials must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.

7. During the sea turtle nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and misdirecting nesting and/or hatchling sea turtles.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which carry out the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Service's Charleston Field Office, 176 Croghan Spur Road, Suite 200, Charleston, South Carolina 29407 within 60 days of completion of the proposed work. This report will include the status of the species (nesting loggerhead and leatherback sea turtles) addressed in this opinion. This report will include the dates of actual construction activities, names and qualifications of

personnel involved in surveys (sea turtle nests) and relocation activities, descriptions and locations of self-release beach sites, nest survey and relocation results, and hatching success of nests for sea turtles. The report will also include any known impacts, either beneficial or adverse, of the project upon completion of the construction phase and following each maintenance phase, inclusive of the years between each operational event.

2. The dates of actual construction activities and the names and qualifications of personnel involved in species surveys should also be included.

3. The biological and geographical scope of these reports will not be limited to areas of actual disposal and pipeline activity, but each report shall encompass all areas within the project action area.

4. All fill material placed on beaches will be sand that is similar to that already existing at the beach site in both coloration and grain size distribution. All such fill material must be free of construction debris, rocks, organic materials, or other foreign matter and will generally not contain, on average, greater than ten percent fines (i.e., silt and clay; passing the # 200 sieve) and must not contain, on average, greater than five percent coarse gravel or cobble, exclusive of shell material (retained by the # 4 sieve).

5. Daily early morning surveys for sea turtle nests will be required if any portion of the beach nourishment project occurs during the period from May 1 to November 30. Nesting surveys must be initiated 65 days prior to nourishment activities or by May 1, whichever is later. Nesting surveys must continue through the end of the project or through November 30, whichever is earlier. If nests are constructed in areas where they may be affected by beach nourishment activities, eggs must be relocated per the following requirements.

   5a. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must be trained by SCDNR and have a valid SCDNR permit. Nesting surveys must be conducted daily between sunrise and 9 a.m. Surveys must be performed in such a manner so as to make sure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures. At a minimum, the following protocol must be followed:
   - The number of nests, in situ and relocated, as well as false crawls, should be counted and recorded on a daily basis.
   - Methods used for marking and screening nests should also be noted.
   - The dates of first and last nesting should be recorded.
   - Emergence activity should be calculated including duration of each nest, date of first emergence, date of evaluation (inventory).
   - Percent of hatching and nest success rate of in situ and relocated nests.

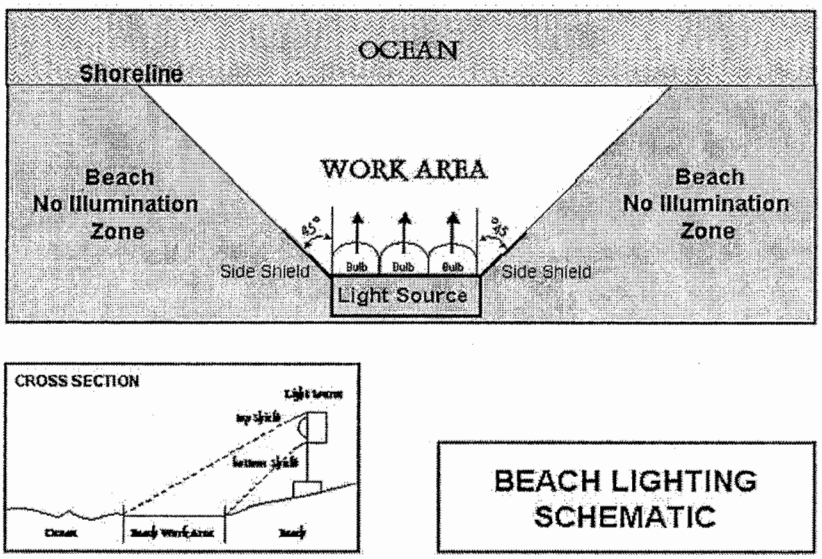
- Information should also be gathered on predation, erosion, and lighting disorientation problems.

5b. Only those nests that may be affected by beach nourishment activities will be relocated. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities must cease when beach nourishment activities no longer threaten nests.

6. From May 1 through November 30, staging areas for construction equipment must be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes that are placed on the beach must be located as far landward as possible while still allowing for heavy equipment traffic on the landward side of the pipe without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes must be off the beach to maximum extent practicable. Temporary storage of pipes on the beach must be in such a manner as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. From May 1 to November 30, direct lighting of the beach and near shore waters must be limited to the immediate construction area and must comply with safety requirements. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters' surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting plants must be reduced to the minimum standard required by OSHA for general construction areas, in order not to misdirect sea turtles. Shields must be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area (see figure below).

Figure 1. Lighting Diagram



8. No permanent exterior lighting will be installed in association with this construction project.

9. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project must be notified so the eggs can be moved to a suitable relocation site.

10. Upon locating a sea turtle adult, hatchling, or egg harmed or destroyed as a direct or indirect result of the project, initial notification must be made to the Service Law Enforcement Office at (843) 727-4707 ext. 28 or (843) 297-9829. Additional notification must also be made to the Charleston Service Field Office at 843-727-4707. Care should be taken in handling injured turtles or eggs to make sure that effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

11. Immediately after completion of the beach nourishment project and prior to May 1 for three subsequent years, sand compaction must be monitored in the area of restoration following a protocol agreed to by the Service, the State regulatory agency, and the applicant. At a minimum, the protocol provided under 11a and 11b below must be followed. If required, the area must be tilled to a depth of 24 inches. All tilling activity must be completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. An annual summary of compaction surveys and the actions taken must be submitted to the Service. (NOTE: The requirement for

compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Also, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.)

11a. Compaction sampling stations shall be located at 500 feet intervals along the project area. One station must be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station must be midway between the dune line and the high water line (normal wrack line).

At each station, the cone penetrometer must be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to make sure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lay over less compact layers. Replicates must be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final six averaged compaction values.

11b. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area must be tilled immediately prior to May 1. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

12. Visual surveys for escarpments along the project area must be made immediately after completion of the beach nourishment and prior to May 1 for three subsequent years. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by May 1. If the project is completed during sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes the methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the Service. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the beach.)

13. A 100 foot buffer must remain around any sea turtle attempting to nest in the project area and all heavy equipment must be shut down until the turtle returns to the ocean.

14. All construction personnel must complete and sign-off on a training session provided by the Service before beginning work on the project.

15. Project initiation will begin at the north end of Folly Beach where the pipeline will come ashore at the washout and proceed north and south from that point.

16. The Corps will purchase all supplies and provide the labor necessary to construct a hatchery for the Folly Turtle Crew if needed. Such hatchery, if needed, will be fenced, locked, and patrolled by staff of the town of Folly Beach.

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Fish and Wildlife Service Law Enforcement Office at (843) 727-4707 ext. 211 or (843) 297-9829. Additional notification must be made to the Fish and Wildlife Services Field Office at (843) 727-4707 ext. 204. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that the sea turtles that nest, are young or as eggs on 28,200 feet of beach will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help carry out recovery plans, or to develop information.

For the benefit of the loggerhead and leatherback sea turtle, the Service recommends the following conservation recommendations:

1. Construction activities for similar future projects should be planned to take place outside the sea turtle nesting and hatching season.

2. Surveys for nesting success of sea turtles should be continued for a minimum of three years following project construction to determine whether sea turtle nesting success has been adversely impacted.

3. More in-depth research should be conducted to assess the potential of the beach nourishment to impact nesting sea turtles, nest incubation, and movement of hatchlings from the nest to the ocean.

4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

5. Fire ant eradication on the beaches of the town of Folly Beach should be implemented and monitored for success in order to reduce turtle hatchling mortality.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the conservation recommendations carried out.

This concludes formal consultation on the action outlined in your request for formal consultation on the Folly Beach re-nourishment project. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Corps involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take, to be monitored by the nourishment of 28,200 feet of beach, is exceeded; (2) new information reveals effects of the Corps' action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the Corps' action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

For this biological opinion the incidental take would be exceeded when the beach nourishment of 28,200 feet of beach on which the incidental take of an undetermined number of young or eggs of sea turtles have been exempted from the prohibitions of section 9 by this opinion. The Service appreciates the cooperation of the Corps during this consultation. We would like to continue

working with you and your staff regarding this project for Folly Beach renourishment. For further coordination please contact Melissa Bimbi at (843) 727-4707, ext. 204. In future correspondence concerning the project, please reference FWS Log No 4-6-03-F-111.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/MKB

cc: USFWS, Atlanta, GA (Joe Johnston) (via email)
USFWS, Jacksonville, FL (Sandy MacPherson)
SCDNR, Charleston, SC (Sally Murphy)
FEMA, U.S. Department of Homeland Security, Region IV, Atlanta, GA

LITERATURE CITED

Ackerman, R. A. 1980. Physiological and ecological aspects of gas exchange by sea turtle eggs. American Zoologist 20:575-583.

Boettcher, R. 1998. Personal communication. Biologist. North Carolina Wildlife Resources Commission. Marshallberg, North Carolina.

Bowen, B.W. 1994. Letter dated November 17, 1994, to Sandy MacPherson, National Sea Turtle Coordinator, U.S. Fish and Wildlife Service, Jacksonville, Florida. University of Florida. Gainesville, Florida.

Bowen, B.W. 1995. Letter dated October 26, 1995, to Sandy MacPherson, National Sea Turtle Coordinator, U.S. Fish and Wildlife Service, Jacksonville, Florida. University of Florida. Gainesville, Florida.

Bowen, B., J. C. Avise, J. I. Richardson, A. B. Meylan, D. Margaritoulis, and S. R. Hopkins-Murphy. 1993. Population structure of loggerhead turtles (Caretta caretta) in the northwestern Atlantic Ocean and Mediterranean Sea. Conservation Biology 7:834-844.

Coastal Engineering Research Center. 1984. Shore protection manual, volumes I and II. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Dean, C. 1999. Against the tide: The battle for America's beaches. Columbia University Press, New York, NY.

Dickerson, D.D. and D.A. Nelson. 1989. Recent results on hatchling orientation responses to light wavelengths and intensities. Pages 41-43 *in* Eckert, S.A., K.L. Eckert, and T.H. Richardson (compliers). Proceedings of the 9th Annual Workshop on Sea Turtle Conservation and Biology. NOAA Technical Memorandum NMFS-SEFC-232.

Dodd, C. K., Jr. 1988. Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758). U.S. Fish and Wildlife Service, Biological Report 88(14).

Ehrhart, L. M. 1989. Status report of the loggerhead turtle. Pp. 122-139 in Proceedings of the Second Western Atlantic Turtle Symposium, L. Ogren et al., eds. NOAA Technical Memorandum NMFS-SEFC-226.

Encalada, S. E., K. A. Bjorndal, A. B. Bolten, J. C. Zurita, B. Schroeder, E. Possardt, C. J. Sears, and B.W. Bowen. 1998. Population structure of loggerhead turtle (*Caretta caretta*) nesting colonies in the Atlantic and Mediterranean, as inferred from mitochondrial DNA control region sequences. Marine Biology 130:567-575.

Ernest, R. G., and R. E. Martin. 1999. Martin County beach nourishment project: Sea turtle monitoring studies. 1997 Annual Report and Final Assessment. Unpublished report to Florida Department of Environmental Protection.

Fletemeyer, J. 1980. Sea turtle monitoring project. Unpublished report to Broward County Environmental Quality Control Board, FL.

Glenn, L. 1998. The consequences of human manipulation of the coastal environment on hatchling loggerhead sea turtles (*Caretta caretta*, L). Pp. 58-59 in Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation, R. Byles and Y. Fernandez, compilers. NOAA Technical Memorandum NMFS-SEFSC-412.

Hopkins, S. R., and J. I. Richardson (eds.). 1984. Recovery plan for marine turtles. National Marine Fisheries Service, St. Petersburg, FL.

LeBuff, C.R., Jr. 1990. The loggerhead turtle in the eastern Gulf of Mexico. Caretta Research, Inc.; Sanibel Island, Florida.

Lenarz, M. S., N. B. Frazer, M. S. Ralston, and R. B. Mast. 1981. Seven nests recorded for loggerhead turtle (*Caretta caretta*) in one season. Herpetological Review 12:9.

Limpus, C. J., V. Baker, and J. D. Miller. 1979. Movement induced mortality of loggerhead eggs. Herpetologica 35:335-338.

Mann, T.M. 1977. Impact of developed coastline on nesting and hatchling sea turtles in southeastern Florida. M.S. thesis. Florida Atlantic University, Boca Raton, Florida.

Martin, E. 1992. Personal communication. Biologist. Ecological Associates, Inc. Jensen Beach, Florida.

McDonald, D.L. and P.H. Dutton. 1996. Use of PIT tags and photoidentification to revise remigration estimates of leatherback turtles (*Dermochelys coriacea*) nesting in St. Croix, U.S. Virgin Islands, 1979-1995. Chelonian Conservation and Biology 2(2):148-152.

McGehee, M. A. 1990. Effects of moisture on eggs and hatchlings of loggerhead sea turtles (*Caretta caretta*). Herpetologica 46:251-258.

Meylan, A., B. Schroeder, and A. Mosier. 1995. Sea turtle nesting activity in the State of Florida 1979-1992. Florida Marine Research Publications 52:1-51.

Miller, K., G. C. Packard, and M. J. Packard. 1987. Hydric conditions during incubation influence locomotor performance of hatchling snapping turtles. Journal of Experimental Biology 127:401-412.

Mrosovsky, N. and A. Carr. 1967. Preference for light of short wavelengths in hatchling green sea turtles (*Chelonia mydas*), tested on their natural nesting beaches. Behavior 28:217-231.

Mrosovsky, N. and S.J. Shettleworth. 1968. Wavelength preferences and brightness cues in water finding behavior of sea turtles. Behavior 32:211-257.

Murphy, S. 1996. Personal communication. Biologist. South Carolina Department of Natural Resources. Charleston, South Carolina.

Murphy, T. M., and S. R. Hopkins. 1984. Aerial and ground surveys of marine turtle nesting beaches in the southeast region. Final report to NMFS-SEFC.

[NMFS and USFWS] National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991b. Recovery plan for U.S. population of loggerhead turtle (*Caretta caretta*). National Marine Fisheries Service, Washington, DC.

[NMFS and USFWS] National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1992. Recovery plan for leatherback turtles (*Dermochelys coriacea*) in the U.S. Caribbean, Atlantic, and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C.

[NRC] National Research Council. 1990a. Decline of the sea turtles: Causes and prevention. National Academy Press, Washington, DC.

[NRC] National Research Council. 1995. Beach nourishment and protection. National Academy Press, Washington, DC.

Nelson, D.A. 1987. The use of tilling to soften nourished beach sand consistency for nesting sea turtles. Unpublished report of the U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Nelson, D. A. 1988. Life history and environmental requirements of loggerhead turtles. U.S. Fish and Wildlife Service Biological Report 88(23). U.S. Army Corps of Engineers TR EL-86-2 (Rev.).

Nelson, D.A. and B. Blihovde. 1998. Nesting sea turtle response to beach scarps. Page 113 *in* Byles, R., and Y. Fernandez (compilers). Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation. NOAA Technical Memorandum NMFS-SEFSC-412.

Nelson, D. A., and D. D. Dickerson. 1987. Correlation of loggerhead turtle nest digging times with beach sand consistency. [Abstract]. Seventh Annual Workshop on Sea Turtle Conservation and Biology.

Nelson, D. A., and D. D. Dickerson. 1988a. Effects of beach nourishment on sea turtles. Proceedings of the Beach Preservation Technology Conference '88. Florida Shore & Beach Preservation Association, Inc., Tallahassee, FL.

Nelson, D. A. and D. D. Dickerson. 1988b. Response of nesting sea turtles to tilling of compacted beaches, Jupiter Island, Florida. Unpublished report. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

Nelson, D.A. and D.D. Dickerson. 1988c. Response of nesting sea turtles to tilling of compacted beaches, Jupiter Island, Florida. Unpublished report of the U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Nelson, D.A., K. Mauck, and J. Fletemeyer. 1987. Physical effects of beach nourishment on sea turtle nesting, Delray Beach, Florida. Technical Report EL-87-15. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Packard, M. J., and G. C. Packard. 1986. Effect of water balance on growth and calcium mobilization of embryonic painted turtles (*Chrysemys picta*). Physiological Zoology 59(4):398-405.

Packard, G. C., M. J. Packard, and T. J. Boardman. 1984. Influence of hydration of the environment on the pattern of nitrogen excretion by embryonic snapping turtles (*Chelydra serpentina*). Journal of Experimental Biology 108:195-204.

Packard, G. C., M. J. Packard, and W. H. N. Gutzke. 1985. Influence of hydration of the environment on eggs and embryos of the terrestrial turtle Terrapene ornata. Physiological Zoology 58:564-575.

Packard, G. C., M. J. Packard, T. J. Boardman, and M. D. Ashen. 1981. Possible adaptive value of water exchange in flexible-shelled eggs of turtles. Science 213:471-473.

Packard, G. C., M. J. Packard, K. Miller, and T. J. Boardman. 1988. Effects of temperature and moisture during incubation on carcass composition of hatchling snapping turtles (*Chelydra serpentina*). Journal of Comparative Physiology B. 158:117-125.

Parmenter, C. J. 1980. Incubation of the eggs of the green sea turtle, *Chelonia mydas*, in Torres Strait, Australia: The effect of movement on hatchability. Australian Wildlife Research 7:487-491.

Pearce, A.F. 2001. Contrasting population structure of the loggerhead turtle (*Caretta caretta*) using mitochondrial and nuclear DNA markers. M.S. thesis. University of Florida, Gainesville, Florida.

Philbosian, R. 1976. Disorientation of hawksbill turtle hatchlings, Eretmochelys imbricata, by stadium lights. Copeia 4:824.

Pilkey, O. H. and K. L. Dixon. 1996. The Corps and the Shore. Island Press, Washington, DC.

Pritchard, P.C.H. 1992. Leatherback turtle *Dermochelys coriacea*. Pages 214-218 *in* Moler, P.E. (editor). Rare and Endangered Biota of Florida, Volume III. University Press of Florida; Gainesville, Florida.

Raymond, P. W. 1984. The effects of beach restoration on marine turtles nesting in south Brevard County, Florida. M.S. thesis, University of Central Florida, FL.

Richardson, J.I. and T.H. Richardson. 1982. An experimental population model for the loggerhead sea turtle (*Caretta caretta*). Pages 165-176 *in* Bjorndal, K.A. (editor). Biology and Conservation of Sea Turtles. Smithsonian Institution Press; Washington, D.C.

Ross, J. P. 1982. Historical decline of loggerhead, ridley, and leatherback sea turtles. Pp. 189-195 in Biology and Conservation of Sea Turtles, K. A. Bjorndal, ed. Smithsonian Institution Press,Washington, D.C.

Schroeder, B. A. 1994. Florida index nesting beach surveys: Are we on the right track? Pp. 132-133 in Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation, K.A. Bjorndal et al., compilers. NOAA Technical Memorandum NMFS-SEFSC-351.

Spotila, J. R., E. J. Standora, S. J. Morreale, G. J. Ruiz, and C. Puccia. 1983. Methodology for the study of temperature related phenomena affecting sea turtle eggs. U.S. Fish and Wildlife Service Endangered Species Report 11.

Spotila, J.R., A.E. Dunham, A.J. Leslie, A.C. Steyermark, P.T. Plotkin, and F.V. Paladino. 1996. Worldwide population decline of *Dermochelys coriacea*: are leatherback turtles going extinct? Chelonian Conservation Biology 2(2):290-222.

Talbert, O. R., Jr., S. E. Stancyk, J. M. Dean, and J. M. Will. 1980. Nesting activity of the loggerhead turtle (*Caretta caretta*) in South Carolina I: A rookery in transition. Copeia 1980:709-718.

Turtle Expert Working Group. 1998. An assessment of the Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-409.

Turtle Expert Working Group. 2000. Assessment update for the Kemp's ridley and loggerhead sea turtle populations in the western North Atlantic. NOAA Technical Memorandum NMFS-SEFSC-444.

Winn, B. 1996. Personal communication. Biologist. Georgia Department of Natural Resources. Brunswick, Georgia.

Witherington, B. E. 1992. Behavioral responses of nesting sea turtles to artificial lighting. Herpetologica 48:31-39.

Witherington, B.E. and K.A. Bjorndal. 1991. Influences of artificial lighting on the seaward orientation of hatchling loggerhead turtles (*Caretta caretta*). Biological Conservation 55:139-149.

Wyneken, J., L. DeCarlo, L. Glenn, M. Salmon, D. Davidson, S. Weege., and L. Fisher. 1998. On the consequences of timing, location and fish for hatchlings leaving open beach hatcheries. Pp. 155-156 in Proceedings of the Sixteenth Annual Symposium on Sea Turtle Biology and Conservation, R. Byles and Y. Fernandez, compilers. NOAA

Zug, G.R. and J.F. Parham. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testidines: Dermochelyidae): a skeletochronological analysis. Chelonian Conservation Biology 2(2):224-249.

Shirey, Alan D SAC

From: Walters, Bret L SAC
Sent: Monday, December 30, 2013 2:42 PM
To: Litz, John T LTC SAC; Stein, William SAC; Metheney, Lisa A SAC; Shirey, Alan D SAC; Warren, Michael D (David) SAC; Jellema, Jonathan M SAC
Subject: RE: Folly Beach Storm Damage Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Sir,

Between our schedules, Tom McCoy (USFWS) and I were not able to speak directly until today. We had a good conversation. He agreed that we have coverage under the previous BO with but will need additional coverage for the proposed listings of the Red Knot and new Critical Sea Turtle Habitat designation when those are finalized. He was clear that we do not need to change our project or schedule. He also agreed that our project would not likely have any impacts on endangered species until May.

He was mostly concerned that we didn't submit our BA earlier even though we have been talking to them about it since March. That is an irritant to them because they are working on the proposed listings right now and they wish we would have sent it to them last fall when they were not so busy.

He didn't make any promises but said that they will probably be done with their BO by February. That is ahead of schedule. I don't think we need a follow-up meeting. Please let me know if you want any additional information.

Bret

-----Original Message-----
From: Walters, Bret L SAC
Sent: Monday, December 16, 2013 1:47 PM
To: Walters, Bret L SAC; Litz, John T LTC SAC; Stein, William SAC; Metheney, Lisa A SAC; Shirey, Alan D SAC; Warren, Michael D (David) SAC; Jellema, Jonathan M SAC
Subject: RE: [EXTERNAL] Folly Beach Storm Damage Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Sir,

Here is some additional follow-up information related to the concern you expressed about the Folly Beach Project yesterday.

I called and left a message with Thomas McCoy today. I will let you know how that conversation goes when he calls back.

The letter acknowledges receipt of our Biological Assessment (BA) and request to initiate formal consultation. It also expresses concern about the project timeline. However, it leaves out much of the background information for the long-standing project at Folly Beach. I believe this letter was sent to document the start of consultation (a required part of the process) and to document that they should not be blamed if they were late in issuing their Biological Opinion (BO).

I wanted you to know that we are aware of the standard timelines and that the BA was submitted later than we would have liked. However, we have coverage under a regional BO the previous BO that was issued for the project. Additionally, we have been coordinating with them informally and the Reasonable and Prudent Measures and Terms and Conditions identified in the letter are planned and the contractor's requirements are in the contract.

We do not anticipate any project impacts if they take the entire 135 days to generate the BO. Internal discussions between staff indicate they will be done sooner than that.

If you are interested in the details, some bullets are provided, below:

1) The only species that this project potentially adversely impacts are nesting sea turtles. Nesting season doesn't begin until May 1st; however, that is a human established date that the turtles don't always 'comply' with (i.e., occasionally turtles have been known to nest a few days prior to May 1st). So we do not have an impact to nesting sea turtles until nesting season begins. The contract requires monitoring for nesting turtles starting on April 15, which gives us a 'cushion' just in case a turtle or two nests early.
2) Impacts to endangered species caused by operation of the dredge is covered under the existing South Atlantic Regional Biological Opinion (SARBO) that we have with National Marine Fisheries Service. Plus, we are using a hydraulic cutterhead dredge which has been found to have minimal impact to listed species anyways.
3) We have an existing Biological Opinion from Fish and Wildlife Service from March 2005 when we did the last full renourishment. There was no expiration date listed in the BO. The project hasn't really changed since then. The only thing that is different is that we are using 2 borrow sites that were not previously used; however, the 'new' borrow areas do not change the projects impacts to listed species. They (i.e., Fish and Wildlife) have verbally told us that they wanted us to prepare a new BA for this renourishment effort (and all future renourishments of Folly and all our other beach renourishment projects - they want us to re-consult every time we perform a renourishment project - in order to be good partners, we typically agree to this, but it really isn't necessary). That being said, we agreed to prepare a new BA for the current renourishment effort on Folly.
4) The 'new' borrow areas are only new in the sense that we have never used them before. These 'new' borrow areas were identified as borrow areas for the Folly Beach project in both the 2005 EA and BA, and thus were fully vetted with the resource agencies (with on exception). The exception was for potential cultural resources and hardbottom habitat (hardbottom habitat is a fisheries resource not

related to listed species). We have since performed the necessary surveys for cultural resources and hardbottom habitat.
5) There are two new proposed listings that would potentially require re-initiation of consultation. One for loggerhead sea turtle critical habitat and the other for red knots (a shorebird). Both of these were included in our BA. Our determinations are that the Folly renourishment project is not likely to adversely affect either one. When a Federal agency makes a 'not likely to adversely affect' determination, they are not required to enter into formal consultation with Fish and Wildlife Service; therefore, these two proposed listings would not trigger formal consultation, which leads us back to the previous BO still being valid. Also, since these are proposed listings, we technically do not have to enter into formal consultation until the listings become final, and that isn't expected to happen until after we are finished with the current renourishment project.
6) The letter from Fish and Wildlife mentions 3 things that were missing from the BA (i.e., nighttime monitoring, light surveys, and removal of incompatible beach material from the beach). Both of these items were discussed in the EA, but they were inadvertently left out of the BA. Removal of imcompatible material also was not in the BA. Both nighttime monitoring and removal of incompatible material is in the contract specifications. We are performing the light surveys with in-house labor, starting tonight.
7) Because of the late timeliness of getting the BA to Fish and Wildlife, I have told them that I would draft the BO for them in order to help them.

Bret
-----Original Message-----
From: Walters, Bret L SAC
Sent: Sunday, December 15, 2013 11:06 PM
To: Litz, John T LTC SAC; Stein, William SAC; Metheney, Lisa A SAC; Shirey, Alan D SAC
Subject: Re: [EXTERNAL] Folly Beach Storm Damage Project

Sir,

Alan can provide more details but we have coverage under an existing BO. Also, all of the construction requirements were coordinated and are in the contract.

Please expect more tomorrow but I have a meeting in Goose Creek in the morning so I wanted to get you something right away.

Bret

----- Original Message -----
From: Litz, John T LTC SAC
Sent: Sunday, December 15, 2013 08:03 PM
To: Stein, William SAC; Metheney, Lisa A SAC; Shirey, Alan D SAC; Walters, Bret L SAC

Subject: FW: [EXTERNAL] Folly Beach Storm Damage Project

All,
I receive this message on 11 DEC. Just getting around to reading it and not sure what this means for our project that I understand is already underway. I'm looking for a response to this message. I was unaware USFWS had an unresolved issue until now.

V/r

LTC John Litz
Commander, Charleston District
US Army Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5103
☎: (843) 329-8004 (office)
☎: (843) 670-5900 (Blackberry)

-----Original Message-----
From: McCoy, Thomas [mailto:thomas_mccoy@fws.gov]
Sent: Wednesday, December 11, 2013 8:24 AM
To: Litz, John T LTC SAC
Subject: [EXTERNAL] Folly Beach Storm Damage Project

Hi Colonel Litz,

Per my voice message this morning, attached is the letter initiating formal section 7 consultation for the Folly Beach Storm Damage Project for your review. We understand that the project will start work in January 2014. However, we received the Biologocial Assessment (BA) and request to initiate formal Section 7 consultation on the loggerhead sea turtle (Caretta caretta) under the Endangered Species Act, as amended, from the USACOE on December 4, 2013. The Service has concerns about the timeline of this consultation because the BA outlines a potential project start date of December 20 13, which is the same month that we received the BA and initiation request. The proposed construction schedule does not allow ample time to complete this consultation and issue our Biological Opinion (BO) before the proposed construction date.

The USACOE initially contacted the Service on March 27, 2013, about this project and discussed a potential start date in the fall of 2013. We were told in August 2013, that the BA would be completed that month, but we did not receive it until December 2013. We attempted to be proactive by making multiple documented

inquiries about the status of the BA and request to initiate consultation in the interest of preventing the situation your agency is now facing.

According to 50 CFR 402.14(e) lnteragency Cooperation, the Service is allowed up to 90 days to conclude formal consultation with your agency and an additional 45 days to prepare our Biological Opinion (BO) for a total of 135 days. We expect to provide you with our BO on or before April 19, 20 14.

Thank you for your help.

Please let me know if I can provide any further assistance.

Tom

Tom McCoy, Deputy Field Supervisor

U.S. Fish and Wildlife Service – Department of the Interior

South Carolina Ecological Services Field Office

176 Croghan Spur Road, Suite 200

Charleston, South Carolina 29407

Main Phone Line: 843.727.4707 Direct Phone Line: 843.300.0431

Fax: 843.300.0204

E-mail: thomas_mccoy@fws.gov <mailto:thomas_mccoy@fws.gov>

Please visit our Web Page for information about our office:
www.fws.gov/charleston <http://www.fws.gov/charleston>

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED
Caveats: NONE

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A HAGOOD AVENUE
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

August 12, 2013

Planning and Environmental Branch

Dr. Pace Wilbur
NOAA Fisheries Service
217 Fort Johnson Road
Charleston, South Carolina 29412-9110

Dear Dr. Wilbur:

The U.S. Army Corps of Engineers, Charleston District (USACE) and the Bureau of Ocean Energy Management (BOEM) are proposing to perform a beach renourishment project at Folly Beach, South Carolina using sand from offshore State waters and sand from the outer-continental shelf (OCS).

The proposed project is a periodic renourishment of a previously approved USACE Hurricane and Storm Damage Reduction Project. The project provides for re-nourishment of approximately 26,000 linear feet (~4.9 linear miles) of shoreline 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. The exact quantity of sand that will be placed on the beach during re-nourishment will be dependent on the 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 will be placed on the beach. The initial nourishment of the Folly Beach Hurricane and Storm Damage Reduction Project was performed by USACE in 1993 using sand from the Folly River. Renourishment efforts were performed by USACE in 2005 and 2007 using sand from offshore State waters. The currently proposed project is the first time that OCS sand will be used for renourishing the beach.

Enclosed, please find a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for your review and comment. This Draft EA and Draft FONSI were prepared for both USACE's and BOEM's compliance with the National Environmental

Policy Act (NEPA). Our preliminary findings are that the proposed project does not significantly adversely affect human health and welfare or the environment, and, therefore, preparation of an Environmental Impact Statement is not warranted. Please provide any comments by September 12, 2013.

If you have any questions about the proposed project, please contact Mr. Alan Shirey of my staff by telephone at (843) 329-8166 or by e-mail at *alan.d.shirey@usace.army.mil*.

Respectfully,

Bret L. Walters
Chief, Planning and Environmental Branch

Enclosure

Cc: Jaclyn Daly (w/o enclosure)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

September 11, 2013 F/SER47:JD/pw

(Sent via Electronic Mail)

Lt. Colonel John Litz, Commander
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, South Carolina 29403-5107

Attention: Alan Shirey

Dear Lt. Colonel Litz:

NOAA's National Marine Fisheries Service (NMFS) reviewed the USACE Charleston Disctrict's Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the *Folly Beach Shore Protection Project and Use of Outer Continental Shelf Sand, Charleston County, South Carolina*, dated August 2013. The Charleston District and Bureau of Ocean Energy Management (BOEM) propose to re-nourish approximately 4.9 miles of shoreline along Folly Beach with sand from offshore borrow areas. The Charleston District has concluded the proposed project would not have a substantial individual or cumulative adverse impact on essential fish habitat (EFH) or fisheries managed by the South Atlantic Fishery Management Council (SAFMC) or NMFS. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Proposed Project Description
The Charleston District and BOEM propose to re-nourish Folly Beach with 1.4 million cubic yards of sand dredged from the seabed within state waters and from the outer-continental shelf. The sand placement area would extend 4.9 miles (26,000 linear feet) from the former Coast Guard Base at the eastern end of Folly Island to just short of the Charleston County Park. The District anticipates a 6-month construction schedule. The proposed re-nourishment would be a continuation of a previously constructed federal hurricane and storm damage reduction project.

Sand would be dredged with a hydraulic cutterhead, transported to the beach through a pipeline, and discharged as a slurry. Temporary sand dikes would contain the discharge and control fill placement. Fill sections would be graded using land-based equipment, such as bulldozers and front-end loaders. The four borrow areas, termed A, B, C, and D, total approximately 620 acres; however, portions of borrow areas A and B have been used for previous nourishment projects leaving 300 acres with 1.95 million cubic yards of beach compatible material. Vibracore samples have been collected in all borrow areas to identify the depths and lateral extents of beach compatible sand, but only borrow areas A and B have been surveyed with side-scan sonar, sub-bottom profilers, and magnetometers. The Charleston District would survey areas C and D for live/hardbottom prior to dredging. Borrow areas A and B have a sand layer 3 to 7 feet thick with two small areas of borrow area B containing sand to 10 feet. Areas C and D have sand layers 5 to 7 feet and 4 feet thick, respectively. The Charleston District proposes to dredge to these depths.

Essential Fish Habitat Assessment and Impacts to Essential Fish Habitat
The EA includes an EFH Assessment describing the project components and examining individual and cumulative effects on EFH. The EFH Assessment is somewhat incomplete. SAFMC designates the surf zone to the shelf break as EFH for coastal migratory fishes (e.g., Spanish mackerel, cobia); both this fishery and its EFH are missing from the EFH Assessment. Unconsolidated bottom and nearshore hardbottom are designated EFH for estuarine-dependent species of the snapper-grouper complex; this description is also missing from the Assessment. In addition, the nearshore waters of the Atlantic Ocean off South Carolina are EFH for several highly migratory species managed by NMFS. Finally, please note that red drum is no longer federally managed and does not have designated EFH; this species should be removed from the list of federally managed species on page 9.

The EFH Assessment also does not review relevant sediment and biological monitoring conducted by the South Carolina Department of Natural Resources (SCDNR). Bergquist et al. (2008) and Bergquist et al. (2009) examined the response and recovery of borrow area A and the beach ecosystems following the 2005 Folly Beach nourishment project and borrow area B following the 2007 emergency nourishment project. SCDNR concluded that dredging resulted in significant and persistent changes in sediment characteristics and biological communities within these two borrow areas.

SCDNR monitored the borrow areas for silt and clay content, calcium carbonate content, sand phi size, and total organic matter. As a result of the 2005 and 2007 re-nourishment projects, sediments in the borrow areas shifted from sand towards fine and organically-enriched material (i.e., mud) and did not show recovery after one year. Silt and clay content of the borrow area sediments was 3.4 times higher and sand phi size was twice as large following dredging during the 2005 project. During the 2007 project, silt/clay content and organic matter increased, calcium carbonate decreased, and sand phi size increased (became finer) significantly following dredging and had not recovered twelve months later when the formal monitoring ceased. Informal monitoring of the surficial sediments indicates mud is still present in these borrow areas four and six years after dredging stopped (pers. comm., Denise Sanger, SCDNR, August 21, 2013).

This sediment shift is consistent with changes documented in other borrow areas in South Carolina excavated deeper than 1 meter by hydraulic dredge and located close to a sources of fine terrigenous and estuarine sediments, such as tidal rivers. Bergquist and Crowe (2009) reviewed multiple borrow areas along the South Carolina coast and noted depressions formed from dredging frequently trap fine material transported in bottom currents. For example, the borrow areas used to nourish Hilton Head in 1990 and 1999 and the borrow area used to nourish Folly Beach in 1993 were dredged to more than three meters below grade, and all were located either adjacent to or within a tidal inlet. These borrow areas accumulated fine material, exhibited major changes in benthic community structure, and failed to recover within one year (e.g., Van Dolah et al. 1992). In summary, the dredging practices used during the 2005 and 2007 projects changed the soft-bottom habitats off the northern end of Folly Island, affecting both the ability to reuse the borrow area for future nourishment projects and ecological characteristics of the habitat. SCDNR has recommended that dredging practices be modified to reduce dredge pit depths (e.g., use a hopper dredge within accepted seasonal windows) or by relocating borrow areas sufficiently far from the Charleston Harbor inlet to minimize accumulation of fine material.

Focusing on biological impacts, SCDNR monitored for species density, richness, evenness, and diversity of amphipods, mollusks, polychaetes, and "other taxa." The borrow areas for both the 2005 and 2007 project showed significant declines in benthic macrofaunal density and species richness and substantial changes in benthic community structure (Bergquist et al. 2008, Bergquist et al. 2009). For example, between pre- and post-dredging time frames, total infaunal density decreased 84% at borrow area A with little to no evidence of recovery one year later. Species evenness and diversity were also negatively impacted by dredging. The shift from sand to muddy substrates is likely accountable for this decline in

species density and richness, changing the forage value of those communities for fishery species. Although no recent reports from SCDNR are available, they have continued monitoring and it is reasonable to assume that the persistent muddy material in the borrow areas have inhibited benthic community recovery to this day. The borrow areas are sources of prey for recreational and commercial fisheries. The significant decrease in density and richness of the infaunal community has decreased the value of the borrow areas as fishery foraging habitat and the persistent presence of fine grain sediments has eliminated these areas from future beach nourishment uses. Given no changes to dredging methods or borrow areas are proposed, NMFS concludes the proposed re-nourishment would significantly adversely impact another 300 acres of EFH for a cumulative total of 600 acres.

With respect to the beach benthic community, NMFS agrees with the Charleston District that the beach community would be adversely impacted by the project but would likely recovery within two years following completion of the project provided the dredged material closely matches the beach sand. Bergquist et al. (2008) found that sediment characteristics did not change substantially on the nourished beach and the changes that did occur (sand phi size and total organic matter) were no longer apparent six months later. This compatibility likely contributed to the recovery of the macroinvetebrates (ghost crab and ghost shrimp) that were monitored during the 2005 project. Increases in turbidity and total suspended solids resulting from discharge will also adversely impact the forage value of surf zone habitat but these impacts would be localized and temporary. During the 1993 Folly Beach re-nourishment project, turbidity levels ranged from 100 to 200 NTU near the pipe depending on weather conditions; these levels persisted 500 to 2000 meters from the pipe depending on ambient weather conditions (Van Dolah, et al. 1994).

In summary, the long-term, persistent impacts to the cumulative 600+ acres of borrow area are of most concern to NMFS. The draft EA and EFH Assessment do not discuss the documented impacts to these areas. Since the early 1990s, SCDNR has continually recommended USACE use borrow areas in a manner that promotes filling with beach compatible material to minimize these long-term impacts; however, USACE has not adopted these recommendations.

Conservation Recommendations
Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely impact EFH. Based on this requirement, NMFS provides the following:

EFH Conservation Recommendations

- The Charleston District shall limit dredging depths within the proposed borrow areas to a depth that, based on modeling and empirical studies, will fill with beach compatible material.
- No dredging shall occur within 400 feet of hardbottom habitat. NMFS requests a copy of the survey report for borrow areas C and D, when available.
- To the maximum extent practical, the Charleston District shall conduct work during October-March.
- The beach and borrow area monitoring plan shall be provided to NMFS for review prior to commencement of the project.

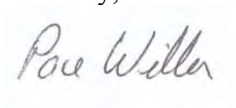
In accordance with Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulations at 50 CFR 600.920(k), the Charleston District is required to provide a written response to the EFH conservation recommendations within 30 days of receipt. The response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the proposed activity. If the response is inconsistent with the EFH conservation recommendations, the Charleston District must provide a substantive discussion justifying the reasons for not implementing the recommendations. If it is

not possible to provide a substantive response within 30 days, the Charleston District should provide an interim response to NMFS, to be followed by the detailed response. The detailed response should be provided in a manner to ensure that it is received by NMFS at least ten days prior to final approval of the action.

Finally, in accordance with section 7 of the Endangered Species Act of 1973, as amended, it is the responsibility of the lead federal agency to review and identify any proposed activity that may affect endangered or threatened species and their habitat. Determinations involving species under NMFS jurisdiction should be reported to our Protected Resources Division at the letterhead address.

We appreciate the opportunity to provide these comments. Please direct related correspondence to the attention of Ms. Jaclyn Daly-Fuchs at our Charleston Area Office. She may be reached at (843) 762-8610 or by e-mail at Jaclyn.Daly@noaa.gov.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc:

COE, Alan.D.Shirey@usace.army.mil
DHEC, trumbumt@dhec.sc.gov
SCDNR, DavisS@dnr.sc.gov
SAFMC, Roger.Pugliese@safmc.net
EPA, Laycock.Kelly@epa.gov
FWS, Karen_Mcgee@fws.gov
F/SER4, David.Dale@noaa.gov
F/SER47, Jaclyn.Daly@noaa.gov

Literature Cited

Bergquist, D., S. Crowe, M. Levisen, R. VanDolah. 2008. Change and recovery of physical and biological characteristics of the borrow area impacted by the 2007 Folly Beach Emergency Renourishment Project. Final Report. Prepared for the U.S. Army Corps of Engineers, Charleston District. 111 pages

Bergquist, D., S. Crowe, M. Levisen, and R. Van Dolah. 2009. Change and recovery of physical and biological characteristics of the borrow area impacted by the 2007 Folly Beach emergency renourishment project. Final Report, prepared by the South Carolina Marine Resources Research Institute, South Carolina Marine Resources Division, Charleston, South Carolina, for the U.S. Army Corps of Engineers, Charleston District. 70 pages

Bergquist, D. and S. Crowe. 2009. Using Historical Data and Meta-analyses to Improve Monitoring and Management of Beach Nourishment in South Carolina. Final Report, prepared by the South Carolina

Marine Resources Research Institute, South Carolina Marine Resources Division for the South Carolina Department of Health and Environmental Control. 99 pages

Van Dolah, R., P. Wendt, R. Martore, M. Levisen, and W. Roumillat. 1992. A physical and biological monitoring study of the Hilton Head Beach nourishment project. Final Report, prepared by the South Carolina Marine Resources Research Institute, SC Marine Resources Division for the Town of Hilton Head Island and the South Carolina Coastal Council. 159 pages

Van Dolah, R., R. Martore, A. Lynch, M. Levisen, P. Wendt, D. Whitaker and W. Anderson. 1994. Environmental Evaluation of the Folly Beach Nourishment Project. Final Report Prepared by the Marine Resources Division, South Carolina Department of Natural Resources, Charleston, South Carolina, for the U.S. Army Corps of Engineers, Charleston District. 155 pages

Culbertson, Jennifer <jennifer.culbertson@boem.gov>

Re: Folly Beach

1 message

Pace Wilber - NOAA Federal <pace.wilber@noaa.gov> Fri, Dec 20, 2013 at 7:59 AM
To: "Shirey, Alan D SAC" <Alan.D.Shirey@usace.army.mil>
Cc: Jaclyn Daly - NOAA Federal <jaclyn.daly@noaa.gov>, "Culbertson, Jennifer" <jennifer.culbertson@boem.gov>

Hi Alan. We sent CESAC comments on September 11. I'll forward that email to you in a second.. The letter has several EFH conservation recommendations (pasted below). Give the DNR monitoring plan you sent and the comments about the rock anomaly, we may be okay. Jaclyn will be in the office in a few hours. I'd like her to look over before saying more.

- The Charleston District shall limit dredging depths within the proposed borrow areas to a depth that, based on modeling and empirical studies, will fill with beach compatible material.
- No dredging shall occur within 400 feet of hardbottom habitat. NMFS requests a copy of the survey report for borrow areas C and D, when available.
- To the maximum extent practical, the Charleston District shall conduct work during October- March.
- The beach and borrow area monitoring plan shall be provided to NMFS for review prior to commencement of the project.

Pace

On Thu, Dec 19, 2013 at 6:39 PM, Shirey, Alan D SAC <Alan.D.Shirey@usace.army.mil> wrote:

> Pace & Jaclyn,
>
> We never received any comments from y'all on our upcoming Folly Beach renourishment project.
>
> Since it is essentially the same project we performed in 2005 (followed by a partial renourishment in 2007), is it safe to assume that y'alls previous concurrences (see attached) are still valid?
>
> As before, we have 'contracted' with DNR to perform monitoring of the borrow area. A copy of the scope for the monitoring is also attached.
>
> Pace, also just as a memory refresher…….. At the end of the Santee Cooper FERC re-licensing meeting in St. Pete back in September, we had a short conversation about the scattered surface rock anomaly (not hard bottom) that we found in Borrow Area D. We are avoiding that area (I wasn't sure that we would be able to due to our potential sand shortage, but we have just enough sand without having to dredge that area).

Thanks,

Alan.

Alan Shirey

Environmental Engineer

U.S. Army Corps of Engineers

Charleston District

69A Hagood Avenue

Charleston, SC 29403

(843) 329-8166

Justice: We get what we deserve. Mercy: We don't get what we deserve. Grace: We get what we do not deserve.

--

Pace Wilber, Ph.D.
HCD Atlantic Branch Supervisor
NOAA Fisheries Service
219 Ft Johnson Road
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Folly Beach Renourishment Project 2013-2014
Biological and Sediment Sampling
Scope of Work

South Carolina Department of Natural Resources
Marine Resources Research Institute

Principal Investigators
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Introduction

The beach renourishment project planned for Folly Beach will provide valuable protection for beach properties from storm damage and enhance one of the state's popular tourist destinations. While this project will provide many benefits, it is essential that the project be completed with minimal environmental damage. The effects of offshore dredging in sand borrow sites is a major environmental concern due to the long-term impacts that have been observed at borrow areas used for previous nourishment projects in South Carolina and other states (e.g., Van Dolah *et al*. 1992, Jutte and Van Dolah 1999, 2000, Naqvi and Pullen 1983, Nelson 1985, Jutte *et al.* 2002, Bergquist *et al*. 2009a, b; 2011a, b). The specific goal of the proposed monitoring efforts will be to document the impacts on and recovery of macrobenthic infaunal communities and sediment characteristics in the sand borrow areas.

Folly Beach was last renourished in 2005 followed by a partial emergency renourishment in 2007. Two offshore borrow areas were used for these renourishments: Borrow Area A and Borrow Area B. These projects did not require all of the sand resources in these borrow areas. The current planned renourishment project will utilize the previously unused portions of Borrow Areas A and B as well as Borrow Areas C and D. The South Carolina Department of Natural Resources Marine Resources Research Institute (MRRI) conducted the macrobenthic and sediment composition monitoring for the previous projects. Monitoring was conducted over a one year period beginning immediately prior to the start of dredging. The monitoring of Borrow Areas A and B for the periodic renourishment in 2005 and emergency renourishment in 2007, respectively, showed that sediments within the borrow areas became increasingly fine (more silt/clay, larger sand phi size, less calcium carbonate) following dredging and showed little evidence of recovery one year after completion of dredging. Therefore, MRRI continued to biannually sample Borrow Areas A and B over subsequent years in order to assess long term recovery rates. The last sampling event was in September, 2011.

Study Participants

The proposed monitoring program will be conducted by scientists from the South Carolina Department of Natural Resources Marine Resources Research Institute (MRRI). MRRI staff have extensive experience in conducting ecological assessments. They completed an environmental evaluation following the previous Folly Beach Nourishment projects in 1992, 2005 and 2007 (Van Dolah *et al.* 1994, Bergquist *et al.* 2008; 2009), and have completed several other studies to monitor the physical and ecological effects of beach nourishment projects in South Carolina (Jutte and Van Dolah 1999, 2000; Jutte *et al.* 1999, Jutte *et al.* 2002, Bergquist *et al*. 2009a, b; 2011a, b).

Approach and Rationale

The Folly Beach Shore Protection Project is scheduled to begin in December 2013, with a slated duration of approximately seven months (completion in early summer 2014). As planned, the project will nourish a 4.9 mile section of beach with an estimated 1.4 million cubic yards of sand. The project extends from just below the former 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. Four potential borrow areas were identified in the Environmental Assessment Amendment for use as sand borrow areas based on sediment characteristics (Borrow Areas A, B, C, and D – Figure 1). Dredging will be limited to these four areas.

This scope of work includes cost estimates for two objectives: (1) Document the impacts and recovery of macrobenthic infaunal communities and sediment characteristics in four sand borrow areas and one reference area; and (2) Document the impacts and recovery of benthic infaunal communities and sediment characteristics in two previously used sand borrow areas.

For the first objective, sediment characteristics and macrobenthic organisms in the proposed dredging locations of Borrow Areas A, B, C, and D, and a reference area (same area used for the 2005 and 2007 project) will be sampled. The reference area currently used is roughly equivalent in areal extent and surficial sediment characteristics in Borrow Areas A and B. The reference area will be reduced to better reflect the size of the proposed dredging areas of each borrow. For the first task, samples will be collected immediately prior to and immediately following completion of dredging activities as well as six months and one year after the completion of dredging activities.

By collecting concurrent data on borrow and reference areas both before and after dredging, this study will adhere to the Before-After-Control-Impact (BACI) design that is the standard for environmental impact assessments. Sampling methods will be similar to those used for biological monitoring of the previous renourishments of Folly Beach (Bergquist *et al*. 2008; 2009a). Ten randomly selected stations will be sampled in

each of the proposed borrow areas and in the reference area prior to dredging. Additional samples will be collected at the borrow and reference areas immediately following the completion of dredging, six months after dredging occurs, and one year after dredging occurs. Previous studies have indicated that ten samples per sampling site and date are sufficient to characterize the dominant benthic taxa (e.g., Van Dolah *et al.* 1994, Jutte *et al.* 1999a). Stations will be randomly chosen using ArcGIS v10.1.

For the second task, a fixed set of stations will be sampled in the previously dredged Borrow Areas A and B to assess longer-term recovery with minimal additional effort and cost. Very little data are available for levels of macrobenthic recovery in dredge areas after more than one-year. However, since portions of Borrow Areas A and B were used in previous renourishments as part of the Folly Beach Shore Protection Project, those areas have been monitored bi-annually for eight and six years, respectively, since project completion. This has provided a unique opportunity to assess recovery of these resources over subsequent years. By obtaining an eight-year post-renourishment sampling of previously dredged Borrow Area A and a six-year post-renourishment sampling of previously dredged Borrow Area B, MRRI will be able to provide the USACE with a sediment composition assessment of the previously dredged areas as well as a better understanding of benthic recovery for these areas over a six and eight year period.

Station positions will be located using a global positioning system (GPS). One benthic grab sample will be collected at each of the ten sites within each borrow area using a 0.043 m^2 Young grab. Each grab sample will be sub-sampled for analysis of sediment characteristics (percent sand, silt, clay, $CaCO_3$, organic matter content, and sand grain size distribution) using a plastic tube (3.5 cm dia.) inserted through the top of each grab to the bottom of the sample. The remainder of the grab sample, representing approximately 0.04 m^2 of the bottom surface area, will be washed through a 0.5 mm-mesh sieve. Organisms and sediment retained on the sieve will be preserved in a buffered solution of 10% formalin with rose bengal stain.

Sediment composition samples will be analyzed for percentages (by weight) of sand, silt, clay, and calcium carbonate ($CaCO_3$) using procedures described by Folk (1980) and Pequegnat *et al.* (1981). Sand fractions will be dry-sieved using a Ro-tap mechanical shaker and grain size will be determined by using fourteen 0.5 phi-interval screens, where phi = $-\log_2$ (grain diameter in mm) according to the Udden-Wentworth Phi classification (Brown and McLachlan 1990). Measurements of total organic matter will be obtained by burning a portion of each sample at 550° C for two hours as described by Plumb (1981).

Macrobenthic organisms will be identified to the lowest possible taxonomic level and enumerated by experienced taxonomists. New animals will be added to the existing voucher collection for the entire Folly Beach monitoring program which is maintained by the Environmental Research Section at MRRI.

Timeline (Estimated) Project Duration: December 1, 2013 to February 29, 2016

	Objective 1: Current Borrow Areas				**Objective 2: 2005-2007 Borrowed Areas A & B**
	Pre	***Immed. Post***	***6 mo Post***	***12 mo Post***	***6 year Post A 8 year Post B***
Sampling	Dec. 2013	July 2014	Jan. 2015	July 2015	Sept. 2013
Processing Completed	Sept. 2015	Jan 2015	July. 2015	Oct. 2015	Feb. 2014
Analysis Completed	Dec. 2015				Sept. 2014
Draft Report	Jan. 2016				
Final Report	Feb. 2016				

Deliverables

A draft report summarizing the macrobenthic community and sediment composition will be provided to the USACE by January 31, 2016 with a final report submitted February 29, 2016. The final report will include a digital copy of all data. Quarterly progress reports will be provided to the USACE per the Cooperative Agreement.

Study Costs

Study costs for this scope of work assume the study will start December 1, 2013 and end February 29, 2016. Study costs for this scope of work represent an effort to: (1) conduct monitoring of the current borrow areas A, B, C, and D for the macrobenthic community and sediment composition (Objective 1); and (2) conduct a 8 yr. and 6 yr. post assessment of previously used portions of Borrow Areas A and B, respectively, for the macrobenthic community and sediment composition (Objective 2). The costs of Objective 1 and 2 are approximately $133,889 and $15,000, respectively. A final report summarizing all findings will be prepared for the USACE. Costs associated with any additional monitoring that may be required will be submitted at a later date, if necessary.

Budget and project timetables assume a start date of pre-nourishment sampling in December 2013, immediate post-nourishment sampling, six month post-nourishment sampling, and one year post-nourishment sampling. If evidence of physical or biological

impacts is present at one or both borrow areas one-year after dredging, additional sampling will be recommended to determine the time required for full recovery to pre-nourishment conditions.

Category	Total
Personnel	$ 88,907
Fringe (38% salary/28% hourly)	$ 30,860
Indirect (21.37%)	$ 18,999
Fixed Costs (boat days/vehicle)	$ 1,693
Travel (boat gas)	$ 3,000
Contractual	$ 100
Supplies	$ 5,400
Total	$ 148,889

References

Bergquist, D.C., S.E. Crowe, M. Levisen and R.F. Van Dolah. 2008. Change and recovery of physical and biological characteristics at beach and borrow areas impacted by the 2005 Folly beach renourishment project. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources,Charleston, SC for the US Army Corps of Engineers, Charleston District 112 pp + appendices.

Bergquist, D.C., S.E. Crowe, M. Levisen and R.F. Van Dolah. 2009a. Change and recovery of physical and biological characteristics of the borrow areas impacted by the 2007 Folly beach emergency renourishment project. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources,Charleston, SC for the US Army Corps of Engineers, Charleston District. 70 pp + appendices.

Bergquist, D.C., S.E. Crowe and M. Levisen. 2009a. The 2006-2007 Hilton Head Island renourishment project: Physical and biological responses of the Joiner and Barrett shoals borrow areas to dredging. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources,Charleston, SC for the Town of Hilton Head,

Bergquist, D.C., S.E. Crowe and M. Levisen. 2011. The 2008 Arcadian Shores Renourishment Project: Sediment and Benthic Community Responses to Borrow Area Dredging. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources, Charleston, SC for Horry County, Conway, SC. 47 pp

Bergquist, D.C., S.E. Crowe, M.V. Levisen. 2011a. The 2006-2007 Hilton Head Island renourishment project: response of the Joiner Shoals borrow area two years post-dredging. Supplemental Report. Marine Resources Research Institute, South Carolina Department of Natural Resources, submitted to Olsen Associates, Inc. and the Town of Hilton Head Island. 56 pp +app.

Bergquist, D.C., S.E. Crowe, M.V. Levisen. 2011b. The 2007-2009 Grand Strand renourishment project: physical and biological responses of the Little River and Cane South borrow areas to dredging. Final Report. Marine Resources Research Institute, South Carolina Department of Natural Resources, submitted to U.S. Army Corps of Engineers, Savannah District. 48 pp + app.

Brown, A.C., and A. McLachlan. 1990. *Ecology of Sandy Shores*. Amsterdam: Elsevier, 328 pp.

Folk, R.L. 1980. Petrology of Sedimentary Rocks. Hemphill Publishing Company, Austin, Texas. 185 pp.

Jutte, P.C., R.F. Van Dolah, M.V. Levisen, P. Donovan-Ealy, P.T. Gayes, and W.E. Baldwin. 1999a. An environmental monitoring study of the Myrtle Beach renourishment project: physical and biological assessment of offshore sand borrow sites. Phase I—Cherry Grove borrow area. Final Report, Marine Resources Research Institute, South Carolina Marine Resources Division, Charleston, South Carolina and Center for Marine and Wetland Studies, Coastal Carolina University submitted to the U.S. Army Corps of Engineers, Charleston District. 80 pp.

Jutte, P.C., R.F. Van Dolah, and M.V. Levisen. 1999b. An environmental monitoring study of the Myrtle Beach renourishment project: intertidal benthic community assessment for Phase I. Final Report prepared by the South Carolina Department of Natural Resources for the U.S. Army Corps of Engineers, Charleston District. 49 pp.

Jutte, P.C. and R.F. Van Dolah. 1999. An assessment of benthic infaunal assemblages and sediments in the Joiner Bank and Gaskin Banks borrow areas for the Hilton Head beach renourishment project. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources, submitted to Olsen Associates, Inc. and the Town of Hilton Head Island. 33 pp. + appendices

Jutte, P.C. and R.F. Van Dolah. 2000. An assessment of benthic infaunal assemblages and sediments in the Joiner Bank and Gaskin Banks borrow areas for the Hilton Head beach renourishment project. Final Report, Marine Resources Research Institute, South Carolina Department of Natural Resources, submitted to Olsen Associates, Inc. and the Town of Hilton Head Island. 34 pp + appendices.

Jutte, P.C., R.F. Van Dolah, G.Y. Ojeda, and P.T. Gayes. 2001a. An environmental monitoring study of the Myrtle Beach Renourishment project: physical and biological assessment of offshore sand borrow sites, phase II—Cane South borrow area. Final Report submitted to the U.S. Army Corps of Engineers, Charleston District. 70 pp.

Jutte, P.C., L.E. Zimmerman, R.F. Van Dolah, G.Y. Ojeda, and P.T. Gayes. 2001b. An environmental monitoring study of the Myrtle Beach Renourishment project: physical and biological assessment of offshore sand borrow sites, phase III—Surfside/Garden City borrow area. Final Report submitted to the U.S. Army Corps of Engineers, Charleston District. 80 pp.

Jutte, P.C., R.F. Van Dolah, and P.T. Gayes. 2002. Recovery of benthic communities following offshore dredging, Myrtle Beach, South Carolina. Shore & Beach. 70(3), 25-30.

Naqvi, S. and E. Pullen. 1982. Effects of beach nourishment and borrowing on marine organisms. Misc. Rept. No. 82-14. U.S. Army Corps of Engineers Coastal Engineering Research Center, Fort Belvoir, Va.

Nelson, W.G. 1985. Physical and biological guidelines for beach restoration projects. Part I. Biological Guidelines. Report No. 76, Florida Sea Grant College. 65 pp.

Pequegnat, W.E., L.H. Pequegnat, B.M. James, E.A. Kennedy, R.R. Fay, and A.D. Fredericks. 1981. Procedural guide for designation surveys of ocean dredged material disposal sites. Final Report prepared by TerEce Corp. for U.S. Army Engineer Waterways Experiment Station, Technical Report EL-81-1, 268 pp.

Plumb, R.H., Jr. 1981. Procedures for handling and chemical analysis of sediment and water samples. Tech. Rept. EPA ICE-81-1, prepared by Great Lakes Laboratory, State University College at Buffalo, NY, for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredge and Fill Material. Published by the U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Van Dolah, R.F., P.H. Wendt, R.M. Martore, M.V. Levisen, and W.A. Roumillat. 1992. A physical and biological monitoring study of the Hilton Head Beach nourishment project. Final Report, prepared by the South Carolina Marine Resources Research Institute, SC Marine Resources Division for the Town of Hilton Head Island and the South Carolina Coastal Council. 159 pp.

Van Dolah, R.F., R.M. Martore, A.E. Lynch, M.V. Levisen, P.H. Wendt, D.J. Whitaker, and W.D. Anderson. 1994. Environmental Evaluation of the Folly Beach Nourishment Project. Final Report. U.S. Army Corps of Engineers, Charleston District, and the Marine Resources Division, South Carolina Department of Natural Resources. 155 pp.

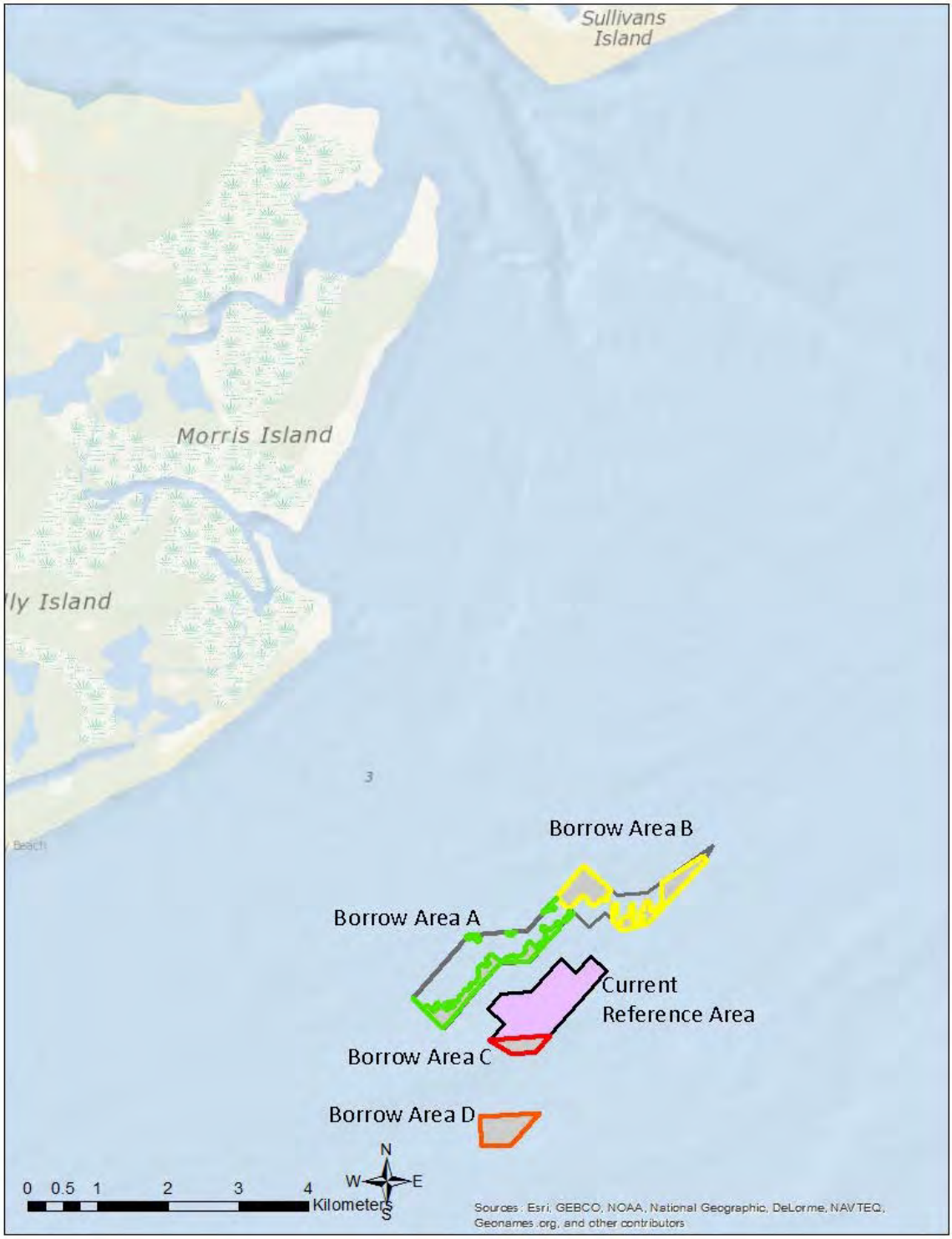

Figure 1. Map of the three borrow areas to be used for the 2013-2014 Folly Beach Renourishment Project. The green, yellow, red, and orange outlines indicate the areas to be dredged for the renourishment

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Notice

401 Water Quality Certification Resource Reductions

State budget cuts have impacted the level of services the Department of Health and Environmental Control (Department) can provide and have resulted in the need for the Department to re-evaluate its workloads and priorities. The 401 Water Quality Certification program has been identified as an area where resource reductions are necessary.

In accordance with S.C. Regulation 61-101, Water Quality Certification, the Department can issue, deny, or waive certification for Federal licenses or permits. If the Department fails to act on a certification within a reasonable period of time, not to exceed one year, the certification requirements are waived.

In light of recent budget cuts, the Department has determined that it can no longer certify all Federal licenses and permits for which it receives applications. Thus, the Department has identified categories of projects for which the 401 Water Quality Certification will be waived as follows:

- **Nationwide Permits as issued by the US Army Corps of Engineers (Corps)**
  Every five years, the Corps issues nationwide permits (NWP) for categories of activities that have been determined to have minimal individual and cumulative adverse effects on the aquatic environment. In a Federal Register notice published on March 12, 2007, the Corps reissued the NWP, and on May 11, 2007, the Department issued both a 401 Water Quality Certification and a Coastal Zone Consistency Certification in accordance with the S.C. Coastal Zone Management Program. At the time of the May 11, 2007 certification, the Department placed conditions on a number of the NWP that would necessitate an individual permit review for those projects. In light of the need to reduce staff resources, the Department will no longer issue individual certifications for these permits. By waiving these 401 certifications, the state will rely on the initial Corps determination of minimal impacts.

- **Groins and Beach Renourishment Projects**
  Groins and beach renourishment activities have very few water quality impacts. As a general rule, the concerns and comments that the Department receives during a 401 Water Quality Certification review for these activities are directed towards the issue of threatened or endangered species. These activities will still require comments from the US Fish and Wildlife Service and/or the National Marine Fisheries Service which have jurisdiction over threatened and endangered species before the Corps can issue their 404 permit. Therefore, the Department has a reasonable assurance that these concerns will be addressed. Further, the Department's OCRM office will still continue to issue direct permits for alteration of the critical area for these activities that also provide a means to address the threatened or endangered species concerns.

These waivers apply only to the 401 Water Quality Certification. Any Coastal Zone Consistency Certifications and the Critical Area Permits issued by the Department's OCRM office are not affected by this action. In light of continuing budget reductions, the Department will periodically evaluate our project workloads to determine if other changes are necessary.

D H E C
PROMOTE PROTECT PROSPER
Catherine B. Templeton, Director
Promoting and protecting the health of the public and the environment

September 3, 2013

Mr. Bret L. Walters, Chief, Planning and Environmental Branch
Department of the Army
Charleston District, Corps of Engineers
69A Hagood Avenue
Charleston, SC 29403-5107

Re: Beach Renourishment Project at Folly Beach, South Carolina

Dear Mr. Walters:

We received your August 12, 2013, letter about the beach renourishment project at Folly Beach, South Carolina on August 15, 2013. *Based on the information provided in the draft Environmental Assessment and draft Finding of No Significant Impact, I am responding on behalf of the South Carolina Department of Health and Environmental Control, Bureau of Air Quality (Bureau).*

The Bureau is tasked with implementing the Federal Clean Air Act (1990, as amended) in the State of South Carolina. The Bureau is required to ensure compliance with the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Currently two criteria pollutants are of particular concern in South Carolina:

- **Ozone** – The 2008 8-hour ozone standards (primary and secondary) are currently set at 0.075 parts per million (ppm). The area represented in this proposal is meeting the 2008 ozone standards. The Environmental Protection Agency (EPA) is currently reviewing the 2008 ozone standard and the proposal of a new standard is anticipated.

- **Particulate Matter 2.5** (Particulates 2.5 microns in size and smaller) – The 2012 standard for maximum daily concentration is set at 35 micrograms per cubic meter. The 2012 standard for the maximum annual concentration is set at 12 micrograms per cubic meter. The area represented in this proposal is meeting the 2012 particulate matter 2.5 standards.

Presently only the eastern portion of York County has been designated nonattainment for the 2008 8-hour ozone NAAQS. For more information on which areas have been designated nonattainment, please visit http://www.epa.gov/oar/oaqps/greenbk. If a project is located in a nonattainment area, it may be subject to prescriptive requirements such as Transportation Conformity or air quality modeling.

An asbestos survey and project license may be required prior to any demolition activities such as deconstruction of a building or removal of structures in the right-of-way of a road project. If you have any questions regarding asbestos regulatory applicability you may contact Robin Mack (with the Bureau's Asbestos Section) at (803) 898-4270 or mackrs@dhec.sc.gov.

All necessary environmental permits for the subject project must be obtained in accordance with applicable state and federal regulations. If you have not already done so, please contact the Bureau of Water at (803) 898-4300 and the Bureau of Land and Waste Management at (803) 896-4000 for input regarding those program areas' assessments of this proposed project.

Emissions from construction equipment are regulated by federal standards. The Bureau would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. More importantly, these strategies are beneficial to the health of citizens of South Carolina.

- Utilize alternatively fueled equipment.
- Utilize emission controls applicable to your equipment.
- Reduce idling time on equipment.
- Fugitive dust emissions should be minimized through good operating practices.

The Bureau can provide model clean construction contract language. A vendor may need to retrofit, repower or replace older and more polluting diesel construction equipment in order to satisfy clean construction requirements. These types of projects can be financed with Congestion Mitigation and Air Quality (CMAQ) funds, and are in fact a high priority for CMAQ funding. Please contact our office if assistance is needed.

Thank you for the opportunity to comment on this project. Should you have any further questions or comments concerning this matter, please do not hesitate to contact me at (803) 898-4122 or at robertln@dhec.sc.gov.

Sincerely,

L. Nelson Roberts, Jr.

L. Nelson Roberts, Jr., Manager
Air Quality Standards and Assessment Section
SCDHEC Bureau of Air Quality

cc: Wendy Boswell, Lowcountry EQC BEHS Office, boswellwm@dhec.sc.gov

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Alvin A. Taylor
Director
Robert D. Perry
Director, Office of
Environmental Programs

September 9, 2013

Mr. Alan Shirley
U. S. Army Corps of Engineers
69-A Hagood Avenue
Charleston, SC 29403-5107

Re: Draft Environmental Assessment (DEA) and Finding of No Significant Impact (FONSI) for the Folly Beach Shore Protection Project and Use of Outer Continental Shelf Sand, Charleston County

Dear Mr. Shirey:

Personnel with the South Carolina Department of Natural Resources have reviewed the above referenced project and offer the following comments.

The USACE Charleston District and the Bureau of Ocean Energy Management (BOEM) proposes to re-nourish approximately 4.9 miles of shoreline along Folly Beach with sand from offshore borrow areas. The project represents a periodic re-nourishment of an existing project. The project extends from just below the U.S. Coast Guard Station on the East end of Folly Island to just above the Charleston County Park on the west end of the island. Construction will be by means of a hydraulic cutter head dredge that will transport sand through a pipeline. Beach compatible sand from four different offshore borrow areas will be used.

The DEA includes an assessment of the potential environmental consequences of the project. We find this portion of the DEA to be incomplete, especially as it relates to borrow area impacts. Our department conducted monitoring of the two borrow areas used to nourish the shoreline of Folly Beach in 2005 and 2007 (Borrow Areas A & B). These borrow areas were sampled for sediment characteristics (silt and clay, calcium carbonate, total organic matter contents and sand phi size) and benthic infaunal community composition using a Before-After-Control-Impact (BACI) design. Following dredging, surficial sediment characteristics within both borrow pits shifted toward finer materials and showed little evidence of recovering one and two years after impact. Changes in benthic community composition occurred primarily at the species level and reflected recolonization by and turnover of opportunistic taxa within the disturbed seafloor.

Monitoring results clearly show that current dredging practices produce significant and consistent changes in soft-bottom habitats off the north end of Folly Island, affecting both the ability to reuse the area for future nourishment projects and the ecological characteristics of the system. In an effort to minimize these impacts and speed recovery, hydrologic and sediment transport modeling studies should be conducted to determine the appropriate borrow pit depth to minimize the accumulation of fine sediments. Dredging should be limited to those depths where beach compatible sands re-accumulate. Consideration should also be given to locating borrow areas further from estuarine plumes. The USACE is proposing to utilize the remainder of Borrow Areas A & B and two additional areas nearby from the outer-continental shelf for the current renourishment project. The proposed project specifies dredging to a maximum depth of 10 feet. Monitoring results for a number of previous projects has shown significant changes in sediment type and slow recovery rates at comparable dredging depths. We recommend the FEA address the potential impacts of dredging to these depths and identify measures to be taken to avoid and minimize long-term impacts to borrow areas.

We understand the USFWS will be initiating a formal Section 7 consultation under the Endangered Species Act and will be preparing a biological opinion that will address the potential impacts of the proposed project on the loggerhead sea turtle. This biological opinion will include specific terms and conditions as well as a number of conservation measures that will address the protection of this species. We recommend that all conservation measures outlined in the biological opinion are incorporated into the FEA.

We appreciate the opportunity to provide these comments and ask that you consider the above recommendations in the preparation of a FEA for this project.

Sincerely,

Susan F. Davis

Susan F. Davis
Coastal Environmental Coordinator

Cc: SCDHEC/Owen
OCRM/Trumbull
USEPA
USFWS
NMFS

COE-Charleston District/BOEM

Folly Beach Beach Re-nourishment Draft EA

EPA Region 4 Comments

August 26, 2013

1. On page 5, Endangered Species section, the COE states that the only changes to the ESA listings is designation of proposed critical habitat for the loggerhead sea turtle and the listing of the Atlantic sturgeon. However, the COE does not discuss whether the proposed project will impact the Atlantic sturgeon. Has the COE made an ESA determination regarding impacts to the Atlantic sturgeon and if so, has this determination been coordinated with NFMS? EPA recommends the COE update the draft EA to reflect discussions regarding possible impacts and ESA determination regarding Atlantic Sturgeon.

2. On page 6, Endangered Species section, the COE states the main impact on the threatened and endangered species will be the logger head sea turtles. The COE goes on to say that coordination is ongoing with USFWS and list precautions on page 7. These precautions appear to be derived from a Biological Opinion (BO). Has the COE conducted a Biological Assessment (BA)? If so, has the USFWS approved a BO? If no BA/BO has been conducted, then where are these "precautions" being cited? Is the COE using the BA/BO from a previously conducted EA? EPA recommends that the COE better explain the consultation process within the EA and properly cite from which BO the "precautions" are derived from. Additionally, EPA recommends the COE provide a copy of the most recent BA/BO as an appendix to the EA.

3. On page 8, Essential Fish Habitat section, the COE discusses essential fish habitat (EFH), but doesn't provide a citation. Is this a recent EFH and if so, what date was it coordinated with NFMS? EPA recommends the COE cite the date of the EFH and place a copy of the EFH as an appendix to the EA.

4. On page 10, Cultural Resources section, the COE discusses a shipwreck being located within Borrow Area B and states that "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 secondary 'target' in the vicinity of the shipwreck." However, there is no documentation or citation regarding this statement. Does the COE plan to complete consultation with SHPO during the NEPA phase? EPA recommends the COE provide citation regarding the SHPO's concurrence to the buffer zone and provide any recent correspondences from the SHPO in an appendix to the EA. Additionally, EPA recommends that the COE better describe when it is anticipated that SHPO consultation will be completed.