FINDING OF NO SIGNIFICANT IMPACT

Issuance of a Negotiated Agreement for the Use of Outer Continental Shelf Sediment Resources in the Raccoon Island Shore Protection/Marsh Creation Phase B Project

Phase B of the Raccoon Island Shore Protection/Marsh Creation Project (TE-48) involves the creation of 68 acres of emergent marsh on the bayside of the westernmost barrier island of the Isles Dernieres in Terrebonne Parish, Louisiana. Phase B, a proposed federal action authorized for planning and funding under the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), is being jointly undertaken by the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) and the Louisiana Department of Natural Resources (LDNR). The NRCS proposes to hydraulically dredge and transport up to 830,000 cubic yards of Outer Continental Shelf (OCS) sediment from a borrow area approximately 3 nautical miles south of Raccoon Island in Ship Shoal Lease Blocks 64 and 71. The inter-tidal and supra-tidal areas constructed will be planted with woody and herbaceous plant species to stabilize the dredged material. Public Law 103-426 gave the Minerals Management Service (MMS) the authority to convey on a noncompetitive basis the rights to OCS sediment resources for use in wetlands restoration projects. The MMS's connected action is the issuance of a negotiated agreement to provide for use of OCS sediment pursuant to Section 8(k)(2)(A) of the Outer Continental Shelf Lands Act.

The purpose of the MMS's proposed action is to provide access to an offshore borrow area in order to protect and create back-barrier marsh habitat behind the barrier island using sediment dredged from offshore coastal Louisiana. The project is needed to protect an important rookery and colonies of seabirds from an encroaching shoreline and create additional avian habitat for the nesting, staging, resting and feeding of local species. Pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality regulations implementing NEPA (40 CFR 1500) and Department of the Interior (DOI) regulations implementing NEPA (43 CFR 46.320), the MMS is adopting the environmental assessment (EA) prepared by the NRCS to determine whether the issuance of a negotiated agreement for the use of OCS sediment for marsh creation at Raccoon Island, Louisiana would have a significant effect on the human environment and whether an environmental impact statement (EIS) should be prepared. The MMS served as a cooperating agency throughout the preparation of the EA. The MMS has reviewed the EA and determined that it adequately addresses the potential impacts of the proposed action.

Phase A of TE-48, completed in 2007, involved the construction of eight segmented breakwaters on the gulf front to curb shoreline erosion. In 2005 the NRCS prepared a Project Plan/EA analyzing the potential impacts to the island and adjacent waters associated with Phase A, as well as onsite placement of dredged material features in Phase B. The NRCS concluded that Phase A of TE-48 would not have any significant effect on the human environment and prepared a Finding of No Significant Impact (FONSI) in March 2005. However, the Project Plan/EA did not evaluate the proposed use of an offshore borrow area in Phase B. The EA being adopted supplements the existing Project Plan/EA and tiers from the "Environmental Assessment for the Issuance of Non-Competitive Leases for the Use of Outer Continental Shelf Sand Resources from Ship Shoal, Offshore Central Louisiana for Coastal and Barrier Island Nourishment and Hurricane Levee Construction" prepared by the MMS in 2004.

Environmental and Socioeconomic Consequences of the Proposed Action

Under the proposed action, which is also the preferred alternative, the MMS would issue a negotiated agreement. The proposed project will result in the creation of 68 acres of supra-tidal and inter-tidal wetlands by backfilling and diking a back-bay open water area with suitable dredged material from the OCS borrow area. The proposed project is expected to enhance wildlife populations and diversity by enlarging habitat areas and reducing the impacts of severe coastal erosion and storms. The proposed project is not expected to result in any long-term, significant, adverse environmental effects. According to the analyses set forth in the adopted EA, the MMS's approval of a negotiated agreement may contribute to the following impacts:

Physical Resources:

Due to the short duration of dredging and construction activities, potential impacts on air quality and water quality would be minor. Given the distance offshore and the dispersing nature of prevailing winds, emissions related to dredge activities and support vessel use are not expected to impact onshore air quality. Water quality may locally deteriorate during dredging and placement operations, but the effects should be short-lived. Implementation of a pollution prevention and control plan will help minimize the risk of accidental spills and discharge. If they were to occur, accidental spills and discharges from activity-related vessels would be small and easily cleaned. Impaired water quality conditions associated with the creation of a dredge pit will be localized and naturally dissipate as the pit infills. Potential impacts to the barrier island are generally positive and include the stabilization of marsh habitat and enhancement of natural processes, such as overwash. In comparison, the creation of an offshore pit may locally affect physical processes in its immediate vicinity, but the impact on hydrodynamics and sediment character is expected to be short-lived and reversible as the pit refills. During the intervening period, the margin area around the pit may erode in response to changes in the flow regime. No appreciable changes in nearshore wave conditions and coupled longshore sediment transport processes are expected.

Biological Resources:

No significant or persistent impacts to coastal and open-water habitats are expected to occur from the proposed action. The expansion of the marsh platform will increase the width of the island, reducing its vulnerability to breaching during storms and increase inter-tidal areas, and thereby potentially improve nesting, staging, resting, and foraging habitat for sundry wildlife. Minor impacts may occur to open water and benthic habitats, including temporary impairment of water quality conditions. Entrapment and mortality of benthic infauna, epi-faunal, and sessile invertebrates may occur in the immediate vicinity of dredging and placement operations. However, given the fecundity and diversity of resident benthic communities and the widespread existence of suitable muddy habitat on the inner shelf, relatively rapid re-colonization is expected. The creation of a pit may contribute to a locally differentiated benthic community until the pit is completely filled. Limited numbers of finfish may be potentially harmed by entrainment in the dredge, turbidity and noise effects, and burial during placement, but motile species are generally expected to avoid such impacts during construction and re-colonize the project area following completion of disturbing activities. The mobility of marine mammals and reptiles should also allow for avoidance of impacts caused by dredging and placement activities; any impacts to protected species are discussed in more detail below. The proposed mitigation

which limits construction activity during the nesting period and sets access restrictions will minimize the short-term disturbance to sea birds, whereas the planned increase in nesting and foraging habitat is expected to have a positive, long-term impact on colonies of seabirds.

Critical Biological Resources:

Dredging and placement activities are not expected to result in mortality of protected Brown Pelican or Piping Plover, but may result in short-term behavior modification and temporary displacement from preferred habitat. Construction operations will occur during non-nesting periods and/or in accordance with the Louisiana Department of Wildlife and Fisheries (LDWF) regulations for the Isles Dernieres Barrier Islands Refuge (LAC 76:III.331). All construction activities will be coordinated with LDWF and U.S. Fish and Wildlife Service prior to initiation. Impacts to marine mammals are unlikely given the low probability of such species being present and interacting with the dredge. Select species of protected sea turtles may be vulnerable to injury and mortality during dredge operations, especially the use of a hopper dredge. The planned use of a hydraulic dredge is less likely to result in injury or mortality, since the dredge encounters a relatively smaller area of sea floor per unit time. Proposed mitigation and monitoring measures specific to protecting sea turtles, formulated during MMS's consultation with the National Marine Fisheries Service, will minimize or eliminate the potential for harmful effects related from dredge operation, placement and construction activities, and lighting and noise. If hopper dredging occurs, an additional suite of measures will be required to mitigate harassment and minimize the potential for injury or mortality. Short-term and localized effects on Essential Fish Habitat (EFH) and fish and shellfish may result from dredge entrainment, burial, impaired water quality and bottom habitat degradation, as well as accidental discharge of pollutants or waste. In general, motile finfish and shellfish will avoid the dredge and coupled environmental stresses. Since the footprint of dredge area and placement area is relatively small compared to similar and undisturbed habitat on shallow inner shelf and estuarine setting, no long-term adverse impacts are expected. Moreover, the proposed action may contribute to a long-term improvement in estuarine EFH by re-establishing tidal creeks and inter-tidal marsh habitat.

Cultural Resources:

No adverse effects on cultural resources are expected in the project area. There are no known shipwrecks or prehistoric sites in the offshore project area. However, if proposed bottom-disturbing activities encounter an offshore cultural site, there may be damage to or loss of significant and/or unique archaeological information. However, the proposed mitigation, which includes mandatory buffers on targets and archaeological monitoring, should reduce the risk of those impacts from occurring to unknown sites or resources.

Social and Economic Resources:

No long-term adverse impacts to commercial and recreational fisheries or tourism are expected. Appropriate and advance notice to affected populations should minimize any use-conflict. Any impacts would be short in duration and limited to the immediate vicinity of the operating dredge or marsh construction. The EA does not analyze the use of submerged or floated pipelines or booster pumps to convey dredged sediment because of the associated distance. The creation of new EFH in the vicinity of the barrier island may have positive effects on recreation fishing, boating, and ecotourism in the estuary. No effects are expected for

minorities or ethnic populations. Dredging and related bottom-disturbing activities pose some risk to existing pipelines and oil and gas infrastructure in the vicinity of the borrow area. Avoidance mitigation, including mandatory use of positioning equipment, operational buffers, lighted buoys marking the approved borrow area, and notification to pipeline operators, minimize impacts to oil and gas infrastructure from direct contact and/or indirect effects, such as exposure from pit margin erosion. Pre and post bathymetric surveys will also be required to monitor potential impacts related to pit margin erosion.

Alternatives to the Proposed Action (Preferred Alternative)

The NRCS considered two alternatives to the preferred alternative for Phase B of the Raccoon Island Shoreline Protection / Marsh Creation Project: (1) no action and (2) marsh creation using an alternative borrow area or upland source. In comparison, the only alternative to the MMS's proposed action is no action, or the equivalent of no access to economically-extractable OCS sediment. However, the potential impacts resulting from the MMS' no action actually depend on the course of action subsequently pursued by the NRCS, since both of NRCS's alternatives are possible as a result of MMS' no action. Consideration of the NRCS' construction alternative indicates that the resources within the project area will benefit by creating the additional marsh habitat. Although the alternative using a different borrow area or upland source may be less costly, it was ultimately eliminated because of potentially greater conflicts with shallow water access, subsurface utilities and infrastructure, and sediment sources essential to littoral or cross-shore supply (i.e., within depth-of-closure), as well as potentially more severe impacts to water quality, sensitive fish habitat, and rare biological resources that were considered unacceptable by the project sponsors. In comparison, the NRCS's no action alternative (i.e., no project) allows for the continuing habitat deterioration for colonial waterbirds, neotropical migrants, and the endangered brown pelican.

Consultations and Public Involvement

The NRCS, as the lead agency, and the MMS, as required by statute and regulation, coordinated with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Environmental Protection Agency - Region VI, U.S. Army Corps of Engineers - New Orleans District, Advisory Council on Historic Preservation, Louisiana Department of Natural Resources, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Environmental Quality, and the Louisiana State Historic Preservation Office. Public involvement in CWPPRA projects is primarily achieved through annual public meetings conducted during project development and selection stages. Upon signature of this Finding of No Significant Impact (FONSI), a Notice of Availability of the FONSI and EA will be prepared and published by the MMS in the Federal Register.

Conclusion

The MMS has considered the consequences of the proposed action of entering into a negotiated agreement with the NRCS and LDNR for the restoration effort at Raccoon Island, Louisiana. The MMS has independently reviewed the EA prepared by the NRCS 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. Based on the NEPA and consultation process coordinated cooperatively by the NRCS and MMS, appropriate terms and conditions will be incorporated into the negotiated agreement (Attachment 1) to mitigate any foreseeable adverse impacts.

Based on the evaluation of potential impacts and mitigating measures discussed in the attached EA (Attachment 2), the MMS finds that entering into a negotiated agreement, with the implementation of the mitigating measures specified in Attachment 1, 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 Environmental Impact Statement.

(Acting)

Dr. James J. Kendall
Chief, Environmental Division

5/20/09

Date

PROPOSED MITIGATION MEASURES

The following mitigation measures are proposed to reduce or eliminate environmental risks associated with the proposed action (herein referred to as the "Project"). Mitigation measures in the form of terms and conditions are added to the negotiated agreement and are shall be considered enforceable as part of the agreement. Application of terms and conditions will be individually considered by the Director or Associate Director of the MMS. Minor modifications to the proposed mitigation measures may be made during the noncompetitive negotiated leasing process if comments indicate changes are necessary or if conditions warrant.

Plans and Performance Requirements

The NRCS will provide the MMS with a copy of the Project's "Construction Solicitation and Specifications Plan" (herein referred to as the "Plan"). No activity or operation, authorized by the negotiated agreement (herein referred to as the Memorandum of Agreement or MOA), at the Raccoon Island Borrow Area shall be carried out until the MMS has determined that each activity or operation described in the Plan will be conducted in a manner that is in compliance with the provisions and requirements of the MOA. The preferred method of conveying sediment from the Raccoon Island Borrow Area involves the use of a hydraulic cutterhead dredge and scows. Any modifications to the Plan that may affect the project area, including the use of submerged or floated pipelines to convey sediment, must be approved by the MMS prior to implementation of the modification. The NRCS will ensure that all operations at the Raccoon Island Borrow Area shall be conducted in accordance with the final approved Plan and all terms and conditions in this MOA, as well as all applicable regulations, orders, guidelines, and directives specified or referenced herein.

The NRCS will require its contractor to: (1) maintain all operations within the Raccoon Island Borrow Area in compliance with regulations, orders, guidelines, and directives specified or referenced herein, and (2) allow prompt access, at the site of any operation subject to safety regulations, to any authorized Federal inspector and shall provide the MMS any documents and records that are pertinent to occupational or public health, safety, or environmental protection as may be requested.

Notification of Activity in or near the Borrow Areas

The NRCS will notify the MMS at dredgeinfo@mms.gov of the commencement and termination of operations at the Raccoon Island Borrow Area within 24 hours after the NRCS receives such notification from its contractor(s) for the Project. The MMS will notify the NRCS in a timely manner of any OCS activity within the jurisdiction of the DOI that may adversely affect the NRCS's ability to use OCS sediment resources for the Project.

Environmental Responsibilities and Environmental Compliance

The NRCS, serving as the lead agency, will ensure that its contractor implements the mitigation terms, conditions, and measures required by the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and MMS pursuant to the Outer Continental Shelf Lands Act

(OCSLA), National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Magnuson-Stevens Fishery Conservation and Management Act (FCMA), National Historic Preservation Act (NHPA), Clean Water Act (CWA), and Coastal Zone Management Act (CZMA). The required mitigation terms, conditions, and measures are reflected in Biological Opinions, Conservation Recommendations, and this MOA.

The NRCS will ensure that all construction activities are conducted during the non-nesting period between September 15 and March 31 and/or in accordance with the Louisiana Department of Wildlife and Fisheries (LDWF) regulations for the Isles Dernieres Barrier Islands Refuge (LAC 76:III.331). All construction activities should be coordinated with LDWF, LDNR, and U.S. FWS prior to initiation. The NRCS will ensure that all work and access to the project area will occur from open water on the bayside of Raccoon Island and that no heavy machinery will be deployed, to the maximum extent practicable, on the existing island. If the proposed action is not initiated by June 3, 2009, the NRCS and MMS shall pursue follow-up consultation with the U.S. Fish and Wildlife Service.

The MMS will serve as the lead federal agency for ESA compliance concerning protected species under the purview of NMFS. In NMFS' Biological Opinion (F/SER/2003/01247) issued in 2005 for multi-project dredging of OCS sediment resources in the vicinity of Ship Shoal, the NMFS anticipated that no sea turtle take would result from the use of a hydraulic cutterhead dredge. Provided a cutterhead dredge is used in the Project, no additional terms and conditions, except those articulated herein, shall be required. Any take must be reported to the MMS within 24 hours of any sea turtle take observed. The MMS also requires immediate notification if two or more turtles are observed in a 24 hour period. A final report summarizing the results of dredging and any accidental takes of listed species shall be prepared and submitted to MMS within 30 working days of the completion of the project. The report shall contain information on project location, date, cubic yards of material dredged, incidental takes and sightings of protected species, mitigation actions taken, water temperatures, name of dredge, observers if present, and any other information deemed relevant. The NRCS must notify the MMS in writing prior to commencement of operations if a hopper dredge will be used. Provided a trailing suction hopper dredge is used in the Project, all terms and conditions identified in the Biological Opinion shall be used to implement the reasonable and prudent measures (Attachment 1). The MMS may provide additional instruction about the use of the Biological Opinion and reporting requirements.

From May 1 through October 31, during sea turtle nesting and emergence season, all lighting on any type of dredge and pump-out barges/scows operating within 3 nautical miles of sea turtle nesting beaches shall be limited to the minimal lighting necessary to comply with U.S. Coast Guard and/or OSHA requirements. All non-essential lighting on the dredge and pump-out barges/scows shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to minimize illumination of the water to reduce potential disorientation effects on female turtles approaching nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches. On offshore equipment, shielded low pressure sodium vapor lights are recommended for lights that cannot be eliminated.

Dredge Positioning

During all phases of the Project, the NRCS 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 or draghead as practicable.

During dredging operations, the NRCS will immediately notify the MMS at dredgeinfo@mms.gov if dredging occurs outside of the approved borrow area. Anchoring, spudding, or other bottom disturbing activity is to be avoided outside the authorized borrow area.

Vessel Strike Avoidance

The NRCS shall ensure its contractor implements the following specific measures to reduce the potential for vessel harassments or collisions with ESA-listed marine mammals or sea turtles during all phases of the Project:

1. Vessel operators and crews should maintain a vigilant watch for marine mammals and sea turtles and slow down or stop their vessel to avoid striking protected species.
2. When whales are sighted, maintain a distance of 100 yards (91 meters) or greater from the whale. If the whale is believed to be a North Atlantic right whale, you should maintain a minimum distance of 500 yards (457 meters) from the animal (50 CFR 2224.103).
3. When sea turtles or small cetaceans are sighted, attempt to maintain a distance of 50 yards (45 meters) or greater whenever possible.
4. When cetaceans are sighted while a vessel is underway, attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel when safety permits. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised.
6. Whales may surface in unpredictable locations or approach slowly moving vessels. When you sight animals in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.
7. Vessel crews must report sightings of any injured or dead protected species (marine mammals and sea turtles) immediately, regardless of whether the injury or death is caused by your vessel. Report marine mammals to the NOAA Fisheries Stranding Hotline at (305) 862-2850 and sea turtles to the NMFS Southeast Regional Office at (727) 824-5312. In addition, if the injury or death was caused by a collision with your vessel, you must notify the MMS within 24 hours of the strike by email to dredgeinfo@mms.gov. The report to NMFS and MMS should include the date and location (latitude/longitude) of the strike, the name of the vessel involved, and the species identification or a description of the animal, if possible.

Local Notice to Mariners

The NRCS shall 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 mobilization. The NRCS shall ensure the contractor also transmits daily broadcasts on Marine Channel 16 as to the dredging and construction operations for the day the broadcast is aired and for upcoming days.

Marine Pollution Control and Contingency Plan

The NRCS will require its contractors and subcontractors to prepare for and take all necessary precautions to prevent discharges of oil and releases of waste and hazardous materials that may impair water quality. In the event of an occurrence, notification and response will be in accordance with 40 C.F.R. Part 300. All dredging and support operations shall be compliant with U.S. Coast Guard regulations and the Vessel General Permit requirement, recently-promulgated by the Environmental Protection Agency. The NRCS will notify the MMS of any occurrences and remedial actions and provide copies of reports of the incident and resultant actions at dredgeinfo@mms.gov.

Encounter of Ordinance

If any ordinance is encountered while conducting dredging activities at the Raccoon Island Borrow Area, the NRCS will report the discovery within 24 hours to Ms. Renee Orr, Chief, MMS Leasing Division, at (703) 787-1215 and dredgeinfo@mms.gov.

Cultural Resources

<u>Onshore Prehistoric or Historic Resources</u>

If the NRCS discovers any previously unknown historic or archeological remains during the construction activity on Raccoon Island authorized by the Corps' CWA Section 404 permit (MVN-2008-0143 CQ), the NRCS must immediately notify the Corps and MMS of any finding. The Corps of Engineers 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.

The Chitimachi Tribe of Louisiana has indicated that the project area is located in aboriginal Chitimachi Homelands. If during the course of work at the placement site, prehistoric and/or historic aboriginal cultural materials are discovered, the NRCS shall contact the Chitimachi Tribe of Louisiana at P.O. Box 661, Charenton, LA, 70523, the Army Corps of Engineers, New Orleans District, and the MMS. The Corps of Engineers, under the CWA Section 404 permitting authority, shall initiate the required Federal, State, and Tribal coordination to determine the significance of the cultural materials and the need, if any, for additional cultural resource investigations.

Offshore Historic Resources

An archaeological and hazard survey was conducted at the Raccoon Island Borrow Area between October 12 and 25, 2008. Review of magnetometer data resulted in the identification of three anomaly clusters, designated Targets 5, 6, and 7, that may represent significant submerged cultural resources. The three anomaly clusters shall be avoided during dredging operations by at least 200 feet, as described in Table 1. No potentially significant side scan sonar or sub-bottom profiler contacts were identified. At least 11 side scan sonar anomalies and 70 additional magnetic anomalies were identified, suggesting insignificant ferrous debris is present in the vicinity of the Raccoon Island Borrow Area.

Table 1: Archaeological avoidance areas.

Target	Area / Block	Anomaly Amplitude (nT) / Duration (ft)	La. So. SP. Coordinates (NAD 83, ft)	Avoidance Radius (ft)
5	Ship Shoal 71	*M46* 3758 / 117.3 Dipole		200
		M56 296.3 / 264.4 Dipole		200
6	Ship Shoal 64	*M60* 656.4 / 70.4 Monopole		200
		M61 1084.5 / 151.8 Multi-component		200
		M67 109.5 / 123.2 Dipole		200
7	Ship Shoal 64	*M18* 31.7 / 286.0 Dipole		200
		M65 996.4 / 85.8 Dipole		200

If the NRCS determines that the anomalies listed in Table 2 cannot be avoided during dredging operations, the NRCS shall notify the MMS, and the NRCS, subject to the availability of appropriations and in accordance with the requirements of applicable law, may conduct further investigations to assess the significance of the objects producing the signatures in accordance with the criteria at 36 CFR section 60.4, "Criteria for evaluation," and National Register Bulletin No. 20, "*Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places*."

The proposed investigation procedures must be discussed with an MMS archaeologist prior to commencing fieldwork. At a minimum, this assessment must include an analysis of the age, physical composition, and structural integrity of the object (*i.e.*, wood or metal, intact or dispersed). Measured drawings and/or underwater video or still photographs of the feature shall be made for documentation and submitted with the final "Report of Findings." A "Report of Findings" prepared in accordance with the archaeological report writing standards specified in the MMS Notice To Lessees (NTL) 2005-G07 must be submitted to the MMS for approval within ten work days of the completion of fieldwork.

Offshore Prehistoric Resources

Subbottom profiler data indicate the presence of paleochannels in the vicinity of the Raccoon Island Borrow Area. Review of data suggests that marine transgressive processes have substantially reworked the margins of the paleochannels. The relatively recent and highly eroded relict channels recorded within the project area have low potential for containing preserved prehistoric archaeological deposits. However, it is possible that dredging operations may disturb or destroy prehistoric resources within the project area. The only way to mitigate the potential impacts from dredging operations is to monitor dredge material and modify operations if there is indication of any impact to a prehistoric archaeological site.

The NRCS and LDNR shall implement a random archaeological monitoring program at the marsh creation site to examine placed marsh fill for items that may have archaeological or cultural value. Any of the following would be considered potentially significant prehistoric and historic resources: prehistoric shell middens; lithic and ceramic artifacts; human and animal bone; burned vegetative matter; charcoal; and concentrations of shell or fragments of rock potentially used in tool manufacture. Wooden timbers or sections of iron or steel hulls; scattered cargo remains, such as ceramics, glass, wooden barrels, or barrel staves; any distinct mound of stones indicative of a ballast pile; cannon and swivel guns and/or ammunition; debris comprised of ship rigging, gear, and fittings; and groups of anchors or other objects may indicate the presence of a shipwreck.

Visual inspections and shovel tests, using standard archaeological survey procedures and spatially documented using GPS, shall occur at least every two weeks. If professional archaeologists discover items of archaeological interest within the fill material, the NRCS and LDNR shall immediately notify the MMS at dredgeinfo@mms.gov. Operations must be suspended immediately until further notification from the MMS. The location where the items were found shall be noted and cross-referenced to the location of the dredge when the items were dredged form the borrow area. If there is a find that is determined to be significant, the dredge shall be relocated to another section of the proposed borrow area following MMS approval. A report shall be prepared on the findings of the monitoring program and submitted to the MMS within 30 days of the completion of dredging.

Offshore Chance Finds Clause

In the event that the dredge operators discover any archaeological resource while conducting dredging operations in the Raccoon Island Borrow Area, the NRCS shall require that dredge

operations will be halted immediately within the borrow area. The NRCS shall then immediately report the discovery to Ms. Renee Orr, Chief, MMS Leasing Division, at (703) 787-1215. If investigations determine that the resource is significant, the parties shall together determine how best to protect it.

Avoidance of Oil and Gas Infrastructure

Oil and gas infrastructure is present in the immediate vicinity of the Raccoon Island Borrow Area. The MMS has provided NRCS the best available information delineating the locations of oil and gas pipelines, based on the best available survey documentation provided to MMS by pipeline operators. The LDNR provided data from a recent shallow hazards survey that showed the location of adjacent pipelines.

During all dredging operations, the NRCS shall require its contractor to observe a minimum "no dredge" setback distance of 300 meters from existing pipelines and all other oil and gas-related infrastructure. The NRCS shall also establish lighted marker buoys along the perimeter of the approved borrow area.

Transcontinental Gas Pipeline Corporation shall be notified prior to the commencement of dredging operations, so that Transcontinental Gas Pipeline Corporation may take precautions to mark their pipeline Segment No. 1536 if it chooses to do so. At least two weeks prior to the commencement of dredging, the NRCS will notify Mr. Chris Mason, Transcontinental Gas Pipeline Corporation at (713) 215-2750 or chris.mason@williams.com. Ms. Renee Orr, Chief, MMS Leasing Division, at (703) 787-1215, shall be notified of the outcome of any communication.

The NRCS will immediately notify Ms. Renee Orr, Chief, MMS Leasing Division, at (703) 787-1215, if any oil and gas infrastructure on the OCS is disturbed during the course of the Project.

The MMS reserves the right to require additional pre-dredging shallow hazards surveys to locate the position of existing pipelines and other seabed infrastructure in the wake of a severe storm event. Subject to the availability of funds and in accordance with applicable law, the NRCS, its designee, or contractor may perform such survey or assessments; if no funds are available, any further activity under this MOA must be approved by the MMS.

Bathymetric Surveys

The NRCS and LDNR will provide the MMS with pre- and post-dredging bathymetric surveys of the Raccoon Island Borrow Area. The pre-dredging survey will be conducted within 30 days prior to dredging. The post-dredging survey will be conducted within 30 days after the completion of dredging. Additional bathymetry surveys are recommended at 1 year and 3 years following the completion of dredging. Hydrographic surveys will be performed in accordance with the U.S. Army Corps of Engineers Hydrographic Surveying Manual EM 1110-2-1003 unless specified otherwise. Survey lines will be established at no greater than 50 m intervals perpendicular to a baseline. Three equidistant cross-tie lines will be established parallel to the

same baseline. Survey lines will extend at least 350 m beyond the edge of the borrow area. All data shall be collected in such a manner that post-dredging bathymetry surveys are 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 hydrographic data will be submitted to MMS before the initiation of dredging. Post-dredging hydrographic data will be submitted to MMS within thirty (30) days after each survey is completed. The delivery format for data submission is an ASCII file containing x,y,z data. The horizontal data will be provided in the North American Datum of 1983 (NAD '83) Louisiana State Plane South Zone, U.S. survey feet. Vertical data will be tidally corrected and provided in the North American Vertical Datum of 1988 (NAVD '88), U.S. survey feet. An 8.5x11" 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. All data will be submitted to dredgeinfo@mms.gov within 30 days of completion.

Submittal of Production and Volume Information

The NRCS, in cooperation with the dredge operator, shall submit to the MMS and LDNR on a biweekly basis a summary of the dredge head track lines, outlining any deviations from the original Plan. A color-coded plot of the cutterhead or drag arms will be submitted, showing any horizontal or vertical dredge violations. This map will be provided in PDF format. The NRCS will provide a biweekly update of the construction progress including estimated volumetric production rates to MMS and LDNR. The biweekly deliverables will be provided electronically to dredgeinfo@mms.gov. The project completion report, as described in paragraph 12 below, will also include production and volume information.

Project Completion Report

A project completion report will be submitted jointly by the NRCS and LDNR to MMS within 90 days following completion of the activities authorized under this MOA. This report and supporting materials should be sent to Ms. Renee Orr, Chief, MMS Leasing Division, 381 Elden Street, MS 4010, Herndon, Virginia 20170 and dredgeinfo@mms.gov. The report shall contain, at a minimum, the following information:

- the names and titles of the project managers overseeing the effort (for the NRCS and LDNR, the engineering firm, 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 Raccoon Island 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);
- 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;

	Project Cost Estimate ($)	Cost Incurred as of Construction Completion ($)
Construction		
Engineering and Design		
Inspections/Contract Administration		
Total		

- a table, an example of which is illustrated below, showing the various items of work construction, final quantities, and monetary amounts;

Item No.	Item	Estimated Quantity	Unit	Unit Price	Estimated Amount	Final Quantity	Bid Unit Price	Final Amount	% Over/ Under
1	Mobilization and Demobilization								
2	Beach Fill								
3	Any beach or offshore hard structure placed or removed								

- a listing of construction and construction oversight information, including the prime and subcontractors, 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 of any pipelines or other oil/gas-related infrastructure in the project area, the owners, and any contacts made;
- 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 the NRCS and LDNR;
- digital appendices containing the as-built drawings, beach-fill cross-sections, and survey data; and
- any additional pertinent comments.

9.0 Incidental Take Statement

Section 9 of the ESA and federal regulations issued pursuant to section 4(d) of the ESA prohibit the take of endangered and 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. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2) of the ESA, 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 such taking is in compliance with the terms and conditions of an incidental take statement.

The measures described below are non-discretionary and must be undertaken by MMS so that they become binding conditions of any grant, permit, contract or other authorization issued to Gulf of Mexico hopper dredge or relocation trawl operators for the exemption in section 7(o)(2) to apply. The MMS has a continuing duty to regulate the activity covered by this incidental take statement. If the MMS (1) fails to assume and implement the terms and conditions or (2) fails to require the hopper dredge or relocation operators to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorizing document, the protective coverage of section 7(o)(2) will lapse. In order to monitor the impact of incidental take, the MMS must report the progress of the action and its impact on the species to the NMFS as specified in the incidental take statement. [50 CFR 402.14(i)(3)].

Only incidental take resulting from the agency action, including incidental take caused by activities approved by the agency, that are identified in this statement and that comply with the specified reasonable and prudent measures and terms and conditions are exempt from the take prohibition of section 9(a) of the ESA.

Amount or Extent of Anticipated Take

Take of sea turtles

NMFS has determined that there is an expected impact to sea turtles by the proposed action in the action area as a result of the activities associated with hopper dredging. Therefore, pursuant to section 7(b)(4) of the ESA, NMFS anticipates the total take associated with hopper dredging to be 14 sea turtles (10 loggerhead, 2 Kemp's ridley, 2 green sea turtles) biennially and up to total of 23 sea turtles (17 loggerhead, 3 Kemp's ridley, 3 green sea turtles) for the entire project, which consists of Whiskey Island and the Morganza to the Gulf project. **This anticipated take level of up to 14 sea turtles/every 2 years and 23 sea turtles/for the life of the project represents the total authorized documented (i.e., observed and counted by onboard endangered species observers) take assuming 50 percent observer coverage.**

In addition, NMFS estimates that relocation trawling in association with the proposed action may result in the capture of no more than 76 sea turtles (46 loggerhead, 20 Kemp's ridley, or 10 green) per 2 years or no more than a total of 152 sea turtles (91 loggerhead, 38 Kemp's ridley, or 23 green) for the duration of the proposed action, which consists of Whiskey Island and the Morganza to the Gulf project. Relocation trawling is required under specific circumstances. This relocation trawling may result in sea turtle takes, but given the low documented injury and mortality rates associated with short-duration relocation trawling, these takes are not expected to be injurious or lethal. NMFS believes that properly

conducted and supervised relocation trawling (i.e., observing trawl speed and tow-time limits and taking adequate precautions to release captured animals) and tagging are unlikely to result in adverse effects to sea turtles. NMFS believes that, overall, sea turtle trawling and relocation efforts will result in considerably less than 0.5 percent mortality of captured turtles, which could result primarily from the turtles being previously stressed or diseased or if struck by trawl doors or accidents on deck. Nonetheless, hopper dredge entrainments invariably result in injury, and are almost always fatal. In the present opinion, NMFS requires relocation trawling and tagging as methods of reducing sea turtle entrainment in hopper dredges and to document the effects of relocation trawling, according to criteria defined in this ITS.

Effect of the take

This opinion determines that the aforementioned level of anticipated take (lethal or non-lethal) is not likely to appreciably reduce either the survival or recovery of loggerhead, Kemp's ridley, or green, in the wild. Specifically, NMFS does not expect the activities associated with the proposed action, when added to ongoing activities affecting these species in the action area and cumulative effects, to affect these listed species in a way that measurably or significantly reduces the numbers of offspring, numbers, or distribution. The proposed action is therefore not likely to result in jeopardy to any of the above-mentioned species.

10.0 Reasonable and Prudent Measures

Regulations (50 CFR Section 402.02) implementing section 7 of the ESA define reasonable and prudent measures as actions the director believes necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take. The reasonable and prudent measures that NMFS believes are necessary to minimize the impacts of hopper dredging in the Gulf of Mexico have been discussed with the MMS and include:

- use of intake and overflow screening,
- use of sea turtle deflector dragheads,
- observer and reporting requirements,
- sea turtle relocation trawling, and
- sedimentation levels.

The following terms and conditions are established to implement these measures, and to document incidental takes. Only incidental takes that occur while these measures are in full implementation are authorized. These restrictions remain valid until completion of the proposed action or until reinitiation and conclusion of any subsequent section 7 consultation.

11.0 Terms and Conditions

1. *Observers*: The MMS shall arrange for NMFS-approved observers to be aboard the hopper dredges to monitor the hopper spoil, screening, and dragheads for sea turtles and their remains. As previously described in the mitigation measures proposed by MMS and incorporated as part of the proposed action, one observer (50 percent coverage) shall be utilized for visually inspecting incoming dredge spoils for turtle remains. One observer shall be aboard each hopper dredge. The observer shall notify NMFS' PRD immediately by phone (**727-824-5312**) or fax (**727-824-5309**) if a sea turtle is taken by the dredge.

2. *Screening*: One hundred percent inflow screening of dredged material is required and 100 percent overflow screening is recommended. If conditions prevent 100 percent inflow screening, inflow screening may be reduced gradually, as further detailed in the following paragraph, but 100 percent overflow screening is then required. NMFS' PRD must be consulted prior to the reductions in screening and an explanation must be included in the dredging report.

   a. Screen Size: The hopper's inflow screens should have 4-inch by 4-inch screening. If the MMS, in consultation with observers and the draghead operator, determines that the draghead is clogging and reducing production substantially, the screens may be modified sequentially: mesh size may be increased to 6-inch by 6-inch, then 9-inch by 9-inch, then 12-inch by 12-inch openings. Clogging should be greatly reduced with these flexible options; however, further clogging may compel removal of the screening altogether, in which case effective 100 percent overflow screening is mandatory. The MMS shall notify NMFS' PRD beforehand if inflow screening is going to be reduced or eliminated, and provide details of how effective overflow screening will be achieved.

   b. Screen Size Modification Option: NMFS believes the option to allow the sequential reduction of inflow screens when clogging is a major problem is necessary, since the need to constantly clear the inflow screens will increase the time it takes to complete the project and therefore increase the exposure of sea turtles to the risk of impingement or entrainment. Additionally, there are increased risks to sea turtles in the water column when the inflow is halted to clear screens, since this results in clogged intake pipes, which may have to be lifted from the bottom to discharge the clay by applying suction.

3. *Dredging Pumps*: Standard operating procedure shall be that dredging pumps shall be disengaged by the operator when the dragheads are not firmly on the bottom, to prevent impingement or entrainment of sea turtles within the water column. This precaution is especially important during the cleanup phase of dredging operations when the draghead frequently comes off the bottom and can suck in turtles resting in the shallow depressions between the high spots the draghead is trimming off.

4. *Sea Turtle Deflecting Draghead*: Rigid deflector dragheads must be used at all times on all hopper dredges mining sand at the borrow areas.

5. *Dredge Take Reporting*: Observer reports of incidental take by hopper dredges must be faxed to NMFS' Southeast Regional Office, PRD (**727-824-5517**), by the onboard endangered species observer within 24 hours of any sea turtle take observed.

   A report summarizing the results of the hopper dredging and detailing any documented sea turtle takes must be submitted to NMFS' PRD within 30 working days of completion of the dredging project. The report shall contain information on project location (specific area dredged), start-up and completion dates, cubic yards of material dredged, problems encountered, incidental takes and sightings of protected species, mitigative actions taken (if relocation trawling, the number and species of turtles relocated), screening type (inflow, overflow) utilized, daily water temperatures, name of dredge, names of endangered species observers, percent observer coverage, and any other information the MMS deems relevant.

6. *Sea Turtle Strandings*: The MMS Project Manager or designated representative shall notify the STSSN state representative (contact information available at: http://www.sefsc.noaa.gov/seaturtleSTSSN.jsp) of the start-up and completion of hopper dredging operations and ask to be notified of any sea turtle strandings in the project area that, in the estimation of STSSN personnel, bear signs of potential draghead impingement or entrainment.

   Information on any such strandings shall be reported in writing within 30 days of project end to NMFS' Southeast Regional Office. Because the deaths of these turtles, if hopper dredge or bed-leveler dredge-related, have already been accounted for in NMFS' jeopardy analysis, and because of different possible explanations for, and subjectivity in the interpretation of potential causes of strandings, these strandings will not be counted against the MMS's take limit.

7. *Reporting - Strandings*: The MMS shall provide to NMFS' Southeast Regional Office, PRD, a final report in writing within 30 days of project end detailing incidents, with photographs when available, of stranded sea turtles that bear indications of draghead impingement or entrainment. This reporting requirement may be included in the project completion report required in Term and Condition No. 5a, above.

8. *Relocation Trawling*: 24-hour relocation trawling shall be conducted subject to the following conditions:

   a. Relocation trawling (a minimum of 12 hours/day) shall be conducted for the 3 days (72 hours) immediately prior to commencement of hopper dredging operations, to reduce the abundance of sea turtles in the project area. If no turtle is captured during this time period, then relocation trawling will not be required unless takes occur during dredging.

   b. If a sea turtle is taken by a relocation trawler during the 72-hour pre-dredging period, relocation trawling must be conducted for a minimum of seven consecutive days following the take.

   c. If no turtle is taken during relocation trawling and hopper dredging for seven consecutive days, then relocation trawling may be discontinued. However, if a sea turtle is subsequently taken during hopper dredging, then relocation trawling will be immediately re-implemented for a minimum of 7 consecutive days; however, dredging may continue

9. *Relocation Trawling Take Limits*: This opinion authorizes the biennial take of 76 sea turtles (of loggerhead, green, Kemp's ridley, or combination of) and a limit of 152 sea turtles (of loggerhead, green, Kemp's ridley, or combination of) for the project, in association with all relocation trawling conducted by or contracted by the MMS to reduce the abundance of sea turtles during the 3 days immediately preceding the start of hopper dredging and during hopper dredging, subject to the following conditions:

   a. *Trawl Time*: Trawl tow-time duration shall not exceed 42 minutes (doors in - doors out) and trawl speeds shall not exceed 3.5 knots.

   b. *Handling During Trawling*: Sea turtles captured pursuant to relocation trawling shall be

handled in a manner designed to ensure their safety and viability, and shall be released over the side of the vessel, away from the propeller, and only after ensuring that the vessel's propeller is in the neutral, or disengaged, position (i.e., not rotating). Resuscitation guidelines are attached (Appendix V).

c. *Captured Turtle Holding Conditions*: Captured turtles shall be kept moist, and shaded whenever possible, until they are released.

d. *Weight and Size Measurements*: All turtles shall be measured (standard carapace measurements including body depth) and tagged, and weighed when safely possible, prior to release. Any external tags shall be noted and data recorded into the observers log. Only NMFS-approved observers or observer candidates in training under the direct supervision of a NMFS-approved observer shall conduct the tagging/measuring/weighing/tissue sampling operations.

e. *Take and Release Time During Trawling*: Turtles shall be kept no longer than 12 hours prior to release and shall be released not less than 3 nmi from the dredge site. If two or more released turtles are later recaptured, subsequent turtle captures shall be released not less than 5 nmi away. If it can be done safely, turtles may be transferred onto another vessel for transport to the release area to enable the relocation trawler to keep sweeping the dredge site without interruption.

f. *Injuries and Incidental Take Quota*: Any protected species injured or killed during or as a consequence of relocation trawling shall count toward the incidental take quota. Minor skin abrasions resulting from trawl capture are considered non-injurious. Injured sea turtles shall be immediately transported to the nearest sea turtle rehabilitation facility.

g. *Flipper Tagging*: All sea turtles captured by relocation trawling shall be flipper-tagged prior to release with external tags that shall be obtained prior to the project from the University of Florida's Archie Carr Center for Sea Turtle Research. This opinion serves as the permitting authority for any NMFS-approved endangered species observer aboard these relocation trawlers to flipper-tag with external tags (e.g., Inconel tags) captured sea turtles. Columbus crabs or other organisms living on external sea turtle surfaces may also be sampled and removed under this authority.

h. *PIT-Tag Scanning*: All sea turtles captured by relocation trawling (or dredges) shall be thoroughly scanned for the presence of PIT tags prior to release using a scanner powerful enough to read dual frequencies (125 and 134 kHz) and read tags deeply embedded deep in muscle tissue (e.g., manufactured by Biomark or Avid). Turtles that scans show have been previously PIT tagged shall nevertheless be externally flipper tagged. The data collected (PIT tag scan data and external tagging data) shall be submitted to NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Attn: Lisa Belskis, 75 Virginia Beach Drive, Miami, Florida 33149. All data collected shall be submitted in electronic format within 60 working days to Lisa.Belskis@noaa.gov.

i. *CMTTP*: External flipper tag and PIT tag data generated and collected by relocation trawlers shall also be submitted to the Cooperative Marine Turtle Tagging Program (CMTTP), on the appropriate CMTTP form, at the University of Florida's Archie Carr Center for Sea Turtle Research.

j. *Tissue Sampling*: All live or dead sea turtles captured by relocation trawling or dredging shall be tissue-sampled prior to release, according to the protocols described in Appendix III or Appendix IV of this opinion. Tissue samples shall be sent within 60 days of capture to: NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Attn: Lisa Belskis, 75 Virginia Beach Drive, Miami, Florida 33149. All data collected shall be submitted in electronic format within 60 working days to Lisa.Belskis@noaa.gov. This opinion serves as the permitting authority for any NMFS-approved endangered species observers aboard relocation trawlers or hopper dredges to tissue-sample live- or dead-captured sea turtles, without the need for a section 10 permit.

k. *Cost Sharing of Genetic Analysis*: The MMS shall pay for collection, shipping, and analysis by NOAA scientists, of up to 32 tissue samples taken during MMS-authorized hopper dredging operations in the Gulf of Mexico. The cost of analysis is currently estimated by NMFS to be about $100-$150 per sample, or $3,200-$4,800. MMS funds shall be provided to NMFS' Southwest Fisheries Center's Dr. Peter Dutton within six months of completion of the project.

l. *PIT Tagging:* PIT tagging is **not required or authorized for, and shall not be conducted by,** ESOs who do not have 1) section 10 permits authorizing said activity and 2) prior training or experience in said activity; however, if the ESO has received prior training in PIT tagging procedures **and is also authorized to conduct said activity by a section 10 permit, then the ESO must PIT tag the animal** prior to release (in addition to the standard external flipper tagging). PIT tagging must then be performed in accordance with the protocol detailed at NMFS' Southeast Science Center's webpage: http://www.sefsc.noaa.gov/seaturtlefisheriesobservers.jsp. (See Appendix C on SEC's "Fisheries Observers" webpage). PIT tags used must be sterile, individually wrapped tags to prevent disease transmission. PIT tags should be 125 kHz, glass-encapsulated tags-the smallest ones made. Note: If scanning reveals a PIT tag and it was not difficult to find, then **do not** insert another PIT tag; simply record the tag number and location, and frequency, if known. If for some reason the tag is difficult to detect (e.g., tag is embedded deep in muscle, or is a 400 mHz tag), then insert one in the other shoulder.

m. *Other Sampling Procedures*: All other tagging and external or internal sampling procedures (e.g., PIT tagging, blood letting, laparoscopies, anal and gastric lavages, mounting satellite or radio transmitters, etc.) performed on live sea turtles are **not permitted under this opinion unless** the observer holds a valid sea turtle research permit (obtained pursuant to section 10 of the ESA from the NMFS' Office of Protected Resources, Permits Division) authorizing the activity, either as the permit holder, or as designated agent of the permit holder.

n. *Handling Fibropapillomatose Turtles*: Observers handling sea turtles infected with fibropapilloma tumors shall either: 1) clean all equipment that comes in contact with the turtle (tagging equipment, tape measures, etc.) with mild bleach solution, between the processing of each turtle or 2) maintain a separate set of sampling equipment for handling animals displaying fibropapilloma tumors or lesions. Tissue/tumor samples shall be sent within 60 days of capture to: NOAA, National Marine Fisheries Service, Southeast Fisheries Science Center, Attn: Lisa Belskis, 75 Virginia Beach Drive, Miami, Florida 33149. All data collected shall be submitted in electronic format within 60 working days to Lisa.Belskis@noaa.gov. This opinion serves as the permitting authority for all NMFS-approved endangered species observers aboard a relocation

trawler or hopper dredge to tissue-sample fibropapilloma-infected sea turtles without the need for a section 10 permit.

10. *Hardground Buffer Zones*: All dredging in sand mining areas will be designed to ensure that dredging will not occur within a minimum of 400 ft from any significant hardground areas or bottom structures that serve as attractants to sea turtles for foraging or shelter. NMFS considers (for the purposes of this opinion only) a significant hardground in a project area to be one that, over a horizontal distance of 150 ft, has an average elevation above the sand of 1.5 feet or greater, and has algae growing on it.

11. *Training - Personnel on Hopper Dredges*: The MMS must ensure that all contracted personnel involved in operating hopper dredges receive thorough training on measures of dredge operation that will minimize takes of sea turtles. Operating procedures shall be consistent with those that have been used successfully by the COE during hopper dredging in other regions of the coastal United States, and that have proven effective in reducing turtle/dredge interactions. Therefore, MMS shall consult and coordinate with appropriate experts in the matter of hopper dredge operation training, and installation, adjustment, and monitoring of the rigid deflector draghead assembly.

12. *Dredge Lighting*: From May 1 through October 31, sea turtle nesting and emergence season, all lighting aboard hopper dredges and hopper dredge pumpout barges operating within 3 nmi of sea turtle nesting beaches shall be limited to the minimal lighting necessary to comply with U.S. Coast Guard and/or OSHA requirements. All non-essential lighting on the dredge and pumpout barge shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to minimize illumination of the water to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches.

13. *Sedimentation Levels*. In order to reduce potential sedimentation damage to habitats adjacent to sand mining sites hopper dredges operating at offshore sand mining sites shall maintain a minimum distance of 400 ft from hardgrounds since these areas may attract sea turtles.

12.0 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to utilize their authority to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered or 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 implement recovery plans, or develop information. The following conservation recommendations are made to assist the MMS in contributing to the conservation of sea turtles by further reducing or eliminating adverse impacts that result from hopper dredging.

> Sodium Vapor Lights on Offshore Equipment: On offshore equipment (i.e., hopper dredges, pumpout barges) shielded low pressure sodium vapor lights are highly recommended for lights that cannot be eliminated.

13.0 Reinitiation of Consultation

This concludes formal consultation on MMS's hopper and hydraulic cutterhead dredging associated with sand mining for coastal restoration projects along the coast of Louisiana using sand from ship shoal in the Gulf of Mexico central planning area, south Pelto Blocks 12,13, and 19, and Ship Shoal Block 88. As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. the amount or extent of taking specified in the incidental take statement is exceeded (e.g., the total take of any species by hopper dredges is exceeded or a turtle is injuriously or lethally taken by relocation trawling);
2. new information reveals effects of the action that may affect listed species or critical habitat, when designated, in a manner or to an extent not previously considered;
3. the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the opinion; or
4. a new species is listed or critical habitat designated that may be affected by the identified action.

Dredging/Trawling Operations Approaching Take Limits: NMFS requests that MMS initiate discussions with the Southeast Regional Office Protected Resources Division early to identify the potential need for reinitiation of consultation, well in advance of actually exceeding the amount or extent of taking specified in the incidental take statement. NMFS requests notification when:

1. Three turtles of any combination are taken by a hopper dredge during the project;
2. relocation trawling indicates high abundance of sea turtles (two captures in 24 hours) or significant presence of sea turtles (one or more captures in seven days of trawling);
3. 14 sea turtles (10 loggerhead, 2 Kemp's ridley, or 2 green) biennially have been taken by the hopper dredge;
4. 76 sea turtles (46 loggerhead, 20 Kemp's ridley, or 10 green) biennially have been taken by relocation trawling; or
5. 152 sea turtles (91 loggerhead, 38 Kemp's ridley, or 23 green) over the life of the project have been taken by relocation trawling.

The NMFS Southeast Regional Office will work with the MMS to quickly review such incidents, to discuss the need and advisability of further mitigating measures, and to plan for a reinitiation of consultation if it appears that one of the reinitiation triggers is likely to be met.

Once the need for reinitiation is triggered, the MMS is not necessarily required to suspend dredging or relocation trawling operations pending the conclusion of the reinitiated consultation, so long as the continuation of operations would not violate section 7(a)(2) or 7(d) of the ESA. In that case, the MMS is advised to document its determination that these provisions would not be violated by continuing activities covered by this opinion during the reinitiation period and to seek NMFS' concurrence with its findings.

Appendix III:

PROTOCOL FOR COLLECTING TISSUE FROM DEAD TURTLES FOR GENETIC ANALYSIS

Method for Dead Turtles

IT IS CRITICAL TO USE A NEW SCALPEL BLADE AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES

1. Put on a new pair of latex gloves.
2. Use a new disposable scalpel to cut out an approx. 1 cm (½ in) cube (bigger is NOT better) piece of muscle. Easy access to muscle tissue is in the neck region or on the ventral side where the front flippers "insert" near the plastron. It does not matter what stage of decomposition the carcass is in.
3. Place the muscle sample on a hard uncontaminated surface (plastron will do) and make slices through the sample so the buffer solution will penetrate the tissue.
4. Put the sample into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW).
5. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state, and carapace length on the waterproof paper label and place it in the vial with the sample. EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001 in Georgia, the label should read "JMD20010715-01, C. mydas, Georgia, CCL=35.8 cm." If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
6. Label the outside of the vial with the same information (stranding ID number, species, state, and carapace length) using the permanent marker.
7. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
8. Wrap parafilm around the cap of the vial by stretching it as you wrap.
9. Place vial within whirlpak and close.
10. Dispose of the scalpel.
11. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
12. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

The vials (both before and after samples are taken) should be stored at room temperature or cooler. If you don't mind the vials in the refrigerator, this will prolong the life of the sample. DO NOT store the vials where they will experience extreme heat (like in your car!) as this could cause the buffer to break down and not preserve the sample properly.

Questions:
Sea Turtle Program
NOAA/NMFS/SEFSC
75 Virginia Beach Drive

Miami, FL 33149
305-361-4207

THANK YOU FOR COLLECTING SAMPLES FOR SEA TURTLE GENETIC RESEARCH!!
Genetic Sample Kit Materials – DEAD turtles

- latex gloves
- single-use scalpel blades (Fisher Scientific 1-800-766-7000, cat. #08-927-5A)
- plastic screw-cap vial containing saturated NaCl with 20% DMSO, wrapped in parafilm
- waterproof paper label, ¼" x 4"
- pencil to write on waterproof paper label
- permanent marker to label the plastic vials
- scotch tape to protect writing on the vials
- piece of parafilm to wrap the cap of the vial
- whirlpak to return/store sample vial

Appendix IV:

PROTOCOL FOR COLLECTING TISSUE FROM LIVE TURTLES FOR GENETIC ANALYSIS

Method for Live Turtles

IT IS CRITICAL TO USE A NEW BIOPSY PUNCH AND GLOVES FOR EACH TURTLE TO AVOID CROSS-CONTAMINATION OF SAMPLES

1. Turn the turtle over on its back.
2. Put on a new pair of latex gloves.
3. Swab the entire cap of the sample vial with alcohol.
4. Wipe the ventral and dorsal surfaces of the rear flipper 5-10 cm from the posterior edge with the Betadine/iodine swab.
5. Place the vial under the flipper edge to use the cleaned cap as a hard surface for the punch.
6. Press a new biopsy punch firmly into the flesh as close to the posterior edge as possible and rotate one complete turn. Cut all the way through the flipper to the cap of the vial.
7. Wipe the punched area with Betadine/iodine swab; rarely you may need to apply pressure to stop bleeding.
8. Use a wooden skewer to transfer the sample from the biopsy punch into the plastic vial containing saturated NaCl with 20% DMSO *(SEE BELOW).
9. Use the pencil to write the stranding ID number (observer initials, year, month, day, turtle number by day), species, state, and carapace length on the waterproof paper label and place it in the vial with the sample. EXAMPLE: For a 35.8 cm curved carapace length green turtle documented by Jane M. Doe on July 15, 2001, in Georgia, the label should read "JMD20010715-01, C. mydas, Georgia, CCL=35.8 cm." If this had been the third turtle Jane Doe responded to on July 15, 2001, it would be JMD20010715-03.
10. Label the outside of the vial with the same information (stranding ID number, species, state, and carapace length) using the permanent marker.
11. Place clear scotch tape over the writing on the vial to protect it from being smeared or erased.
12. Wrap parafilm around the cap of the vial by stretching it as you wrap.
13. Place vial within whirlpak and close.
14. Dispose of the biopsy punch.
15. Note on the stranding form that a part was salvaged, indicating that a genetic sample was taken and specify the location on the turtle where the sample was obtained.
16. Submit the vial with the stranding report to your state coordinator. State coordinators will forward the reports and vials to NMFS for processing and archiving.

*The 20% DMSO buffer in the plastic vials is nontoxic and nonflammable. Handling the buffer without gloves may result in exposure to DMSO. This substance soaks into skin very rapidly and is commonly used to alleviate muscle aches. DMSO will produce a garlic/oyster taste in the mouth along with breath odor. The protocol requires that you WEAR gloves each time you collect a sample and handle the buffer vials.

The vials (both before and after samples are taken) should be stored at room temperature or cooler. If you don't mind the vials in the refrigerator, this will prolong the life of the sample. DO NOT store the vials where they will experience extreme heat (like in your car!) as this could cause the buffer to break down and not preserve the sample properly.

Questions:

Sea Turtle Program
NOAA/NMFS/SEFSC
75 Virginia Beach Drive
Miami, FL 33149
305-361-4207

THANK YOU FOR COLLECTING SAMPLES FOR SEA TURTLE GENETIC RESEARCH!!

Genetic Sample Kit Materials – LIVE turtles

- latex gloves
- alcohol swabs
- Betadine/iodine swabs
- 4-6 mm biopsy punch – sterile, disposable (Moore Medical Supply 1-800-678-8678, part #0052442)
- plastic screw-cap vial containing saturated NaCl with 20% DMSO, wrapped in parafilm
- wooden skewer
- waterproof paper label, ¼" x 4"
- pencil to write on waterproof paper label
- permanent marker to label the plastic vials
- scotch tape to protect writing on the vials
- piece if parafilm to wrap the cap of the vial
- whirlpak to return/store sample vial

Appendix V: SEA TURTLE HANDLING AND RESUSCITATION GUIDELINES

Any sea turtles taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

A) Sea turtles that are actively moving or determined to be dead (as described in paragraph (B)(4) below) must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

B) Resuscitation must be attempted on sea turtles that are comatose or inactive by:

1. Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.

2. Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water-soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.

3. Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

4. A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck.

These guidelines are adapted from 50 CFR § 223.206(d)(1). Failure to follow these procedures is therefore a punishable offense under the Endangered Species Act.

Supplemental Environmental Assessment

for

Raccoon Island Shore Protection/Marsh Creation Project (TE-48)
Phase B - Marsh Creation

Terrebonne Parish, Louisiana

United States Department of Agriculture
Natural Resources Conservation Service

in coordination with
United States Department of the Interior
Minerals Management Service

March 31, 2009

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

Supplemental Environmental Assessment for
Raccoon Island Shore Protection/Marsh Creation Project (TE-48)
Terrebonne Parish, Louisiana

ABSTRACT

This document was prepared to evaluate the potential environmental impacts related to the U.S. Department of Agriculture Natural Resource Conservation Service's (NRCS) proposed plan to protect and restore the rapidly eroding back-barrier marsh of Raccoon Island, the westernmost barrier island in the Isles Dernieres chain in Terrebonne Parish, Louisiana. In Phase B, NRCS proposes to create additional inter-tidal and supra-tidal marsh and avian habitat for bird species on the northeast portion of the island by backfilling an open water area with suitable sediment dredged from the Outer Continental Shelf, approximately 4 miles to the south of Raccoon Island. The following document addresses significant resources of the affected environment and potential environmental consequences of Phase B that were unknown at the time of the original Project Plan and Environmental Assessment.

This document has been prepared under authority of the Coastal Wetlands Planning Protection, and Restoration Act of 28 November 1990, House Document 646, 101st Congress. The document is intended to fulfill the requirements of the National Environmental Policy Act for the project to be funded under the authorization of Public Law 101-646.

Prepared by: U.S. Department of Agriculture, Natural Resources Conservation Service in cooperation with the Minerals Management Service

For Information Contact: Kevin Norton
State Conservationist
USDA, Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302
(318) 473-7751

This report should be cited:
United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), 2008. *Raccoon Island Shore Protection/Marsh Creation Project (TE-48) – Supplemental Environmental Assessment for Phase B Marsh Creation*. U.S. Department of Agriculture, Natural Resources Conservation Service. 75 pp. plus Appendices.

EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared to assess potential impacts related to implementation of the Raccoon Island Shore Protection/Marsh Creation (TE-48) Phase B- Marsh Creation project, in Terrebonne Parish, Louisiana. The objective of Phase B, proposed by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), is to protect and create back-barrier marsh habitat behind the barrier island using sediment dredged from offshore coastal Louisiana. The proposed project area includes shallow open-ocean and sound water, salt marsh, and barrier island habitats. The project is needed to protect an important rookery and colonies of seabirds from an encroaching shoreline and create additional avian habitat for the nesting, staging, resting and feeding of local species. Phase A of TE-48, completed in 2007, involved the construction of 8 segmented breakwaters, complementing the 8 originally constructed on the gulf front in 1997 to prevent shoreline erosion in Coastal Wetlands Planning Protection, and Restoration Act Project TE-29. Phase B involves the creation of 68 acres of emergent marsh on the bayside of the island.

The EA was prepared in accordance with all applicable statutes and regulations, including the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations Parts 1500 – 1508). This EA supplements the Final Project Plan and Environmental Assessment for the Raccoon Island Shoreline Protection/Marsh Creation Project (TE-48) (USDA, NRCS, 2005) and tiers from the Environmental Assessment for the Issuance of Non-Competitive Leases for the Use of Outer Continental Shelf Sand Resources from Ship Shoal, Offshore Central Louisiana for Coastal and Barrier Island Nourishment and Hurricane Levee Construction prepared by MMS (USDOI, MMS, 2004).

Two alternatives to no action were considered in the 2005 Final Plan and EA (USDA, NRCS, 2005), including a project that included only gulf-front shoreline protection and a combination of gulf-front shoreline protection and marsh creation to expand the available habitat for avian use. The primary objective of the Phase A project was to slow shoreline erosion, historically in excess of 52 ft per year which was estimated to result in complete loss of the unprotected portion of the island in less than a decade. Despite the massive loss of land, the existing island remains the primary nesting site for the endangered brown pelican and numerous other coastal seabirds. The preferred alternative to the 2005 Final Plan and EA involved the combination of gulf-front shoreline erosion with breakwaters and marsh creation on the bayside to increase the size of the available avian habitat. However, the original analysis did not contemplate the full project area or range of possible project consequences.

The preferred alternative in Phase B involves moving sediment from an offshore borrow area and placing it into a confined area defined by containment dikes within the project area. While the original EA (USDA, NRCS, 2005) addressed most of the concerns relevant to the placement area, the supplemental EA has been prepared to address the environmental concerns relative to offshore dredging, including transport and placement of the dredged material. Since the proposed borrow area is in the vicinity of Ship Shoal, this EA is supplementing a similar evaluation already completed by MMS on use of Ship Shoal for coastal restoration (USDOI, MMS, 2004); however, that analysis did specifically include the proposed action described herein.

The preferred borrow area is a paleo-distributary channel located approximately 3.8 miles south of the island on the Outer Continental Shelf in -22 to -26 ft water depths. The overall borrow area is 8,850 feet long and is designed for a maximum cut of 20 ft. The overall texture of the sediment is mixed sediment with an average grain size of 0.10 mm (very fine sand). The primary cut volume is estimated at 830,000 yd^3, whereas the total volume available within the overall borrow area is estimated to be approximately 3,420,000 yd^3. Potential impacts related to construction activities are generally considered reversible because they will be minor to moderate, localized, and short-lived. This conclusion is based on a comprehensive review of

relevant literature, site-specific data, project-specific engineering reports related to biological, physical, and cultural resources, and biological consultations. This EA finds that no significant long-term adverse environmental impacts are anticipated from implementing the Raccoon Island Shoreline Protection/Marsh Creation Phase B – Marsh Creation project. However, the mitigations specified below will be necessary to ensure environmental protection, consistent environmental policy, and safety as required by NEPA. The natural resource benefits anticipated from implementing this project would enhance and sustain dune, swale, and intertidal habitat within the project area. The project would increase critical avian habitat and both quality and acreage of fisheries habitat. In addition, the preferred project would result in increased storm surge and wave protection for natural environments and infrastructure on and behind the barrier islands to be restored.

Mitigation Measures

- Implement a marine pollution control plan to minimize any impact to water quality from construction activity.
- Provided a trailing suction hopper dredge is used to dredge offshore sediment, the suite of non-discretionary measures and conservation recommendations identified in the 2004 National Marine Fisheries Service (NMFS) biological opinion (F/SER/2003/01247) must be followed to minimize the impacts to and incidental take of protected sea turtles. The biological opinion, authorized for use for this project by NMFS, specifies the terms and conditions to implement the reasonable and prudent measures. Reasonable and prudent measures include but are not limited to the use of intake and overflow screening, use of sea turtle deflector dragheads, lighting requirements, observer and reporting requirements, and sea turtle relocation trawling. If three turtles of any combination are taken by a hopper dredge, re-initiation of consultation may be required.
- Construction activities will be compliant with Louisiana Department of Wildlife and Fish (LDWF) regulations for the Isles Dernieres Barrier Islands Refuge (LAC 76:III.331) at all times.
- Collection of bathymetric data at the borrow area pre-construction at most two months before and post-construction no more than one month after, approximately one year, and approximately three years after the completion of dredging. The extent of the bathymetric survey should extend at least 350 m beyond the limits of the borrow area.
- Implement a minimum no-dredge setback distance of 305 m (1000 ft) from existing pipelines (locations verified by remote sensing survey) to avoid any impact to pipelines. The perimeter of the borrow area will also be delineated by lighted buoy. All dredges must have continuous GPS positioning capability and the GPS unit must be placed as close to the cutterhead as practicable.
- Avoidance of potential historic archaeological targets in the vicinity of the borrow area.
- Implement a field program to monitor for prehistoric archaeological resources dredged from the offshore borrow area.

1.0 INTRODUCTION

The overall objective of the Natural Resources Conservation Service's (NRCS) Raccoon Island Shore Protection/Marsh Creation Project (TE-48) is to protect the barrier island and prolong the longevity of rookery habitat and seabird colonies on the island by reducing the rate of gulf and bayside shoreline retreat. Raccoon Island is one of the only barrier islands along the Isle Dernieres chain along coastal Louisiana with a fairly extensive wooded habitat still remaining and is an important nesting area for many species including the Brown Pelican (*Pelecanus occidentalis*), Roseate Spoonbill (*Platalea ajaja*), and various other seabirds. It also serves important wintering habitat for the Piping Plover (*Charadrius melodus*). The TE-48 project includes two phases of construction: Phase A (eight segmented rock breakwaters located on the eastern end of the island) and Phase B (creation of approximately 68 acres of marsh habitat). Phase A was previously evaluated in the Final Project Plan and Environmental Assessment for the Raccoon Island Shoreline Protection/Marsh Creation Project (TE-48) (USDA NRCS, March 2005), and construction was completed in September 2007. Because the final design, plans, and specifications for the marsh creation component were not yet complete at the time of the original EA, this supplemental EA was prepared to address additional issues that are relevant to fulfilling NEPA requirements, including the use of an offshore borrow area. This supplemental EA has been prepared in coordination with the Minerals Management Service (MMS) of the U.S. Department of the Interior since MMS has jurisdiction over the removal of marine minerals from the Outer Continental Shelf (OCS).

The original Project Plan/Environmental Assessment (Plan/EA) and this Supplemental EA have been prepared to fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508). The original Project Plan/EA addressed most of the subaerial issues with regards to potential impacts of the proposed action including vegetation, water and air quality, fish and wildlife habitat, threatened and endangered species, migratory birds, and cultural resources. MMS has previously considered the potential impacts of sediment removal from Ship Shoal in its Environmental Assessment for the Issuance of Non-Competitive Leases for the Use of Outer Continental Shelf Sand Resources from Ship Shoal, Offshore Central Louisiana for Coastal and Barrier Island Nourishment and Hurricane Levee Construction (USDOI, MMS, 2004). The proposed action for Raccoon Island was not specifically addressed in the EA, but since the offshore borrow area is in close proximity to Ship Shoal, affected resources and potential consequences are comparable. This EA also augments an Environmental Impact Statement (EIS) for the Louisiana Coastal Wetlands Restoration Plan prepared by the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Task Force (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF], 1993). Additional information on existing conditions and potential impacts were summarized from the final EA prepared for the Pass La Mer to Chaland Pass and Pelican Island, LA restoration projects (Tetra Tech EM, 2004) and the MMS' Final EIS for the Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012 (USDOI, MMS, 2007).

1.1 Description of Proposed Action

The Phase B project proposes to hydraulically dredge approximately 830,000 yd^3 of OCS sediment and placement into a containment cell on the north side of Raccoon Island to create approximately 54 acres of intertidal marsh and 14 acres of supratidal area. Once constructed, native herbaceous and woody vegetation will be planted to facilitate development. Construction is targeted to begin in May 2009, with an estimated completion date of November 2009.

1.2 Need

The Isles Dernieres are experiencing one of the highest rates of erosion in the entire Gulf of Mexico region. Sediment starvation, rapid relative sea level rise, and recurrent storms are contributing to rapid landward migration and barrier island disintegration. The same processes have impacted back-barrier marshes and wetlands, which have historically lost approximately 18 acres per year. The inter-tidal marsh and supra-tidal island platform provides vital habitat for a range of important avian species, while mitigating the effects of storm surge and waves. The proposed action would protect and enhance existing critical habitat and nesting colonies of seabirds, while enhancing natural storm protection and slowing island disintegration.

1.3 Project Location

Raccoon Island is the westernmost barrier island of the Isles Dernieres located approximately 50 miles (80 km) south of Houma, LA and approximately twenty-one miles southwest of the community of Cocodrie (Figure 1). The 3.2 mile (5.1 km) long island is one of four islands, Whiskey Island, Trinity Island, and East Island, which consist of a 22 mile long island Isles Dernieres arc (McBride et al., 1989). These islands are experiencing rapid narrowing and land loss as a consequence of the interactions of global sea level rise, subsidence, inadequate sediment supply, human disturbance, and wave and storm processes (Penland et al., 1988; McBride et al., 1989; Williams et al., 1992). These islands are separated from the mainland by Terrebonne Bay, Lake Pelto, and Caillou Bay, with the Gulf of Mexico as the southern boundary. The subaerial Raccoon Island Shore Protection/Marsh Creation Project area lies within the Terrebonne Hydrologic Basin in Terrebonne Parish, Louisiana. The island falls within Region 3 of the Coast 2050 Management Plan. This portion of the project encompasses approximately 502 acres of beach, shrub, saline marsh, and open water.

A preferred borrow area has been identified in -22 to -26 ft water depths on the OCS approximately 3.8 miles south of the island (Figure 2). The delineated borrow area is about 8,850 feet long; the maximum depth cut is expected to be around 20 feet. The volume available within the overall borrow area is estimated to be approximately 3,420,000 cubic yards.

1.4 Previous Restoration Projects

From 1978 to 1988, the area of Raccoon Island decreased from approximately 350 acres to 200 acres (Penland et al., 2005). By 1993, Raccoon Island had decreased to less than 100 acres. The FEMA restoration project, completed in 1996, increased the size of Raccoon Island to 127 acres. The TE-29 project, constructed in 1997, included the first 8 segmented breakwaters and increased the island area to 145 acres. Phase A of TE-48, completed in September 2007, involved the construction of an additional 8 segmented breakwaters and eastern terminal groin on the gulf front to prevent shoreline erosion. The original project plan view map indicates the three major features of the project (Figure 3).

The original Final Project Plan and EA for TE-48, prepared by NRCS, was completed in March 2005. The EA determined that the preferred alternative would not significantly adversely impact the environment, including the segmented breakwater construction, groin construction, and marsh creation concept. NRCS issued a Finding of No Significant Impact (FONSI) on March 24, 2005. Nevertheless, because the Phase B portion of the project was still in planning and the full nature of the proposed action, including the potential for dredging of an offshore borrow area, was unknown, NRCS committed to preparing a Supplemental EA to ensure that any future action would be consistent with the FONSI.

Figure 1. Project vicinity map.

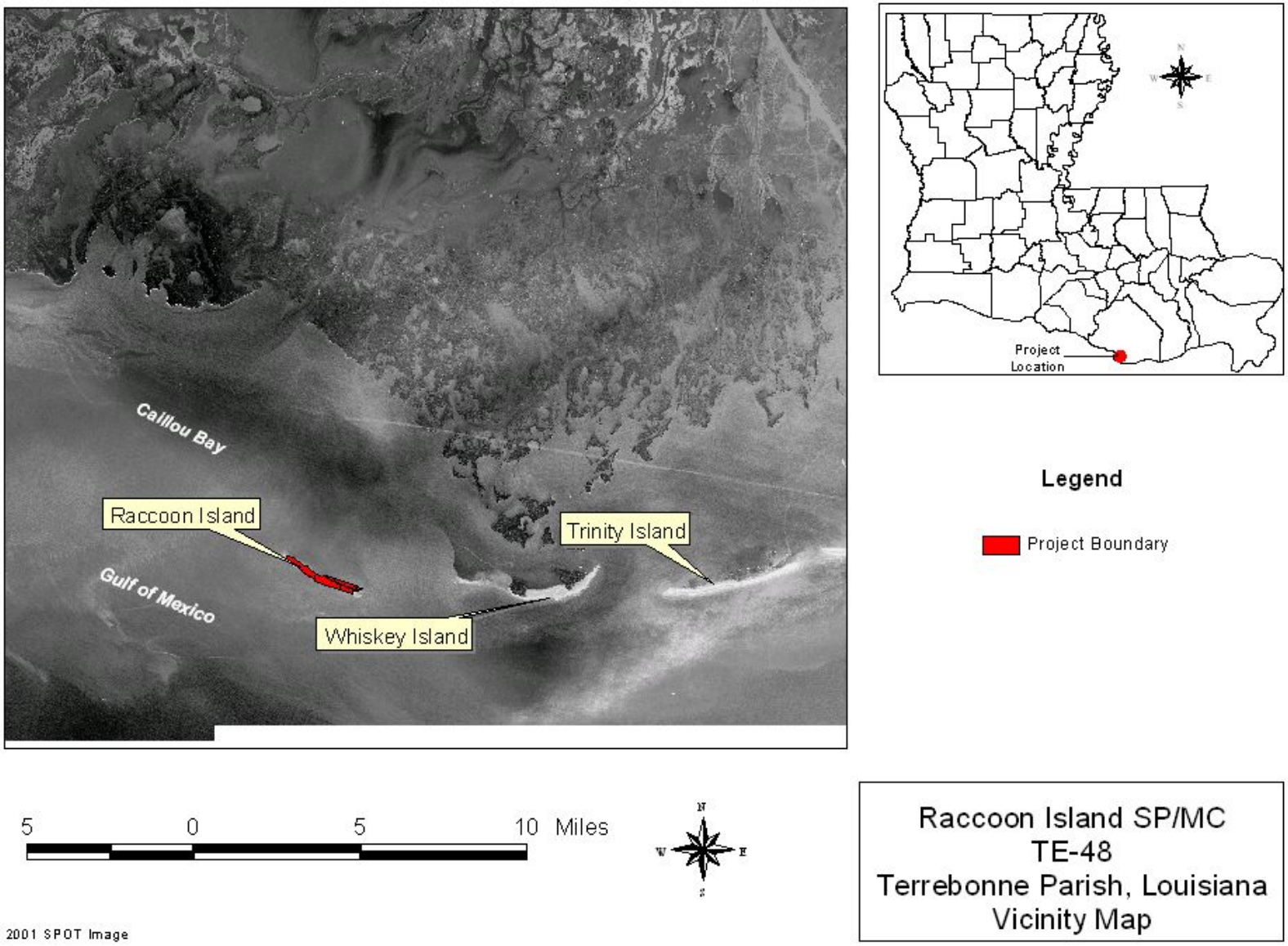


Figure 2. Borrow area location map.

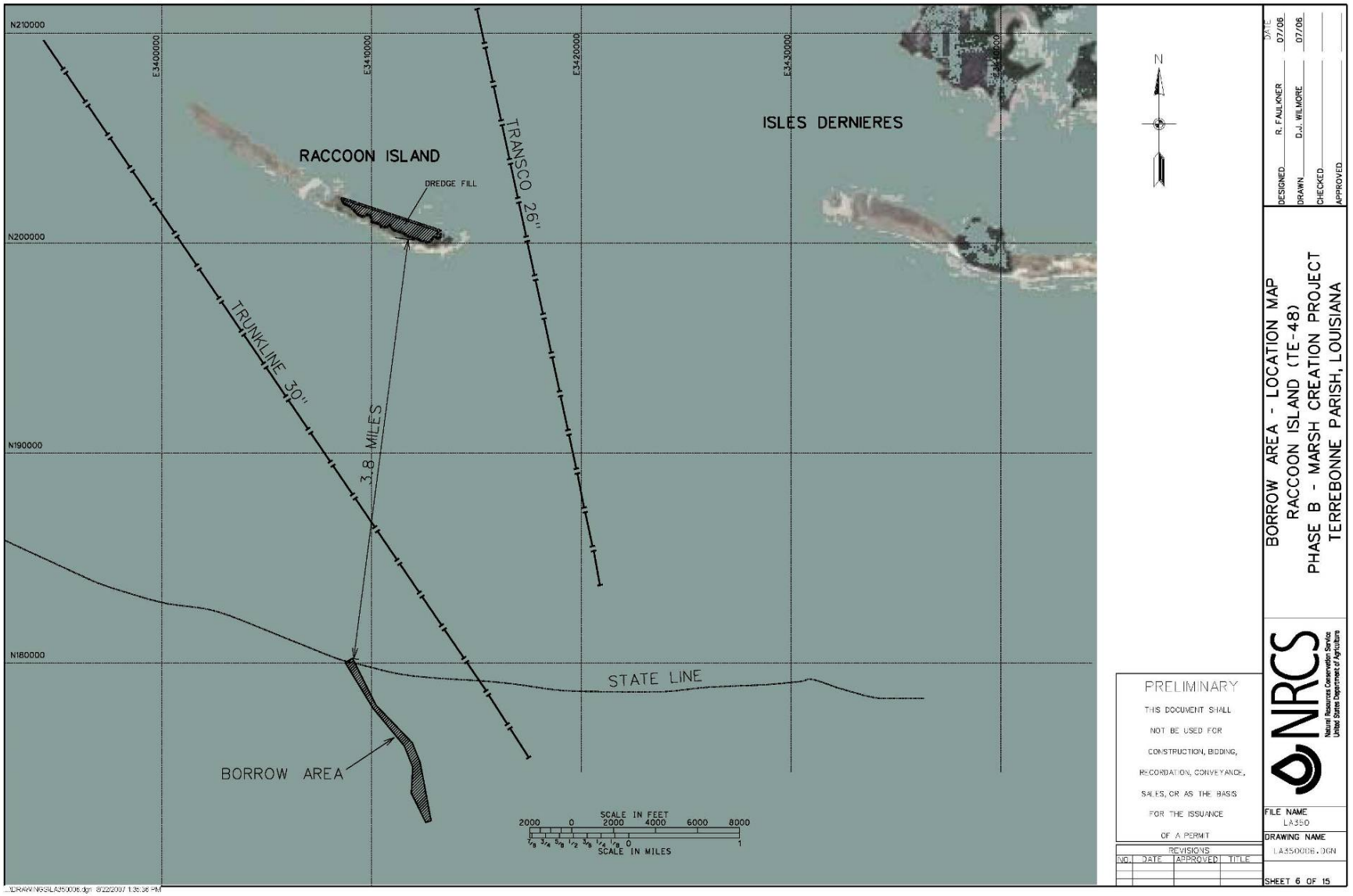
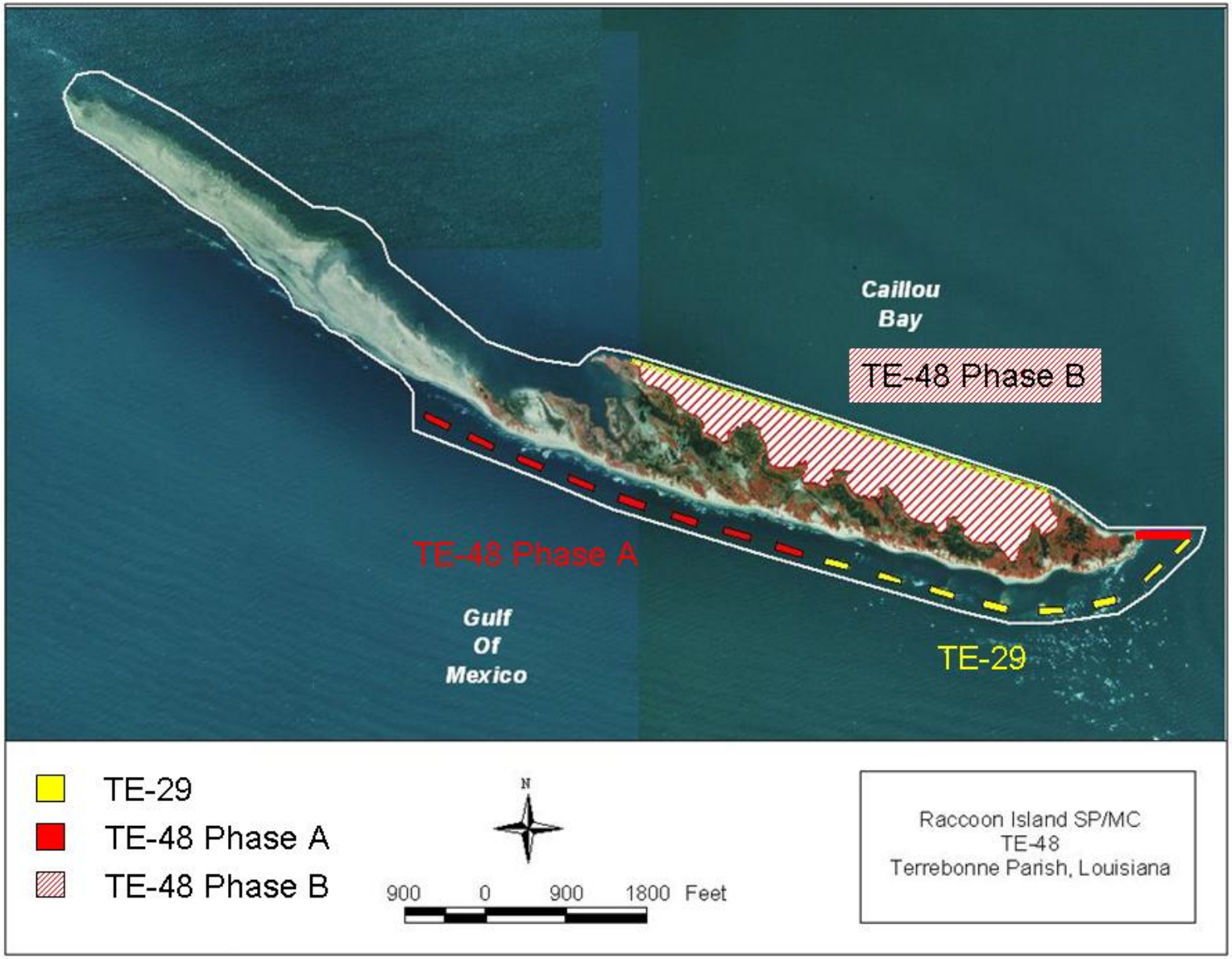


Figure 3. Project phases map.



1.5 Scoping of Project

On April 20, 2005, an initial meeting was held in Houma, LA with representatives from NRCS, Louisiana Department of Natural Resources (LDNR), and Louisiana Department of Wildlife and Fisheries (LDWF) along with representatives from SJB Group, Inc. and Coastal Engineering Consultants (CEC) to discuss the proposed features for the Phase B Marsh Creation portion of the Raccoon Island Shore Protection and Marsh Creation Project (TE-48). Several suggestions for the proposed features for Phase B were discussed in concept; however, it was agreed that a final decision on which features would be included could be not made prior to site visits and until pending geotechnical analysis were completed.

On the following day, April 21, 2005, a field visit to the site allowed participants to view the project site and make suggestions based upon various areas of expertise on potential project features. The features that were discussed included an interior berm separating existing marsh from the newly created marsh to allow for tidal exchange to continue to the existing bay-side marshes, an exterior berm to contain the dredged marsh platform material, the dredged marsh platform created from offshore dredged material, a tidal shoal connected to the exterior berm to act as a wave run-up to dissipate waves before reaching the exterior berm, and several tidal bayous to maintain tidal exchange to existing and created marsh. Considerable discussion took place on what elevations to target in construction, and it was concluded that, without the geotechnical information on proposed borrow areas, target elevations could not be determined. Nevertheless, it was agreed upon that, depending on material availability, the project would target a certain percentage of supratidal habitat (2 to 5 ft, NAVD) and bay intertidal (0 to 2 ft). It was expected that achieving heights greater than 5 ft NAVD, which is classified as dune, would be unlikely; however, in the event that the geotechnical analysis indicated that the material was available to achieve dune height, then the project would allow for dune habitat creation.

A second general planning meeting was held in Baton Rouge, LA on May 17, 2006 with representatives of NRCS, LDNR, and LDWF. Preliminary data on geotechnical survey was available and various design considerations were reviewed. As expected, geotechnical analysis indicated that the material available would be relatively low in sand content, indicating a lack of ability to stack material and create higher elevations. The design specifications were adjusted accordingly and were limited to supratidal and bay intertidal (0-5 ft, NAVD) habitat. Additional scoping for the potential impacts of using an offshore borrow area was completed over multiple teleconferences with MMS throughout early 2008.

The 30% CWPPRA Task Force design review meeting for Phase B was held on October 24, 2007, and the 95% CWPPRA Task Force design review meeting was held on December 19, 2007. The project was considered for construction funding recommendation on January 16, 2008 by the Technical Committee and was approved on February 13, 2008 by the CWPPRA Task Force.

1.6 Authority

Federal funds to be used for planning and implementing projects, which create, protect, restore, and enhance wetlands in coastal Louisiana, are provided by CWPPRA as specified by 28 November, 1990, House Document 646 101st Congress. The Act calls for formation of the Louisiana Coastal Wetlands Conservation and Restoration Task Force (Task Force) to consist of the Secretary of the Army, the Administrator of the Environmental Protection Agency (EPA), the Governor of Louisiana, the Secretary of Interior, the Secretary of Agriculture, and the Secretary

of Commerce. This project is authorized under CWPPRA (16 U.S.C. §777c, 3951-3956), which stipulates that five Federal agencies and the State of Louisiana jointly develop and implement a plan to reduce the loss of coastal wetlands in Louisiana (16 U.S.C. §3952 (b) (2)). As Federal sponsor for the implementation of the Raccoon Island Shoreline Protection/Marsh Creation Project (TE-48), NRCS is responsible for NEPA compliance. LDNR is the non-Federal local project sponsor. The MMS is a Federal cooperating agency. Other participating Federal agencies include the U.S. Army Corps of Engineers (COE); the U.S. Fish and Wildlife Service (USFWS), Department of the Interior; National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration, Department of Commerce; and the U.S. Environmental Protection Agency (EPA).

The Raccoon Island Shore Protection/Marsh Creation Project (TE-48) was approved for planning, engineering, design, and pre-construction monitoring on the Eleventh Priority Project List submitted to Congress in April 2002. Once planning, engineering, and design are substantially complete, the Phase B portion of the project will be submitted to the Task Force for the funding of construction, maintenance, rehabilitation, and post-construction monitoring. Under CWPPRA guidelines the Federal sponsor provides 85% of the project cost and LDNR contributes the remaining 15%. A cooperative agreement between LDNR and NRCS documents cost sharing details. The total fully funded cost of Phase B of the TE-48 Project is estimated at $10,204,827.

The proposed project intends to involve the use of sediment resources located on the Outer Continental Shelf (OCS). The United States Government, and specifically, MMS, a bureau in the U. S. Department of the Interior, has jurisdiction over all mineral resources on the Federal OCS. Public Law 103-426, enacted October 31, 1994, gave MMS the authority to convey, on a noncompetitive basis, the rights to OCS sand, gravel, or shell resources for shore protection, beach or wetlands restoration projects, or for use in construction projects funded in whole or part or authorized by the Federal government. Those resources fall under the purview of the Secretary of the Interior who oversees the use of OCS sand and gravel resources, and MMS as the agency charged with this oversight by the Secretary. After an evaluation required by NEPA, MMS may issue non-competitive negotiated agreements for the use of OCS sand to the requesting agencies. Accordingly, this EA, prepared in cooperation with MMS, examines (1) the physical, biological, and socioeconomic resources affected by dredging OCS material from the proposed borrow site and placement of the material on a barrier island, (2) the impact-producing factors caused by dredging or placement, and (3) the potential impacts from dredging or placement on the affected environmental resources.

2.0 ALTERNATIVES FORMULATION, DESCRIPTION, AND COMPARISON

2.1 Formulation of Alternatives

Three alternatives for Phase B of the Raccoon Island Shoreline Protection / Marsh Creation Project are considered: (1) no action, (2) marsh creation using an OCS borrow area, and (3) marsh creation using an alternative borrow area or upland source. The alternatives are summarized below; the 30% and 95% Design Reports present the construction alternative in more detail.

2.2 Description of Alternatives

2.2.1 Alternative 1: No Action

This alternative consists of no additional treatment for the project area. Consequently, no new habitat would be created, and existing inter-tidal and supra-tidal marsh habitat would continue to be lost at a rate of approximately 15-20 acres per year. Reduction in back-barrier marsh and barrier island width could enhance the potential for breaching along the narrow barrier island.

The no-action alternative assumes that the NRCS and MMS will not enter into a negotiated agreement for access to OCS sediment in the vicinity of Ship Shoal. Although this alternative eliminates any potential impacts to the marine and coastal environments, it also eliminates the positive benefits of the habitat restoration project and further jeopardizes the sustainability of Raccoon Island.

2.2.2 Alternative 2: Marsh Creation using an Outer Continental Shelf borrow area (Preferred Alternative)

Phase B will include all measures in regards to the bayside marsh creation portion of the project described as the preferred alternative in the 2005 Final Project Plan and EA (Figure 2; Figure 4). Phase B involves creating approximately 68 acres of additional barrier island habitat on the bayside area as a northward extension of the current island. Approximately 54 acres of intertidal marsh will be created using dredge material and an additional 14 acres of supratidal area will be created with the containment dikes. Three acres of the supratidal area directly adjacent to the bayside island shoreline will be constructed at dune elevation (+5 ft NAVD 88). Structural features include building a containment dike between two peninsulas on the bayside of the island to enclose a large open water cove area, then backfilling the area with hydraulically dredged material (Figure 5). Non-structural features involve planting the newly created dune and supratidal areas with woody and herbaceous plant species to compliment existing island habitat.

Two containment dikes will be constructed to encircle the marsh creation area (Figure 4). These dikes will be designated as island side and bayside containment dikes and will extend for approximately 11,000 ft. These structures will be built to an elevation of 5.0 ft (1.5 m) NAVD 88, have a 20 ft (6.1 m) crown, and a 5H:1V slope on each side. The containment dikes will be constructed using approximately 100,000 yd^3 of sediments bucket dredged from the marsh creation area. The borrow area for the containment dikes will be dredged to a depth not to exceed -13 ft (-4.0 m), and will be located approximately 25 ft (7.6 m) from the toe of the earthen structures. These borrow areas will be filled in during the marsh creation phase. After the marsh creation area has consolidated, the bayside containment dike will be lowered to the marsh elevation [2.5 ft (0.8 m) NAVD 88] in four locations to provide tidal exchange. The gaps will be 10 ft (3.0m) wide and will be spaced on 1000 ft (305 m) intervals

Once construction of the containment dikes are complete, marsh creation activities will be initiated by dredging sediments from an offshore borrow area south of Raccoon Island. The proposed action includes taking approximately 830,000 yd^3 of OCS sediment using either a cutterhead suction dredge or trailing suction hopper dredge, transporting dredge material to the barrier island, and placing it on the backside to create marsh. The proposed borrow area for Phase B is an elongated polygon, in -22 – 26 ft of water, located on Ship Shoal Blocks 64 and 71 (Figure 2). The final depth of cut is expected to be on the order of 10 to 20 feet. It is anticipated

Figure 4. Site location map.

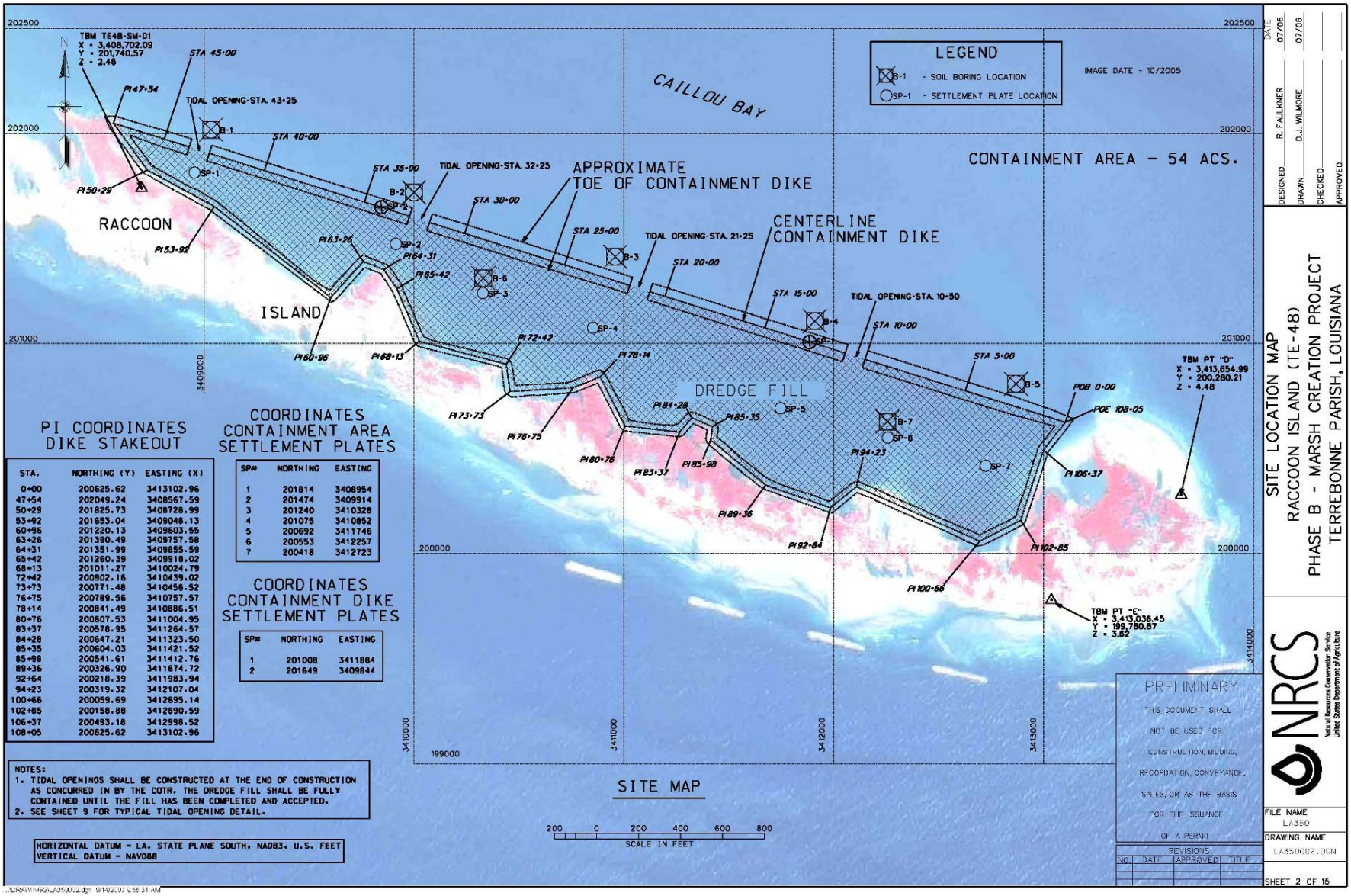
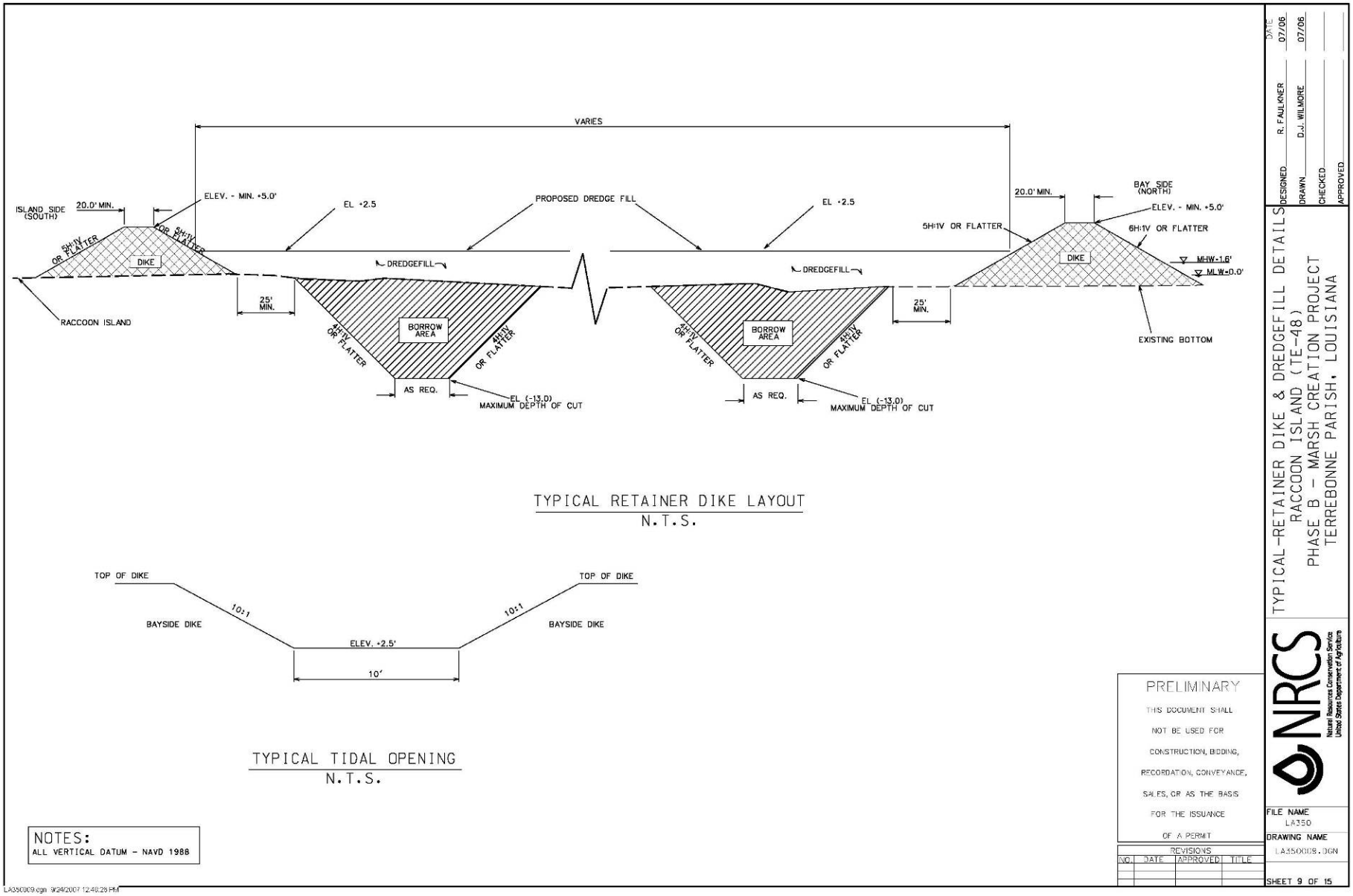


Figure 5. Typical retainer dike and dredgefill details.



for the volume requirement that dredging may last for 120 days, but the duration is contingent on weather windows and any equipment breakdown.

While a cutterhead suction dredge is the preferred method of dredging, it is possible that either a cutterhead or hopper dredge could be used. A cutter-suction dredge uses a rotating cutterhead around the intake of a suction pipe to break up or loosen bottom material. The dredge digs material from the bottom by swinging the cutterhead back and forth across an arc of 150 to 300 feet. Winches on the bow of the dredge pull the cutterhead back and forth and advance it ahead in the cut in 4- to 6-foot steps. The cutter-suction dredge is typically anchored in position by a three-wire anchoring arrangement or by spuds; the position is changed as the dredge finishes removing all the material it can reach. A large centrifugal pump removes the loosened material from the ocean bottom and pumps it as a sediment-water slurry through a discharge pipeline to the placement site. But in cases where the distance from the dredge location to the placement site is beyond a few miles, the slurry is often pumped into scows for transport to the placement site. The dredge plant is supported by one or more small work boats used for surveying, line handling, anchor placement, and transporting workers. In the case of a barge-based project, the operation would include one or two tugboats and one or two barges.

A hopper dredge digs material from the bottom by making passes over the site, typically moving at 1 to 2 knots while dredging. The hopper dredge is equipped with dragarms, dragheads, and a hopper which collects and decants slurried sediment. In the case of a twin-arm dredge, the material is dug in two swaths that are each the width of the draghead (typically 6-8 ft wide). To get a full load, a typical hopper dredge may make two or three passes along the borrow area. The dragheads have teeth, house the pumping system and pressure jets to loosen the material being dredged, and are fitted with turtle deflectors. When the hopper is full, material is transported to a pump out buoy located offshore transiting at speeds between 10-15 knots. The material is pumped through a discharge pipeline, which runs along the ocean floor, and up onto the beach where bulldozers and graders distribute the material along the subaerial beach and foreshore. The project schedule would require either two medium-size hopper dredges (4,000-5,000 yd^3 capacity) delivering a total of six loads per day, or one large hopper dredge (9,000 to 12,000 yd^3) delivering two or three loads per day. The number of daily trips depends on loading times, mechanical efficiency of the dredging plant, and sea state conditions.

The sediments dredged from the offshore borrow area will be hydraulically pumped into the marsh creation area. The dredge will work continually, except for downtime which may be due to weather conditions or equipment breakdown. It is estimated that the dredge will be working 75% of the time. Open water areas and containment-dike borrow pits will be filled to a maximum elevation of 2.5 ft (0.8 m) NAVD 88 to create new marsh. Approximately 830,000 yd^3 of dredged material will be used to create 54 acres (21.9 ha) of intertidal habitat. The design includes a 4,800 ft long and 150 to 700 ft wide marsh platform. Following five years of consolidation, the disposal area is anticipated to have an average elevation of 1.6 ft (0.5 m) NAVD 88.

To stabilize the marsh creation and containment dike areas and increase emergent and woody vegetation cover, native herbaceous and woody wetland plants will be planted. Herbaceous species will be planted using vegetative plugs or 4 in. containers, while woody species will utilize trade-gallon-sized containers. Species selected will be based on soil conditions, elevation, and hydrology. Plantings will begin as soon as the dredged sediments have consolidated and will be conducted in 2 or 3 phases spanning 2 or 3 years.

2.2.3 Alternative 3: Marsh Creation using alternative borrow area or source (Considered, but eliminated)

NEPA requires the consideration of less damaging alternatives, unless those alternatives can be excluded for environmental and project management concerns. The material needed for marsh creation does not need to be beach-quality sand and may contain a relatively substantial fraction of finer-grained material. As a result, dredging suitable material in state waters, including nearshore and backbay areas, or transporting from upland sources, should be considered.

A search for closer, suitable material was conducted via a literature review, geophysical survey, and geotechnical investigation within a 5 mile perimeter of the proposed project area. No other potential borrow areas, with the exception of another buried channel adjacent to the preferred borrow area on the OCS, were determined to be suitable because of potential conflicts with shallow water access, subsurface utilities, and sediment sources essential to littoral or cross-shore supply (i.e., within depth-of-closure), as well as potentially more severe impacts to water quality, sensitive fish habitat, and rare biological resources (LDNR, personal communication; USDA, Joint Permit Application For Work Within the Louisiana Coastal Zone, submitted to the U.S. Army Corps of Engineers, New Orleans District, 12/21/07). Alternative 3 was eliminated from further consideration.

3.0 SIGNIFICANT RESOURCES IN AFFECTED ENVIRONMENT

3.1 Physical Resources

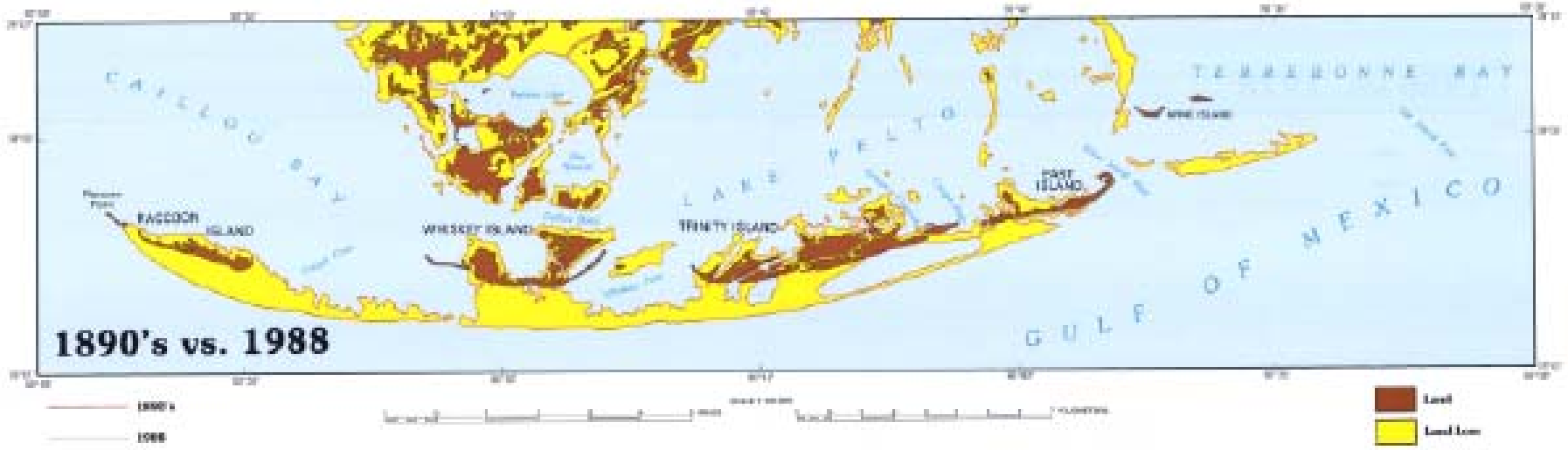
3.1.1 Climate and Meteorology

The climate in southern Louisiana is influenced by its subtropical latitude and its proximity to the Gulf of Mexico. The project area is characterized by long, hot, humid summers with areas adjacent to the coast frequently cooled by sea breezes. The average daily maximum temperature is 78.4^{o}F, and the average daily minimum temperature is 58.8^{o}F. The winters are generally mild with only a few cold days. The average frost-free period of 264 days extends from February 22 to November 18. Average rainfall is 62 inches. Even though the rainfall is fairly evenly distributed throughout the year, it is heaviest from June through September.

The meteorologic conditions of the project area are discussed in detail in Section 3.1.1 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004) and are incorporated by reference. Prevailing winds during the summer are southerly and produce conditions favorable to thunderstorms. During winter months, the area is subjected alternately to the southerly flow of warm tropical air and the northerly flow of cold continental air. The resulting frontal movements lead to sudden drops in temperature and pressure, which often cause rapid changes in wind speed and water level (Georgiou et al., 2005).

The Louisiana coast is affected by relatively infrequent tropical and extra-tropical storms. Sixty percent of tropical storms make landfall along coastal Louisiana in August and September, whereas 80% of hurricane landfalls occur during the same period (Stone et al., 1997). Recent storms, including Hurricanes Katrina, Rita, Gustav and Ike, contributed to widespread flooding and erosion, as well as localized barrier overwash and breaching of the barrier island (Barras, 2007). Extra-tropical storms occur with relatively more frequency (i.e., 20-30 times per year) and can be extremely important for hydrodynamic and sediment transport processes (Kobashi et al.,

Figure 6. Land Loss 1890's vs. 1988.



2007). Cold-fronts move west to east with a typical duration of 12 to 24 hours and are characterized by strong winds, large waves, and low water levels (Georgiou et al., 2005). During the spring flood season, the strong northwesterly and southwesterly winds of cold-fronts steer the Atchafalaya River buoyant plume east towards Ship Shoal (Walker and Hammock, 2000).

3.1.2 Coastal Geology and Geomorphology

The Isles Dernieres barrier system forms the seaward geologic framework of the southwestern Terrebonne basin in Terrebonne Parish (Williams et al., 1992). The barrier island arc consists of four main islands: Raccoon Island, Whiskey Island, Trinity Island, and East Island (Figure 6). The Isles Dernieres extend more than 20 miles and enclose Caillou Bay, Lake Pelto, and Terrebonne Bay, which are connected to the Gulf of Mexico by Boca Caillou, Coupe Colin, Whiskey Pass. Coupe Carmen, Coupe Juan, Wine Island Pass, and Cat Island Pass.

The Isles Dernieres barrier system originated from the erosion of the Bayou Petit Caillou headland distributaries and beach ridges over the last 600-800 years (Penland et al., 1985; Penland et al., 1987). Raccoon Island, located on the western end of the Isles Dernieres barrier system, is a remnant of the transgressive barrier island arc of the Lafourche subdelta complex. The substrate is composed of Holocene deltaic sediments that overlie Pleistocene deposits at depths of approximately 400 feet. Compaction of these Holocene sediments, combined with structural movements related to geosynclinal settling, faulting, and fluid extraction, results in high rates of subsidence.

Coastal changes in the Caillou headland observed between 1853 and 1978 illustrate the transition from an erosional headland into a barrier island arc. In 1853, Pelto and Big Pelto bays separated the Caillou headland and the flanking barriers from the mainland by a narrow tidal channel less than 500 m wide. By 1978, the size of these bays had increased three-fold, and they had coalesced to form Lake Pelto. During this period, the Gulf shoreline of the Caillou headland eroded landward over 1 km. The 1890's vs. 1988 map produced by Williams et al. (1992) illustrates land loss along the Isles Dernieres (Figure 3).

The Isles Dernieres now lie several kilometers seaward of the retreating mainland (Williams et al., 1992). Long-term shoreline change between 1887 and 2002 was -27.4 ft/yr, whereas more recent data (1988 to 2002) show rates have accelerated to -60.5 ft/yr (Penland et al., 2005). The movement of sediment inland and westward continues today with coarser sandy material deposits forming the gulfside beaches and the overwashing muddy sediments depositing on the lee side of the island that form a platform for marshes and scrub-shrub habitat. Detailed analysis of sediment transport dynamics as it relates to the island's formation, development, and management are provided in Stone et al. (2003) and Thomson et al. (2004).

Williams et al. (1995) reported that the Louisiana barrier shoreline is dominated by two types of island evolution: landward rollover and in-place breakup. Landward rollover is dominated by washover processes capable of eroding and transporting sediment from the gulf shoreline across the barrier island, and depositing this sediment along the bay shoreline; both the gulf and bay shorelines migrate landward. When in-place breakup occurs, sediment is not transported across the entire barrier because there is an inadequate sediment supply and/or the barrier island is too wide to be completely overwashed. Seaward migration along the bayside shoreline occurs in response to wave activity (erosion) and subsidence. This type of evolution is associated with barrier island systems that are rapidly deteriorating and have short life expectancies (Raccoon Island is considered part of this group). Williams et al. (1995) concluded that systems, such as Isles Dernieres and particularly Raccoon Island, where in-place breakup occurs are the most critical areas of barrier island land loss and need the greatest attention. Consequently, the Isles

Dernieres barrier island chain has been documented to be one of the most rapidly deteriorating barrier shorelines in the United States (Williams et al., 1992; McBride and Byrnes, 1997).

Historically, most of Louisiana's barrier island shorelines have been in a chronic stage of deterioration resulting from the complex interaction of natural and human influences. As the fragmented islands have become smaller and less geologically stable, the effects of storms have increasingly become more devastating and threaten complete loss of smaller islands like Raccoon Island. Hurricane Andrew in 1992 resulted in the loss of nearly half of the island area. In fact, the devastation of Hurricane Andrew on Raccoon Island is what necessitated the beginning of human intervention in order to sustain what remains of the island today.

In 1995, the State of Louisiana proposed the implementation of a near-term strategy for large-scale restoration of its barrier islands (van Heerden and DeRouen, 1997). As part of the comprehensive barrier island restoration plan, the Raccoon Island Breakwaters Demonstration Project (TE-29) was initiated to demonstrate the effectiveness of segmented breakwaters in mitigating shoreline erosion along the Louisiana barrier islands, and to evaluate the potential role of breakwaters in future barrier island protection and restoration efforts. Data collected through July 1998 indicate that the segmented breakwaters on Raccoon Island have attenuated wave energy and significantly reduced the rate of shoreline retreat (Armbruster, 1999). A substantial amount of sand accumulation, ranging from 40 to over 70 m^3/m, was measured in the immediate vicinity of the breakwater segments, as well as in the gaps between the breakwaters during the first 12 months after construction (Stone et al., 1998). Recent photo analysis by USGS indicates that the downstream impact from breakwater construction is not as severe as other studies have indicated (Handley et al., 2005).

In September 2002, Tropical Storm Isadore, and one (1) week later in October 2002, Hurricane Lily caused moderate damage to the island. A considerable amount of accreted sand material both seaward and landward of the breakwaters was lost. In comparison to other barrier islands along the Isle Dernieres and Timbalier chain, aerial photography indicates Raccoon Island sustained the least amount of damage mainly due to the protection afforded by the breakwaters (Linscombe, 2002). In addition, the breakwaters provide the potential for a short term recovery process whereas the recovery of resources for other barrier islands are either human-dependent, long term, or perpetually lost.

With the most recent hurricane events, Hurricanes Katrina and Rita in 2005 and Hurricanes Gustav and Ike in 2008, the island area protected by the breakwaters continues to recover and maintain its areal extent and position. While these events battered the island and temporarily resulted in sand material deficits, new material tends to begin to be redeposited immediately after each event resulting in accumulations similar to pre-storm levels within several months. Consequently, the island south shoreface, which had been retreating at a rate greater than 50 ft per year has been halted and the only remaining erosional shoreface has been on the northside, but at a lower rate (3-7 ft per year).

3.1.3 Geology and Geomorphology of Borrow Area

Sediments offshore in the vicinity of the proposed borrow area are Holocene in age and deltaic in origin related to the formation and demise of the Lafourche delta complex (Kulp et al., 2005). New geophysical and geotechnical data were collected offshore Raccoon Island to evaluate buried channels known to exist from legacy geophysical data (Suter et al., 1991). The geophysical survey identified multiple buried channels. The primary distributary channel was between 15 and 25 ft thick and 500 and 750 feet in width and was selected as the preferred area for borrow material for the proposed project (Figure 2).

The SJB Group/CEC (SJB/CEC 2006) geotechnical report evaluated the sediment characteristics of material preserved in the buried channel. Sediments recovered in vibracores ranged from highly cohesive clay to coarse silt/very fine sand. Further geotechnical investigation within the primary channel showed that the top ten feet of the cores had an average grain size of 0.11 mm; the average percent coarse fraction retained above the No. 200 sieve (very fine sand) was 24.6%. A ten foot cut was recommended as the primary cut in the reach where the coarsest material was present. A secondary cut was recommended from ten to twenty feet along the same channel footprint. The material generally coarsened to the north. The preferred borrow area was extended towards the north outside of the area of ground-truthing, given sub-bottom profiles that showed seismic signatures similar to suitable areas to the south and proven with vibracore data.

The overall proposed borrow area is 8,850 feet long with a maximum cut depth of 20 feet (with a five-foot overdredge tolerance) and a width varying from 440 to 890 feet. The overall texture of the sediment in the borrow area was mixed sediment with minor sand fractions. A cut to fill ratio of 1.6 was recommended. The cut volume in the primary cut was estimated to be approximately 830,000 cubic yards, and the total cut volume within the overall borrow area is estimated to be approximately 3,420,000 cubic yards.

3.1.4 Physical Oceanography and Processes

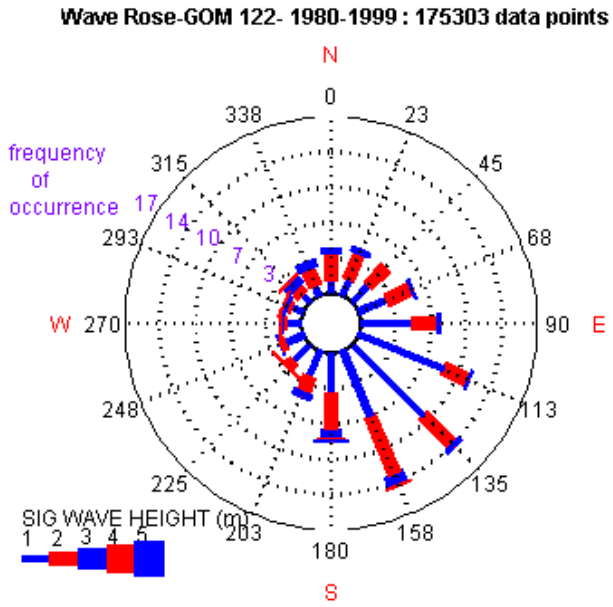
The physical processes acting on the shallow Louisiana inner shelf and coastal barrier islands are discussed in detail in Section 3.1.1 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004). A summary of relative sea level rise, circulation, tides, and waves are presented here.

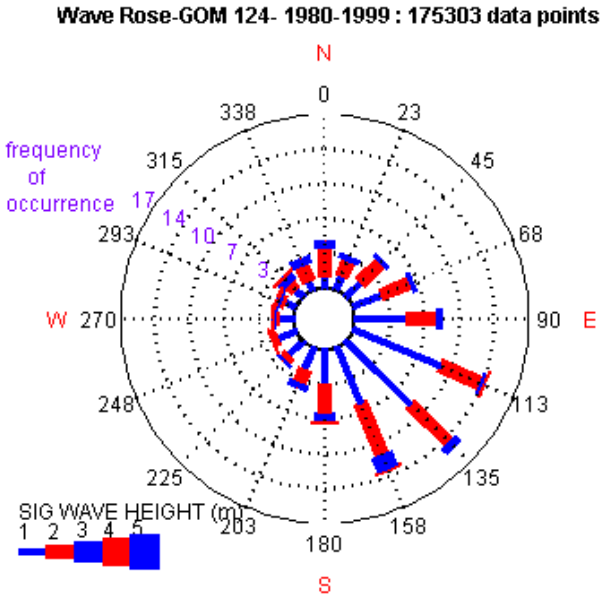
Relative sea level rise (RSLR), which includes subsidence and sea level rise, is an important contributing factor to wetland loss in the project area. Grand Isle, east of Raccoon Island, exhibits the largest rising trend among the U.S. coastal tidal stations with a relative sea level rise value of 9.85 mm/year (0.39 inches/year) (Zervas, 2001). This estimated value is very similar to Penland and Ramsey estimates (1990), which concluded that relative sea level is rising at a rate of 1.03 cm per year (0.4 inches/year). During the 20-year project life, the relative sea level rise is projected to be on the order of 0.68 ft.

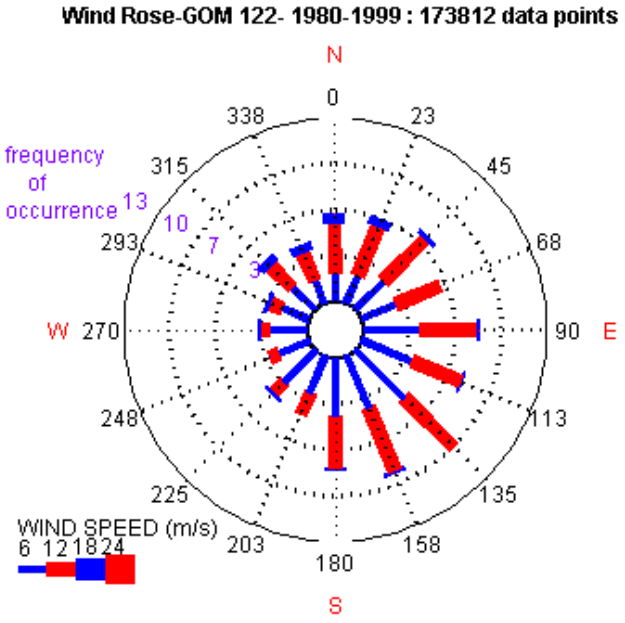
Currents in the open Gulf waters of coastal Louisiana are relatively small (0.3 to 0.5 ft/sec). The dominant force driving currents is the prevailing wind, given the fact that waves and tidal flow is generally low (Murray, 1997). During most of the year, the wind blows from the southeast directing coastal currents westward. Buoyant plumes of the Mississippi and Atchafalaya Rivers, are also strongly affected by directional winds and can affect the hydrodynamics of the project area (Walker and Hammack, 2000; Kobashi et al., 2007). Tides are strongly diurnal, varying from a low of 15 cm (0.5 ft) during equatorial tidal conditions to a high of 97 cm (3.2 ft) during tropic tides (Georgiou et al., 2005). Tidal currents can reach speeds of approximately 50 cm/s at barrier island inlets. In the absence of wind, barotropic and baroclinic effects are important to coastal circulation, when currents reach magnitudes of approximately 10-15 cm/s (Georgiou et al., 2005).

Wave Information Studies (WIS) data from stations 122 and 124 were used to characterize incident waves. The wave and wind rose diagrams for a twenty year period (January 1980 to December 1999) indicate that the dominant wave and wind direction are from the southeast (Figure 7). Table 1 and 2 below list the average wave and wind conditions for the three dominant wave conditions at WIS-122 and WIS-124. The most severe wave conditions are typically from the south / southeast.

Figure 7. Wave and wind roses for WIS-122 and WIS-124 based on hourly hindcasts during period 1980 - 1999.







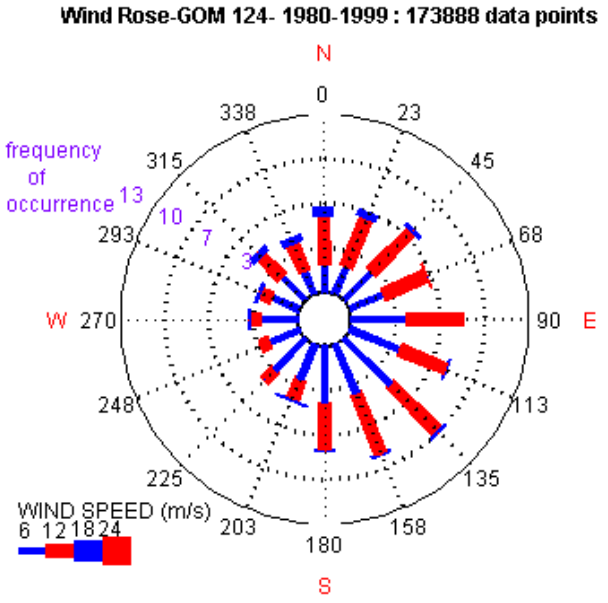


Table 1. Average wave heights and periods.

#	Wave Direction (DEG)	WIS-122		WIS-124		Average	
		Wave Height (m)	Wave Period (s)	Wave Height (m)	Wave Period (s)	Wave Height (m)	Wave Period (s)
1	135	0.9	4.4	1.0	4.6	0.95	4.5
2	157.5	1.1	4.8	1.2	5.0	1.15	4.9
3	112.5	0.8	4.2	0.9	4.4	0.85	4.3

Table 2. Average wind speeds.

#	Wind Direction (DEG)	WIS-122	WIS-124	Average
		Wind Speed (m/s)	Wind Speed (m/s)	Wind Speed (m/s)
1	135	5.4	5.5	5.45
2	157.5	6.3	6.5	6.4
3	112.5	5.4	5.4	5.4

Longshore sediment transport along the Isles Dierners is complex given the fragmented nature of the barrier islands and tidal inlets; however, it generally moves sediment west at a magnitude of approximately 45,000 $yd^3\ y^{-1}$ (Stone and Zhang, 2001). The magnitude varies with changes in the wave height, breaking wave angle, and wave setup coupled to overprinted circulation and cross-shore transport. The recent accumulation of sand in the lee of the breakwaters at the eastern end of Raccoon Island indicates that onshore sediment transport may be another important phenomenon (Stone et al., 2003). Bottom boundary layer measurements made in the vicinity of Ship Shoal also indicate net onshore transport during weather and storm conditions (Georgiou et al., 2005).

Storm surge is the abnormal rise in sea level during a hurricane or other intense storm. The maximum measured water level at Grand Isle between 1978 and 2004 is approximately +5 ft NAVD88 (during Hurricane Juan on October 27, 1985). Note that the 1978 to 2004 period includes a number of other significant storms (e.g., Bonnie-1986, Andrew-1992, Opal-1995). During the 2005 Hurricane season, the maximum measured water level recorded prior to 2004 was exceeded twice. During Hurricane Katrina the maximum recorded water level was +6.24 ft NAVD88. Note that the station was located on the weak (west) side of the storm, and significantly higher water levels were recorded on the east side of the storm track. In September 2005, the maximum water level at Grand Isle recorded during Hurricane Rita was +5.2 ft NAVD88. However, the most destructive hurricanes to hit southwest coastal Louisiana occurred prior to the period of available data (e.g. Camille-1969). The surge caused by these storms (approximately 12 to 17 ft along southwest Louisiana) was not part of the measured record at Grand Isle.

3.1.5 Soil Distribution and Types

The soils found in the project area have been recently mapped as Felicity and Scatlake soils. Felicity soil formed in the sandy beach rim/dune complex along the Gulf of Mexico shoreline. The Scatlake soil formed on the level lee side of the island in remnant intratidal deltaic marsh sediment consisting of clay and muck, with washover of sand and loam. Both soils formed in a saline environment.

Felicity loamy fine sand, 1 to 3 percent slopes, frequently flooded (FCA): This level to gently sloping, somewhat poorly drained, very rapidly permeable soil is located on the convex beaches along the Gulf shoreline. The soil is frequently flooded by high tides and storm surges.

Washover causes the soil to be subject to scouring and deposition of sediment. Typically the surface layer is grayish brown, loamy fine sand about nine inches thick. The underlying material to a depth of 60 inches is a dark grayish brown, very dark gray or olive gray, loamy sand.

Scatlake muck, tidal (SCA): This level, very poorly drained, very fluid mineral soil is in saline coastal marshes. The surface layer is dark gray muck. The underlying layer, to a depth of 75 inches, ranges from dark gray muck to a gray, very fluid clay. The soil is inundated daily by saline tidal water. Typically the surface layer is a dark gray, very fluid muck about eight (8) inches thick. Some areas are overlain by sandy and loamy sediment due to tidal washover. Tidal channels dissect many areas.

3.1.6 Water Quality

There are no freshwater surface waters on Raccoon Island. Caillou Bay surrounds the island on the backside, and the Gulf of Mexico interfaces with the beach on the front side and crosses into Caillou Bay where the island is breached. Due to the proximity of the Gulf of Mexico, salinities in the area are relatively high. Coastal waters are turbid due to the suspended sediments from the Mississippi and Atchafalaya River discharge and from coastal erosion. The water quality in Barataria-Terrebonne Estuary was rated fair (USEPA, 2007).

Section 305(b) of the Louisiana Department of Environmental Quality's (LDEQ) 2002 Water Quality Inventory report lists Caillou Bay (water body segment number – LA 120801-00) as an estuary that fully supports primary contact recreation, secondary contact recreation, and oyster production. The estuary is listed as not fully supporting fish and wildlife propagation. The suspected cause of impairment is turbidity with the natural conditions being listed as the suspected source. The Environmental Protection Agency (EPA) Consolidated Assessment and Listing Methodology (CALM) has placed this system into the 4c category. This rating is described as a waterbody which is impaired for one or more uses, but a pollutant does not cause the impairment. Even following Hurricanes Katrina and Rita, which caused extensive flooding and damage to industrial and municipal waste facilities, very few toxics were detected and water quality was not significantly degraded in estuarine or coastal waters (USEPA, 2006).

A discussion of the water properties and quality of OCS open-ocean waters is presented in Section 3.1.3 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004) and incorporated by reference. River discharge introduces low concentrations of contaminants and high concentrations of nutrients and sediments to the inner shelf. The shallow Gulf of Mexico experiences episodic and/or prolonged periods of hypoxia and anoxia due to high levels of primary production coinciding with periods of stratification. Hypoxia and anoxia are frequent occurrences in the Northwestern and Central Gulf of Mexico (Texas to Alabama) and shallow bay systems of the entire Gulf of Mexico (e.g., Diaz and Rosenberg, 1995; Ritter and Montagna, 1999; Rabalais et al., 2002). Coastal hypoxic and anoxic bottom zones generally appear in the summer when high discharge from the Atchafalaya and Mississippi Rivers, high atmospheric temperatures, and low wind stress enhance water column stratification. Hypoxia on the Louisiana shelf has been reported as early as February and as late in the year as October (Rabalais et al., 2002). Size and relative depth of the hypoxic area off the Louisiana shelf is strongly correlated with riverine discharge: years of higher discharge tend to have the largest volume of hypoxic waters (Rabalais et al., 2002). In August 2007, the zone measured 20,500 km^2 (7,900 mi^2), the third largest measured area since monitoring began in 1985 (LUMCON, 2007). Hydrocarbons are introduced into the Gulf of Mexico from natural seeps and anthropogenic shore-based and offshore sources, including produced water.

3.1.7 Air Quality

Air quality depends on multiple variables including the location and quantity of emissions, dispersion rates, distances from receptors, and local meteorology. Meteorological conditions, including precipitation and storms may confine, disperse, or distribute air pollutants in a variety of ways. No significant point sources of air-borne pollutants occur in the vicinity of Raccoon Island, so local air quality is generally good. Terrebonne Parish meets all national ambient air quality standards as an attainment area for criteria pollutants. As required by LAC 33:111.1405B of the Louisiana Department of Environmental Quality air regulations, an inventory and applicability determination was made for current conditions and for the separate subaerial components of the proposed project. The applicability determination was based upon direct emissions estimates. Indirect emissions were not considered, nor the potential emissions of dredge plants operating in the project area. It is assumed that if any indirect emissions would occur they would be negligible.

Air quality over OCS waters is discussed in detail in Section 3.1.2 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004) and that discussion is incorporated by reference. The Federal OCS waters attainment status is unclassified. The OCS areas are not classified because there is no provision for any classification in the Clean Air Act for waters outside of the boundaries of State waters. The area is presumed to meet National Ambient Air Quality Standards, and therefore, there is no requirement to prepare a general conformity determination.

3.2 Biological Resources

3.2.1 Beach and Intertidal Habitats

Beach habitat and intertidal habitats are discussed in detail in the Final EA and Project Plan for the Raccoon Island Shoreline Protection/Marsh Creation Project (USDA, NRCS, 2005). Beach habitat includes unvegetated areas adjacent to open water that are subject to direct wave action and infrequent storm surge. Gulf-facing and back-barrier beaches generally do not typically support vegetation. Beaches consist of sand, shell, organic matter, rock, or a mixture of sediment types (i.e., wrack). The beach may extend from the high-tide line to the upper extent of unvegetated washover sediments (Coastal Research Laboratory, 2000). Intertidal habitat is an indistinct shallow area, consisting of muddy sand, and does not support emergent vegetation.

3.2.2 Open-Water Habitats

Open-water habitat in the project areas includes the Gulf of Mexico to the south and Calliou Bay to the north. The back-barrier estuarine system is composed of several small inlets, sloughs, and small ponds intertwined throughout the saline marsh, all of which are tidal. This area is considered typical of Louisiana coastal estuaries, which are characterized by extensive marshes and open-water habitats representing a salinity continuum from fresh to saline. Shallow tidal sand flats, sandbars, and shallow bayside areas make up the periphery of the island edge. All of these components make for abundant saltwater fisheries in the project area and surrounding water bodies. Small tidal ponds are present on the interior of the eastern end of the Island. These small ponds are lined with black mangrove, which serve as primary nesting habitat for brown pelicans and other wetland bird species.

The pelagic offshore water-column biota contains: (1) primary producers - phytoplankton and bacteria, with 90 percent of the phytoplankton in the northern Gulf of Mexico constituted by diatoms; (2) secondary producers - zooplankton; and (3) higher tropic level consumers - larger marine species including fish, cephalopods, crustaceans, and marine mammals (USDOI, MMS, 2007). The zooplankton consists of holoplankton (organisms for which all life stages are spent in the water column—including protozoans, gelatinous zooplankton, copepods, chaetognaths, polychaetes, and euphausids) and meroplankton (mostly invertebrate and vertebrate organisms for which larval stages are spent in the water column)—including polychaetes, echinoderms, ctenophores, chordates, gastropods, bivalves, and fish larvae and eggs (O'Connell et al., 2005). Floating Sargassum in the Gulf can support more than 100 animal species (USDOI, MMS, 2007). Hydroids and copepods dominate the supported assemblage, which also includes fish, crabs, gastropods, polychaetes, bryozoans, anemones, and sea spiders. During their early years of life, sea turtles drift with the Sargassum and feed off their living organisms.

3.2.3 Benthic Habitats

Offshore benthic environments are discussed in detail in Section 3.2.2 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004) and are incorporated by reference. Inner shelf benthic habitat and faunal density and diversity are typically differentiated by sediment texture and water depth (Vittor & Associates, 1985; GMFMC, 2004; Brooks et al., 2006). The most typical bottom substrate in the Central Gulf of Mexico is soft muddy bottom, where polychaetes, mollusks, and crustaceans are the dominant macrobenthos (Baker et al., 1981; Baustian, 2005; Brooks et al., 2006; USDOI, MMS, 2007; Dubois et al, in preparation). Although seasonal and inter-annual variability is significant, spring is generally the peak season for spawning, abundance, biomass, and diversity (Brooks et al., 2006). Other variables affecting the distribution of benthic organisms include distance from shore, water column structure, illumination, food/prey availability, and intensity of currents and tides (USDOI, MMS, 2007).

Most commonly reported polychaetes in the Gulf of Mexico include *Prionospi cristata, Nephtys incise, N. picta, and Siphanes bombyx* (Brooks et al., 2006). *Ampelisca* is the predominant amphipod genera found in the Gulf, where as the bivalve, *Mulinia lateralis*, is the most commonly reported mollusk species (Brooks et al., 2006). However, Baustian (2005) reported that crustaceans, in particular oxygen-sensitive amphipods, are absent from muddy areas surrounding Ship Shoal in summer and autumn. Nematodes are the most common meiofauna and tend to prefer burrowing in the muddy matrix of the inner shelf (Radziejewska et al., 1996; Fleeger and Grippo, in preparation). Benthic habitats near the project area may also support bacteria and algae (Grippo et al., in preparation); abundances are controlled by scarcity of suitable substrates and limited light penetration. When turbidity is low, sedimentary microalgae, in the form of cyanobacteria and diatoms, may be present. A relatively larger fraction of benthic microalgae may be composed of settled phytoplankton (Rabalais et al., 2004). The benthic community supports higher levels of the food chain, such as shrimp, crabs, and demersal fish (Baker et al., 1981; USDOI, MMS, 2004).

The benthic fauna on the inner shelf and estuarine areas of the proposed project are stressed because of frequent perturbations by hypoxia, storms, and relatively high turbidity (Baker et al., 1981). The variable benthic environment causes the inner shelf macroinfaunal community to be dynamic and unstable, and to remain at immature levels of development (Barry Vittor & Associates, 2003). Correspondingly, most benthic invertebrates tend to be r-selected in that they are short-lived, have relatively high fecundity, and have rapid growth rates (Palmer et al., 2008).

3.2.4 Emergent and Submerged Aquatic Vegetation

Vegetation plays several critical roles in the stabilization and function of barrier islands. Plants colonize and protect newly deposited material from erosion and provide the physical structure necessary to trap and retain wind and water borne sediment that is essential for dune formation and vertical maintenance. Accumulating detrital material from decomposing plants contributes to soil nutrients and structure and forms the basic trophic level of the food chain. Vegetation also provides a diversity of habitat functions. The Raccoon Island plant communities furnish vital resting habitat to neotropical migratory birds during their transgulf migration and nesting areas for colonial waterbirds. Plant structures have also been found to support a vigorous epiphytic population of algae as well as a diverse population of diatoms (Stowe, 1982).

As previously discussed, Raccoon Island was once part of the continuous Isle Dernieres barrier island arc. Positioned in the interface between estuarine and marine processes, Raccoon Island is subject to the extremely dynamic environmental conditions that generate considerable spatial and temporal variation in barrier island structure and habitat. Changes in the species composition and distribution of plant communities are a reflection of the processes impacting Raccoon Island. The occurrence and arrangement of barrier island vegetation communities are associated with substrate elevation and the degree of exposure to tidal inundation and salt spray. Disturbances that change these conditions, and therefore affect the distribution and persistence of plant species, typically include overwash, erosion, or accretion associated with storm events, sediment deprivation, subsidence, and sea level rise.

Early accounts of Isle Dernieres depict it as a single wooded island fronted by a broad beach (Silas, 1890) and a "myrtle-shadowed village at the island's western tip" was described by Deutschman (1949). The presence of wooded areas and wax myrtle (*Morella cerifera*) certainly indicate that the area now called Raccoon Island was part of a relatively higher and wider, more stable barrier island system than at present. Wax myrtle typically grows in fresh conditions, but tolerates very low salinities and is not uncommon in barrier island and headland habitats, where sufficient protection is provided from salt spray and tidal events. Raccoon Island has experienced a tremendous amount of narrowing, loss of elevation, and fragmentation due to erosion and overwash events, as have all of the Louisiana barrier islands in the last century (McBride et al., 1992). Areas remaining on barrier islands with conditions suitable for wax myrtle are minimal. Presently, wax myrtle thicket (synonym of coastal dune shrub thicket), as classified by the Louisiana Natural Heritage Program (LNHP), is listed as a rare community because of its limited extent throughout Louisiana due to the relatively poorly-developed coastal dunes remaining in the state (Craig et al., 1987).

More recently, during a study initiated in 1994 (Visser and Sasser, 1998), six distinct vegetation communities were identified on Raccoon Island. These six communities generally occurring from the beach northward were dune, overwash, mangrove, salt flat, high marsh, and marsh. Of these, the dune community occurs at the highest elevation, and in this study was found to be sparsely vegetated with marshhay cordgrass (*Spartina patens*) as the dominate species, and yellow nut flat sedge (*Cyperus esculentus*), marshelder (*Iva frutescens*) or sea ox-eye (*Borrichia frutescens*) were the most frequent other species. Marshhay cordgrass is known to primarily occur in brackish to saline marshes, low dunes and along wet tidal shores. The overwash habitat was very sparsely vegetated by sea purslane (*Sesuvium portulacastrum*), seashore dropseed (*Sporobolus virginicus*), or saltwort (*Batis maritime*). The mangrove habitat was dominated by black mangrove (*Avicennia germinans*), and often had saltwort or smooth cordgrass (*Spartina alterniflora*) as co-dominants. The salt flat habitat transitioned from old overwash that had been colonized by a mixed community of saltwort, sea ox-eye, and woody glasswort (*Salicornia virginica*). Salt flat habitat graded into high marsh habitat dominated by smooth cordgrass with saltwort as a frequent co-dominant species. The marsh areas were dominated by smooth

cordgrass with no co-dominants. Wax myrtle was not included in the list of species found in this study.

The latest NRCS field investigations in 2004 revealed that black mangrove was the dominant species found in all evaluated sites that contained emergent vegetation. At more than half of the sites, black mangrove composed 80% or more of the plant community cover. Smooth cordgrass, marshhay cordgrass, and marshelder also occurred at all sites, but typically none composed more than 10% of the community cover. Other species that were listed composed less than 5% to trace amounts of the community and were sea purslane, salt grass (*Distichlis spicata*), saltwort, glasswort, sea ox-eye, seaside goldenrod (*Solidago sempervirons*), seaside heliotrope (*Heliotropum currasavicum*), and matrimony vine (*Lycium carolinianum*).

Smooth cordgrass typically grows in the brackish to saline intertidal pools, shallow lagoons, and saturated marsh areas flooded by high tides (Chabreck and Condrey, 1979; Godfrey and Wooten, 1979). The current overwhelming dominance of the plant community by species that occur at the lower elevations of emergent coastal habitats is indicative of Raccoon Island's reduction in height and increasing encroachment of gulf influences.

No submerged aquatic vegetation (SAV) was noted to occur during the 2004 NRCS investigation. Although the LNHP listed the bayside of the Isle Dernieres barrier islands as having the potential for marine aquatic beds and SAV (Craig et al., 1987), no record of recent occurrence is known.

3.2.5 Wildlife Resources

Barrier islands are recognized as supporting an abundance of fish and wildlife. The habitats found on Raccoon Island, in addition to its relative isolation, relatively low human disturbance, and lack of predators, provide for the greatest species diversity of nesting colonial waterbirds found on any barrier island in the state (Vermillion, 2003, personal communication).

3.2.5.1 Coastal Birds

Birds that use the project area can be divided functionally into swimmers, sea birds, waders, shore birds, birds of prey, and passerine birds. In addition to nesting, these avian species utilize the island for feeding and resting. An example is the endangered brown pelican of which the island currently supports the largest nesting colony in the state (Hess, 2003, personal communication). Also included, but not limited to, in this species diversity are colonial seabirds such as black skimmers (*Rynchops niger*), least terns (*Sterna antillarum*), sandwich terns (*Sterna sandvicensis*), wading birds such as great egrets (*Ardea alba*), reddish egrets (*Egretta rufescens*), glossy ibis (*Plegadis falcinellus*), and roseate spoonbills (*Ajaia ajaja*). Other non-nesting species, such as shorebirds, including the threatened piping plover (Charadrius melodus) and neotropical migrants, utilize the island during migration as a resting and feeding area. In addition to the endangered brown pelican and threatened piping plover, which are protected under the Endangered Species Act of 1973, colonial nesting waterbirds are protected under the Migratory Bird Treaty Act. Therefore, construction activities require coordination with LDWF, USFWS, LDNR and NRCS to minimize habitat disturbance. Although brown pelican populations have exhibited increasing trends over the last 10 to 20 years, populations of most other wildlife species such as seabirds, shorebirds, wading birds, and ducks have exhibited decreasing trends as the area is experiencing rapid erosion, leading to loss of habitat (LCWCRTF/WCRA, 1999).

Ducks are part of the swimmer functional group. Though most ducks prefer freshwater marshes and rarely use saline marsh, the marshes near the project area may provide habitat for the mottled duck (Anas fulvigula), the only duck that breeds in large numbers in the coastal marshes of Louisiana (Wicker et al., 1982). The most frequently encountered (and harvested) dabbling ducks are gadwall (*Anas strepera*), blue-winged teal (*A. discors*), and green-winged teal (*A. crecca*) (Wicker et al., 1982). Open water in brackish marsh is favored by the lesser scaup (*Aythya affinis*), the most commonly harvested diving duck in the area. Except for the mottled duck, all the game birds are migratory winter residents. Other ducks that occur in saline habitats and thus possibly could occur in the project area include: fulvous whistling-duck (*Dendrocygna bicolor*), American widgeon (*Anas americana*), ring-necked duck (*Aythya collaris*), bufflehead (*Bucephala albeola*), ruddy duck (*Oxyura jamaicensis*), American black duck (*Anas rubripes*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and northern shoveler (*Anas clypeata*). Other swimming birds that occur in saline habitats include: pied-billed grebe (*Podilymbus podiceps*), eared grebe (*Podiceps nigricollis*), snow goose (*Chen caerulescens*), and Canada goose (*Branta canadensis*) (American Ornithologists' Union 1983, as cited in Gosselink 1984).

Several wading birds occur in saline habitats and could occur in the project area. The clapper rail (*Rallus longirostris*) is a wading bird common in brackish and salt marsh. The yellow rail (*Coturnicops noveboracensis*), black rail (*Laterallus jamaicensis*), and Virginia rail (*Rallus limicola*) also occur in saline habitats. Other wading species include least bittern (*Ixobrychus exilis*), great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), little blue heron (Egretta caerules), tricolored heron (Egretta tricolor), reddish egret (*Egretta rufescens*), cattle egret (*Bubulcus ibis*), green-backed heron (*Butorides striatus*), black-crowned night-heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violaceus*), white ibis (*Eudocimus albus*), white-faced ibis (*Plegadis chihi*), and glossy ibis (*Plegadis falcinellus*) (American Ornithologists' Union 1983, as cited in Gosselink 1984). Shore birds are primarily winter visitors and occur on sand beaches and tidal mud flats in large numbers (Conner and Day, 1987). Shore birds likely to occur in the project area include black-bellied plover (*Pluvialis squatorola*), samipalmated plover (*Charadrius semipalmatus*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*Tringa flavipes*), solitary sandpiper (*Tringa solitaria*), willet (*Catoptrophorus semipalmatus*), spotted sandpiper (*Actitis macularia*), wimbrel (*Numenius phaeopus*), hudsonian godwit (*Limosa haemastica*), semipalmated sandpiper (*Calidris pusilla*), western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), Baird's sandpiper (*Calidris bairdii*), dunlin (*Calidris alpina*), stilt sandpiper (*Calidris himantopus*), short-billed dowitcher (*Limnodromus griseus*), long-billed dowitcher (*Limnodromus scolopaceus*), common snipe (*Gallinago gallinago*), and Wilson's phalarope (*Phalaropus tricolor*) (American Ornithologists' Union 1983, as cited in Gosselink 1984).

Birds of prey that occur in saline habitats and thus are likely to be present in the project area include northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), peregrine falcon (*Falco peregrinus*) and short-eared owl (*Asio flammeus*) (American Ornithologists' Union 1983, as cited in Gosselink 1984). Passerine birds that occur in saline habitats and thus are likely to occur in the project area include tree swallow (*Tachycineta bicolor*), bank swallow (*Riparia riparia*), cliff swallow (*Hirundo pyrrhonota*), barn swallow (*Hirundo rustica*), sedge wren (*Cistothorus platensis*), marsh wren (*Cistothorus palustris*), savannah sparrow (*Passerculus sandwichensis*), sharp-tailed sparrow (*Ammodramus caudacutus*), and seaside sparrow (*Ammodramus maritimus*) (American Ornithologists' Union 1983, as cited in Gosselink 1984).

The project area is located at the bottom of the Mississippi Flyway, and birds from central and northern North America start to converge in the fall. Shorebirds begin arriving in mid-July and peak in September. Waterfowl migration begins in mid-August, and populations peak in

December. Birds of prey and passerine birds also converge in Louisiana. Some stay all winter, but many stay only a few days before departing southward. The spring return of migrants starts in late February or early March and peaks in late April and early May. Most wading birds do not migrate from Louisiana (Conner and Day, 1987).

3.2.5.2 Mammal and Reptile Resources

Emergent marshes, remnant dunes, and marsh ponds in the project area provide habitat for other wildlife species including reptiles, amphibians, and mammals. These species numbers are very limited due to flooding and distance of the island from the mainland. The swamp rabbit is the only species of mammal harvested as game from the saline marshes typical of the project area (GEC, 2001). Fur-bearing mammals that may also occur in the project area include muskrat, nutria, mink, raccoon, and otter and non-game mammals that may occur in or near the project area include red fox, nine-banded armadillo, and marsh rice rat (GEC, 2001); however, as evidenced by the lack of predation on the avian nesting communities, it is unlikely that many of these species are present on Raccoon Island. Furthermore, recent hurricanes have inundated the island likely eradicating resident mammal populations. Reptiles and amphibians that could occur within the project area include treefrogs, bullfrogs, salamanders, newts, diamondback terrapins, six-lined racerunners, mole skinks, and island glass lizards (GEC, 2001).

The Atlantic bottlenose dolphin (*Tursiops truncatus*) is the only marine mammal commonly found in the gulf and bay waters surrounding the island. Manatees, which rarely occur in the project area, are discussed in Section 3.3.1. Sea turtles are also discussed in Section 3.3.1.

3.2.6 Fish Resources

A discussion of finfish and shellfish resources in the back-barrier estuarine setting of Raccoon Island is provided in the Final EA /Project Plan (USDA, NRCS, 2005) and is incorporated into this EA by reference. The life history of estuary-dependent species may involve (1) transporting eggs, larva, or juveniles to estuarine nursery grounds, (2) growing and maturing in the estuary, and (3) migrating of young adults back to the inner shelf for spawning. Important recreational species include red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), and southern flounder (*Paralichthys lethostigma*). Commercial species include white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), blue crab (*Callinectes sapidus*), and gulf menhaden (*Brevoortia patronus*). Other common species include Atlantic croaker (*Micropogonias undulatus*), bay anchovy (*Anchoa mitchilli*), spot (*Leiostomus xanthurus*), striped mullet (*Mugil cephalus*), and black drum (*Pogonius cromis*) (O'Connell et al., 2005). These species vary in abundance from season to season and year to year due to their migratory life cycle and environmental conditions. Estuarine-dependent species, such as blue crab, black drum, Gulf menhaden, southern flounder, and spotted seatrout, have shown decreasing abundance trends over the last 10-20 years (LCWCRTF/WCRA, 1999). Most species spawn offshore in the open Gulf of Mexico and enter the island and bay area to use the shallow bay bottoms and island marsh habitats as a nursery. Other utilization of the project area by these and other fisheries species include foraging and predation refuge. Loss of habitat can significantly affect populations of all fisheries (O'Connell et al., 2005).

Rich in finfish and shellfish, the Terrebonne Basin is one of the most productive estuaries in the nation for seafood (http://www.btnep.org). The Barataria and Terrebonne basins were nominated for participation in the National Estuary Program in 1989 in recognition of their significance for ecological and economic sustainability of estuarine resources (http://www.btnep.org). Approximately 24 million pounds (10 million kilograms) of oysters were harvested in Louisiana

in 1999. A large portion of Louisiana's oyster beds are located in Terrebonne Basin; however, no oyster leases are within the proposed project area. Highly abundant or abundant harvested species include brown shrimp, white shrimp, sand sea trout, black drum, southern flounder, blue crab, gulf menhaden, and anchovies (Patillo et al., 1997). Important forage species in the area include hardhead catfish, sheepshead minnow, gulf killifish, spot, Atlantic croaker, southern kingfish, silver perch, white mullet, striped mullet, scaled sardine, Florida pompano, and silversides (Patillo et al., 1997).

The role of barrier islands in protecting important fisheries habitat within the back-barrier region is well documented by indirectly enhancing tidal exchange through inlets and by contributing to transport of larvae/juveniles into estuaries from offshore waters (O'Connell et al., 2005). Less appreciated is the value of habitat of the barrier islands themselves in the surf zone on the Gulf side of the islands as well as the intra-island tidal creeks and ponds (Williams, 1998). For example, fishes that dominate the surf zone of barrier islands throughout the Gulf of Mexico are among the most important forage species in the ecosystem (such as menhaden, anchovies, and silversides). The surf zone is used extensively by larval and juvenile fish, and it provides an essential staging area for fish awaiting tides favorable for transport into back-barrier marshes through tidal passes. Intra-island ponds and creeks provide more protected habitat for resident and transient fishes, many of which exhibit a marked preference for intra-island habitats (Williams, 1998). A detailed study of species assemblages of intra-island habitats of East Timbalier, LA, showed tremendous seasonal variability—likely due to changes in water level, temperature, and tidal action. Overall species diversity was greater in intra-island habitats than in mainland marshes, suggesting that barrier island restoration has value beyond protecting back-barrier marshes (Williams, 1998).

Offshore finfish and shellfish resources are discussed in detail in Section 3.2.6 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004). Fisheries resources in the borrow areas are difficult to describe and quantify; the distribution of coastal finfish and pelagic fish families depend on the water column structure, bottom habitat, and prey availability, which all can vary spatially and seasonally. Coastal fishes occur in two broad ecological groups: predatory species (e.g., mackerel, cobia, bluefish) and planktivorous species (e.g., menhaden, scad, anchovies). A wide range of shellfish commonly occur in the shallow GOM. Up to 15 species of penaeid shrimp can be expected to use the coastal and estuarine areas. Brown, white, pink, and royal red shrimp are the most common. Blue crabs are the most important portunid (swimming) crab species that use the coastal and estuarine areas of the Gulf. Preliminary results of a habitat use study commissioned by MMS (Condrey and Gelpi, *in preparation*) suggest that Ship and Trinity Shoals are important offshore mating, spawning and hatching grounds for the blue crab. Between 2005 and 2007, the authors found persistent and significant numbers of female blue crabs with full gonads or in berry on Ship Shoal from April to October. While the numbers of blue crabs found off of the shoal in less sandy bottom cover were significantly lower, blue crabs are known to use muddy bottoms as refuge and foraging areas in near-shore environments (Baker et al., 1981). The possibility also remains that there may be unidentified migratory pathways leading to the sand shoals.

NOAA has recently released a series of reports considering the impact of Hurricanes Katrina and Rita in 2005 on fish stocks and fishery habitat (USDOC, NMFS, 2007, 2008a, 2008b). While the reports confirm physical changes to nearshore and offshore habitats, there were no fish resources significantly impacted by the 2005 hurricanes, with the exception of oysters. Most ecologically-important offshore fish species, such as red drum, mackerels, snappers, and groupers, are managed by the Gulf of Mexico Fisheries Management Council (GMFMC). Common pelagic or oceanic finfish include managed predatory species, such as sharks. These important fish and the shell fish species above, as well as their respective habitats are discussed in detail in the Section 3.3.2 on Essential Fish Habitat.

3.3 Critical Biological Resources

3.3.1 Threatened and Endangered Species

Based on consultation with the U.S. FWS in 2003 and 2008, there is one threatened (T) and two endangered (E) species that occur within the project boundary under FWS purview. As noted previously, endangered brown pelicans nest in large numbers on Raccoon Island (4,500 nests in 2002) (Hess, 2003, personal communication). In addition to Raccoon Island, endangered brown pelicans are currently nesting on Queen Bess Island, Wine Island, and scattered locations within the Chandeleur chain. Nests are built in the late winter, spring, and summer, primarily in mangrove trees and other shrubby vegetation, but may also occur on the ground. Brown pelicans also utilize the shallow estuarine waters and open gulf for feeding, and the beach, sand flats and rock breakwaters as resting or loafing sites.

Threatened piping plovers migrate during the fall and spring through coastal Louisiana (USDOI, FWS, 2001). These birds are primarily associated with the sand flats and beaches and occur within the project area primarily during migration periods, but may be present in Louisiana for 8 to 10 months of the year. They arrive from their breeding grounds as early as late July and may remain until late March or April. Designated critical habitat of the piping plover are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes. These components include sparsely vegetated intertidal beaches and flats that occur between annual low tide and annual high tide and associated dunes and flats above annual high tide. Roosting plovers prefer un-vegetated or sparsely vegetated sand, mud, or algal flats above high tide. Major threats to this species in Louisiana are degradation and loss of habitat.

The only listed marine mammal that may be present, however highly unlikely, in the project area is the West Indian manatee. Manatees have occasionally been sighted in the coastal marshes along the Louisiana Gulf coast during summer months. During the winter months, the United States' manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia. Manatees are herbivores that feed opportunistically on a wide variety of submerged, floating, and emergent vegetation (USDOI, FWS, 2001). Manatees primarily use open coastal (shallow nearshore) areas, and estuaries, and they are also found far up in freshwater tributaries. Shallow grassbeds with access to deep channels are their preferred feeding areas. Coastal and riverine habitats near the mouths of coastal rivers and sloughs are used for feeding, resting, mating, and calving (USDOI, FWS, 2001).

Other threatened and endangered species occur within the adjacent gulf waters and are under the purview of the National Marine Fisheries Service (NMFS). Threatened and endangered sea turtles, marine mammals, and fish are discussed in detail in Sections 3.2.3, 3.2.4, and 3.2.6 respectively of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, USDOI, MMS, 2004). The same species were addressed in more detail in a Biological Assessment submitted to NMFS in September 2003 for multi-project dredging of Ship Shoal (Appendix I). NMFS issued a Biological Opinion to MMS in 2005 (Appendix II, Consultation Number F/SER/2003/01247) discussing the likelihood of occurrence in the project area. The federally-listed threatened and endangered coastal and marine species are briefly discussed below.

The endangered Kemp's ridley (*Lepidochelys kempii*), hawksbill (*Eretmochelys imbricate*) and leatherback (*Dermochelys coriacea*) sea turtles, as well as the threatened loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) sea turtles, occur in the Gulf of Mexico. Of these five sea

turtle species, the loggerhead and ridley sea turtles are relatively common in the nearshore waters of the Gulf of Mexico, where they forage, and may occur within the actual project area. Juvenile and sub-adult Kemp's ridley sea turtles occupy shallow coastal waters, where crabs are abundant and substrates are sand or mud. Small turtles are generally found nearshore from May through October. Adults and juveniles move offshore to deeper, warmer water during the winter.

There are five endangered species of whales that occur in the Gulf of Mexico. They include the finback (*Balaenoptera physalus*), humpback (*Megaptera novaeangliae*), right (*Eubalaena glacialis*), sei (*Balaenoptera borealis*) and sperm (*Physeter catodon*) whales. Due to the extreme shallow waters within the project area, none of these species are likely to be present.

The threatened gulf sturgeon is an anadromous fish whose historically range included the freshwater and estuarine waters of the gulf coast east of the Atchafalaya River. Section 3.2.7.1 of the MMS Final Multi-sale EIS (2007) describes the life stages of gulf sturgeon. Its present range extends from Lake Pontchartrain in Louisiana east to the Suwannee River in Florida; sporadic occurrences have been recorded as far west as the Rio Grande. Gulf sturgeon adults would most likely occur in the estuarine and marine waters from November to March when not spawning. Various riverine, estuarine, and marine habitats in Louisiana have been identified as critical habitat for this species; however, critical habitat does not occur in the project area.

These marine species may occur in and around the borrow area, or in the region between the borrow area and placement site to be transited by vessels. However, their presence is transient as all of these species generally are highly mobile and are known to range over broad areas of the gulf. The actual occurrence of a species in the area depends on the availability of suitable habitat, season of the year relative to species' temperature tolerance, migratory habitats, food availability, and other environmental factors.

3.3.2 Essential Fish Habitat (EFH)

Healthy fish resources and fishery stocks depend on Essential Fish Habitat (EFH) waters and the substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. EFH and finfish resources in the vicinity of Ship Shoal and coastal barrier island and estuaries were discussed in detail in Section 3.2.6 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004). However, the Fishery Management Plans of the Gulf of Mexico were amended in 2005 to include over 50 additional species that are now managed under the Magnuson-Stevens Fishery Conservation and Management Act. Detailed information on federally managed fisheries and their EFH is provided in the 1998 generic amendment, 2004 EIS supporting revised Fishery Management Plans for the Gulf of Mexico, and 2005 generic amendment number 3 for addressing essential fish habitat requirements, habitat areas of particular concern, and adverse effects of fishing in the following Fishery Management Plans of the Gulf of Mexico: Shrimp fishery of the Gulf of Mexico, United States Waters, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, coastal migratory pelagic resources (mackerels) in the Gulf of Mexico and South Atlantic, stone crab fishery of the Gulf of Mexico, spiny lobster in the Gulf of Mexico and South Atlantic, coral and coral reefs of the Gulf of Mexico(GMFMC, 1998; GMFMC, 2004; GMFMC, 2005). There are Fishery Management Plans (FMPs) in the northern Gulf of Mexico for shrimp, red drum, reef fishes, coastal migratory pelagics, stone crabs, and highly migratory species (HMS). Additional shark species are managed under the National Marine Fisheries Service Shark Fishery Management Plan.

This EA includes all the required components of an EFH Assessment: (1) description of the proposed action; (2) description of the action agency's approach to protection of EFH and proposed mitigation, if applicable; (3) description of EFH and managed and associated species in

the vicinity of the proposed action, and (4) analysis of the effects of the proposed and cumulative actions on EFH, managed species, and associated species. Categories of EFH that have been designated in the project area include estuarine emergent wetlands, estuarine water column, estuarine mud and sand substrates, marine water column, and marine non-vegetated bottom. Table 3 lists the EFH, federally managed species, and their life stages expected to occur in the project area, including in the vicinity of the offshore borrow area. No habitats of particular concern (HAPC) have been designated in the proposed project area.

Table 3. Essential fish habitat for federally managed species and their life stages.

Common Name	Latin Name	Life Stage	System	EFH
Brown shrimp (estuarine-dependent)	*Farfante penaeus aztecus*	eggs	marine (M)	<110 m, demersal
		larvae	M	<110 m, planktonic
		postlarvae/juvenile	estuarine (E)	marsh edge
		subadults	E	mud bottoms
		adults	M	<110 m silt sand, muddy sand
White shrimp (estuarine-dependent)	*Litopenaeus setiferus*	eggs	M	<40m, dimersal
		larvae	M	40 m, planktonic
		postlarvae/juvenile	E	marsh edge, SAV, marsh ponds, inner marsh, oyster reefs
		subadults	E	same as postlarvae/juvenile
		adults	M	<35 m, silt, soft mud
Red drum (estuarine-dependent)	*Sciaenops ocellatus*	eggs	M	planktonic
		larvae	M	planktonic
		postlarvae/juvenile	M/E	SAV, estuarine mud bottoms, marsh/water interface
		subadults	E	mud bottoms, oyster reefs
		adults	M/E	Gulf of Mexico and estuarine mud bottoms, oyster reefs
Red snapper	*Lutjanus campechanus*	eggs	M	over shelf in summer/fall
		larvae	M	17-183 m
		postlarvae/juvenile	M	17-183 m
		subadults	M	20-46 m; over sand and mud
		adults	M	7-146 m
Dog Snapper		juvenile	M/E	Mangrove and emergent marsh
Lane Snapper	*Lutjanus synagris*	eggs	M	offshore shelf
		adult	M	Reefs, sand, 4-132 m
King mackerel	*Scomberomorus cavalla*	juvenile	M/E	Pelagic
		adult	M	Pelagic

Cobia	*Rachycentron canadum*	eggs	M	Pelagic
		larvae	M/E	estuarine & shelf
		postlarvae/juvenile	M	coastal & shelf
		adult	M	coastal & shelf
Bonnethead shark	*Sphyrna tiburo*	juvenile	M	inlet, estuaries, coastal waters < 25 m
		adult	M	< 25 m

Source: *GMFMC (2005) amendment*

3.3.2.1 Shrimp

Brown shrimp: Brown shrimp are present in both the marsh and borrow areas of the project. The brown shrimp fishery comprises 57% of the Gulf of Mexico shrimp landings (NOAA 1993, as cited in Patillo et al. 1997). Brown shrimp are consumed by many finfish predators, and therefore, large juvenile stocks are considered important for supporting other fish species. Brown shrimp are estuarine-dependent, which means that they require estuarine habitat to complete their lives. The eggs of brown shrimp are demersal and occur offshore, probably in proposed project borrow areas. Larval stages are planktonic and postlarvae move into the estuary through the passes on flood tides at night. The peak recruitment of postlarvae into estuaries occurs in the spring (February to April) with a minor peak in the fall (Cook and Lindner, 1970 as cited in GMFMC, 1998). Larvae are highly abundant in Terrebonne Bay during February and March (Patillo et al., 1997). The postlarval and juvenile stages are highly abundant in Terrebonne Bay, especially in low salinity months. The abundance of postlarvae and juveniles is highest in marsh-edge habitat and near submerged vegetation; tidal creeks, inner marsh, shallow open water, and oyster reefs also are used. In unvegetated areas, muddy bottoms are preferred. Juveniles and subadults are found in estuarine channels, shallow marsh areas, and estuarine bays; they prefer vegetated habitats. Subadults move into coastal waters and at the adult stage emigrate to offshore spawning grounds; adults are associated with silt, muddy sand, and sandy substrates. Subadults and adults are likely to be found in preferred project borrow areas. Spawning occurs mainly during spring to late fall in water greater than 59 feet (18 m) deep (generally 151 to 298 feet [46-91 m]). In deeper water (210 to 361 feet [64-110 m]), spawning appears to occur throughout the year (Patillo et al., 1997; GMFMC, 1998).

White Shrimp: White shrimp are present in both the marsh and borrow areas of the preferred project areas. White shrimp comprise 31 percent of the Gulf of Mexico shrimp landings; maximum catches are along the Louisiana coast west of the Mississippi delta (NOAA, 1993, as cited in Patillo et al. 1997). White shrimp are estuarine-dependent. Within Terrebonne Bay, adults are abundant during March-April and August-November; larvae are highly abundant during May-June, August-September, and abundant during June-August; juveniles are highly abundant during June-November. White shrimp stay in the estuary longer than brown shrimp, but brown shrimp may displace white shrimp from Spartina marshes to nearby mud substrates in areas where their distributions overlap. White shrimp eggs are demersal in marine waters and possibly occur in the borrow area locations. Larval stages are planktonic, and postlarvae migrate through the passes during May-November, peaking in June and September, and become benthic when they reach the estuarine nursery. Postlarvae and juveniles prefer shallow estuarine waters with mud and sand bottoms that have high organic debris or vegetative cover; densities are highest along the marsh edge and among submerged aquatic vegetation, though they also occur in marsh ponds and channels, inner marsh, and oyster reefs. Juveniles and adults are demersal;

juveniles prefer lower salinity waters of tidal rivers but move through and out of the estuary into coastal waters when they mature. Adults inhabit nearshore Gulf waters on bottoms of soft mud or silt. Due to the habitat preferences of juveniles and adults, they are likely to be found in borrow area locations. White shrimp are euryhaline and are not as affected as brown shrimp by sudden salinity drops (Patillo et al., 1997; GMFMC, 1998). Spawning occurs from spring to late fall, peaking in the summer months of June and July (Linder and Anderson, 1956, as cited in GMFMC, 1998). Spawning occurs offshore in water 29 to 111 feet (9 to 34 m) deep with most spawning occurring in water less than 88.6 feet (27 m) deep. Limited spawning may occur in bays and estuaries (Renfro and Brusher, 1982, as cited in GMFMC, 1998).

Pink and Royal Red Shrimp: Pink and Royal Red shrimp may occur in the project area but are less common than brown and white shrimp. Pink shrimp occupy a variety of habitats, depending on their life stage. Eggs and early planktonic larval stages occur in marine waters. Eggs are demersal, whereas larvae are planktonic until the postlarval stage when they become demersal. Postlarvae and juveniles of pink shrimp occur in estuarine waters of wide-ranging salinity (0 to >30 ppt). Recruitment into estuaries occurs in spring and fall at night, primarily on flood tides, through passes or open shoreline. Juveniles inhabit almost every U.S. estuary in the Gulf but are most abundant in Florida (Figure 12). Juveniles are commonly found in estuarine areas with seagrass where they burrow into the substrate by day and emerge at night. Postlarvae, juvenile, and subadult may prefer coarse sand/shell/mud mixtures. Densities are highest in or near seagrasses, low in mangroves, and near zero or absent in marshes. Adults inhabit offshore marine waters (Figure 13) with the highest concentrations in depths of 9 to 44 m. Preferred substrate of adults is coarse sand and shell with a 90 mixture of less than 1% organic material.

Royal Red shrimp occur throughout the Atlantic and Gulf Coasts and live on the upper continental shelf at depths between about 180 and 730 m. Royal reds are scarce in less than 250 m making them unlikely to occur in significant numbers in the project area.

3.3.2.2 Stone Crab

Stone Crab: Stone crabs may occur in the project area but are much more abundant in South Florida where there is an abundance of preferable substrate. Adult stone crabs burrow under rock ledges, coral heads, dead shell, or grass clumps. In seagrass flats (primarily *Thalassia testudinum*) and along the sides of tidal channels they inhabit burrows which may extend 127 cm (50 in.) into the substrate. They occasionally inhabit oyster bars and rock jetties of Louisiana.

3.3.2.3 Red Drum

Red Drum: The red drum is present in both marsh and borrow areas of the preferred project sites. The commercial harvest of red drum caused significant declines in numbers that resulted in restriction of the harvest in Louisiana and a moratorium in Federal waters. Juveniles are common in Terrebonne Bay throughout the year, and adults are common in the high salinity season. Red drum is an estuarine-dependent species. Eggs are spawned in nearshore waters close to barrier islands and passes from June to October. Therefore, eggs are likely to occur in borrow areas. Spawning habitats include seagrass, mud, or hard bottom areas with little or no current. Eggs, larvae, and early juveniles are planktonic. Larvae enter estuarine waters July to November through passes and seek quiet cover, tidal flats, and lagoons with vegetation that offer protection; larvae prefer muddy bottoms. Young of the year exhibit a strong affinity for tidal ponds and creeks. As they mature, juveniles disperse through the bay and estuarine waters and may be found in tidal passes, marshes, shallow shorelines, back bays and other sheltered areas; they can be found over mud to sand bottoms. Older juveniles move into primary bays and open-water habitats. Estuarine wetlands are important to larvae, juveniles, and subadults; juveniles are abundant around the perimeters of marshes. Subadults and adults prefer shallow bay bottoms or

oyster reefs. The USFWS developed a habitat suitability index model for larval and juvenile red drum which indicated that shallow water (5 to 8.2 feet [1.5 to 2.5 m]) deep) with 50 to 75 percent submerged vegetation cover over mud bottoms and fringed emergent vegetation is optimum (Buckley, 1984, as cited in GMFMC, 1998). Subadults are common or more abundant to both estuarine and marine environments, and exhibit both solitary and schooling behavior. Adults are often solitary except for large aggregations during spawning periods in early fall months. Adults may be found in the estuary but tend to move into shallow nearshore waters off beaches and up to 13.5 mi (25 kilometers) from shore; they prefer mud to sand or oyster-reef bottoms with little or no seagrass (Patillo et al,. 1997; GMFMC, 1998), as well as artificial reef habitats such as oil and gas platforms. Due to the habitat preferences of adults, they are likely to occur in the borrow areas.

3.3.2.4 Reef Fish

The GMFMC lists 43 species of managed reef fish as common in the Gulf of Mexico.

Red Snapper: Red snapper occur throughout the Gulf of Mexico shelf. The species is demersal and is found over sandy and rocky bottoms, around reefs, and underwater objects at depths between 0 to 200 m, possibly even beyond 1200 m. Adults favor deeper water in the northern Gulf. Spawning occurs in offshore waters from May to October at depths of 18 to 37 m over fine sand bottom away from reefs. Eggs are found offshore in summer and fall. Larvae, postlarvae and early juveniles are found July through November in shelf waters ranging in depth of 17 to 183 m. Early and late juveniles are often associated with structures, objects or small burrows, but also are abundant over barren sand and mud bottom. Late juveniles are taken year round at depths of 20 to 46 m. Adults are concentrated off Yucatan, Texas, and Louisiana at depths of 7 to 146 m and are most abundant at depths of 40 to 110 m. They commonly occur in submarine gullies and depressions, and over coral reefs, rock outcroppings, and gravel bottoms.

Lane Snapper: Lane snapper is expected to be present only in the borrow areas of the project. Adults are found offshore over sandy bottoms, natural channels, banks, and man-made reefs and structures (Bullis and Jones, 1976, as cited in GMFMC, 1998) in water depths of 13 to 433 feet (4 to 132 m) (Starck, 1971, as cited in GMFMC, 1998). Spawning occurs some distance offshore (Reid, 1952, as cited in GMFMC, 1998) from March to September with a peak between July and August. Eggs are present offshore on the continental shelf during these spawning periods (Starck, 1971, as cited in GMFMC, 1998). Juveniles are present inshore during the late summer or early fall, and are associated with grass flats, back reefs, and soft bottoms.

Other Reef Fish*:* The GMFMC lists 43 species of managed reef fishes common in the Gulf of Mexico. In addition to the snappers, red, black and gag grouper, scamp, amberjack, tilefish, and triggerfish are quite common. Some of these species may not be common directly in the dredge and placement location, or the potential impacts on these species would be identical to those listed for the species managed under the Reef Fish Management Plan and described above.

3.3.2.5 Pelagic Fish

King Mackerel**:** King mackerel is expected to be present only in the offshore borrow area of the project. Adults migrate throughout the Gulf of Mexico. They are present in the northern Gulf during the spring, near southern Florida in the summer, and in the western Gulf in fall (Nakamura, 1987; Sutherland and Fable, 1980, both cited in GMFMC, 1998). Adults can be found in both coastal and offshore waters up to depths of 656 feet (200 m). Spawning occurs May to October on the outer continental shelf in the northwestern and northeastern Gulf of Mexico (Nakamura, 1987, as cited in GMFMC, 1998). Young juveniles occur May-October, peaking in July and October, and can be found ranging from the inshore to the midshelf. Older

juveniles occur within the nearshore and innershelf (Grimes et al., 1990, as cited in GMFMC, 1998). While juveniles are not estuarine-dependent, they prey upon estuarine dependent fishes (Naughton and Saloman, 1981, as cited in GMFMC, 1998). Growth of larval and juvenile king mackerel is enhanced in the north-central and northwestern Gulf due to the nutrient-rich Mississippi River plume (DeVries et al., 1990; Grimes et al., 1990, both cited in GMFMC, 1998).

Cobia: The cobia is expected to be present only in the offshore borrow area of the project. Eggs are pelagic and occur during the summer (Shaffer and Nakamura, 1989, as cited in GMFMC, 1998) in the top meter of the water column (Ditty and Shaw, 1992, as cited in GMFMC, 1998). Larvae are present from May to September in estuarine and offshore shelf waters from the surface up to 984 feet (300 m) deep (Shaffer and Nakamura, 1989, as cited in GMFMC, 1998). Juveniles occur in coastal water and the offshore shelf from April to October (Dawson, 1971, as cited in GMFMC, 1998). In the northern Gulf, seasonal migration of adults occurs from March to October. Cobia can be found from 3.3 to 230 feet (1 to 70 m) depths ranging from shallow coastal waters to continental shelf waters (Christmas and Walker, 1974, as cited in GMFMC, 1998). Spawning occurs April to September in continental shelf waters (Joseph et al,. 1964, as cited in GMFMC, 1998).

Bonnethead shark: The bonnethead is expected to be present only in the offshore borrow area of the project, often in schools in inshore waters less than 82 feet (25 m) deep. Spawning occurs spring through fall (Hoese and Moore, 1998).

Other sharks: Blacktip sharks and finetooth sharks may occur in the project area. These species are managed under the National Marine Fisheries Service Shark Fishery Management Plan. Blacktip sharks inhabit shallow coastal waters and estuaries and offshore surface waters. Blacktip sharks use shallow inshore waters as nursery areas for their pups in spring and summer. They can be found in groups as young or adults feeding in shallow water. The finetooth shark can also be commonly found close inshore, and forms large schools.

3.4 Cultural Resources

3.4.1 Terrestrial Archeological Cultural Resources (Placement Area)

Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest. An investigation of cultural resources for CWPPRA projects is done in a three-phase process. The first phase is an investigation by NRCS of the National Registry of Historic Places and site files at the State Historic Preservation Office, Division of Archaeology. The second phase is a review by the Louisiana Division of Archaeology to determine potential impacts to any resources; followed, if necessary, by a field investigation conducted by professional archaeologists. In the event any cultural resources are found to be of significant value, then the plan will be modified to minimize or eliminate potential impacts.

A NRCS review of the State site survey files and a letter of concurrence dated October 22, 2004 from the Louisiana Department of Culture, Recreation, and Tourism, Division of Archaeology in Baton Rouge, Louisiana revealed that there are no known terrestrial cultural sites or historic properties located within the Raccoon Island project area. Therefore, there are no known sites eligible for the National Historic Register at this time. The Chitimacha Tribe of Louisiana has indicated that the project area is located in the aboriginal Chitimacha homelands. However,

existing information indicates that there are no known archaeological resources within the onshore portion of the project area.

3.4.2 Offshore Archeological Cultural Resources (Borrow Area)

The potential for prehistoric archaeological resources and historic archaeological resources in the vicinity of Ship Shoal is discussed in Section 3.3.3 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004).

At the height of the last glacial advance, relative sea level in the Gulf of Mexico was approximately 90 m (up to 120 m) below present sea level. Terrestrial site analogues indicate that prehistoric people concentrated their subsistence activities in the vicinity of streams and rivers, especially confluences. Tributaries to larger river systems, such as the historic delta complexes of the Mississippi River, were favored areas for prehistoric habitation. The preferred borrow area is a small buried paleo-distributary, and therefore, the offshore project area may have potential for preserved prehistoric archaeological sites. Many sites would have been destroyed or greatly modified by oceanic forcing experienced during the Holocene transgression. If the margins of Holocene channels (i.e., levees, point bars, etc.) are preserved, they may host prehistoric sites.

The width of the main part of the channel varies between 500 and 750 feet (SJB Group/CEC, 2006). The thickness of cross-bedded channel fill varies from 10 to 25 feet. Vibracores show the presence of mixed, variable sediment, ranging from cohesive clays and interbedded muds to coarse silt/very fine sand. Seismic cross-sections show the potential for pockets of sandier sediments near the bottom of the channel, as denoted by “bright” seismic signatures. Levees and terraces were not identified in seismic data, suggesting marine transgression destroyed most if not all prehistoric land surfaces.

Available historical records show significant maritime activity in the northern Gulf of Mexico. The MMS has contracted several studies (e.g., Garrison et al., 1989; Pearson et al., 2003) to identify the areas in the Gulf of Mexico where historic shipwrecks are most likely to exist. A 1977 study concluded that two thirds of the total number of shipwrecks in the northern Gulf lie within 1.5 km (1 mi) of the shore, and most of the remainder lie between 1.5 and 10 km (1 and 6 mi) of the coast (CEI, 1977). The 1989 study found that changes in the late 19th- and early 20th-century sailing routes increased the frequency of shipwrecks in the open sea in the Eastern Gulf to nearly double that of the Central and Western Gulf (Garrison et al., 1989). The Garrison study also found the highest observed frequency of shipwrecks occurred within areas of intense marine traffic, such as the approaches and entrances to seaports and the mouths of navigable rivers and straits. The MMS Shipwreck Database currently identifies 954 wrecks in the Central Planning Area, but only 93 in neighboring Ship Shoal blocks (Pearson et al., 2003). The MMS database of shipwrecks does not include any suspected wrecks within the proposed project area (Ship Shoal Lease Blocks 64 and 71). The NOAA Automated Wreck and Obstruction Information Service (AWOIS) database does not indicate the presence of any suspected wrecks in the project area.

An archeological assessment of the borrow area was conducted applying remote sensing data collected between October 12 and 25, 2008. This study was conducted to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and with 36 CFR 800, Protection of Historic Properties. All aspects of these investigations were completed in accordance with the Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716); with the Abandoned Shipwreck Act of 1987 (43 U.S.C. 2101-2106); with National Park Service Abandoned Shipwreck Guidelines; with National

Register Bulletins Nos. 14, 16, and 20; Minerals Management Service NTLs 2005-G07 and 2006-G07; and the Louisiana Division of Archeology.

Review of the geology, prehistory, and history of the study area indicate that there is a low potential for the discovery of both submerged prehistoric cultural resources and for the discovery of submerged historic cultural resource, such as shipwrecks. Review of magnetometer data resulted in the identification of one pipeline, one anomaly cluster that may represent a pipeline, and three anomaly clusters, designated Targets 5, 6 and 7, that may represent significant submerged cultural resources. All of these anomaly clusters will be avoided during dredging and construction operations. No potentially significant side scan sonar or sub-bottom profiler contacts were identified during remote sensing data analyses.

3.5 Social and Economic Resources

The 2000 U.S. Census Bureau estimated population for Terrebonne Parish is 104,500, which represents a 7.7 percent increase from 1990. Louisiana's estimated 2000 population of 4,469,000 represents a lower increase of only 5.9 percent over the 1990 census.

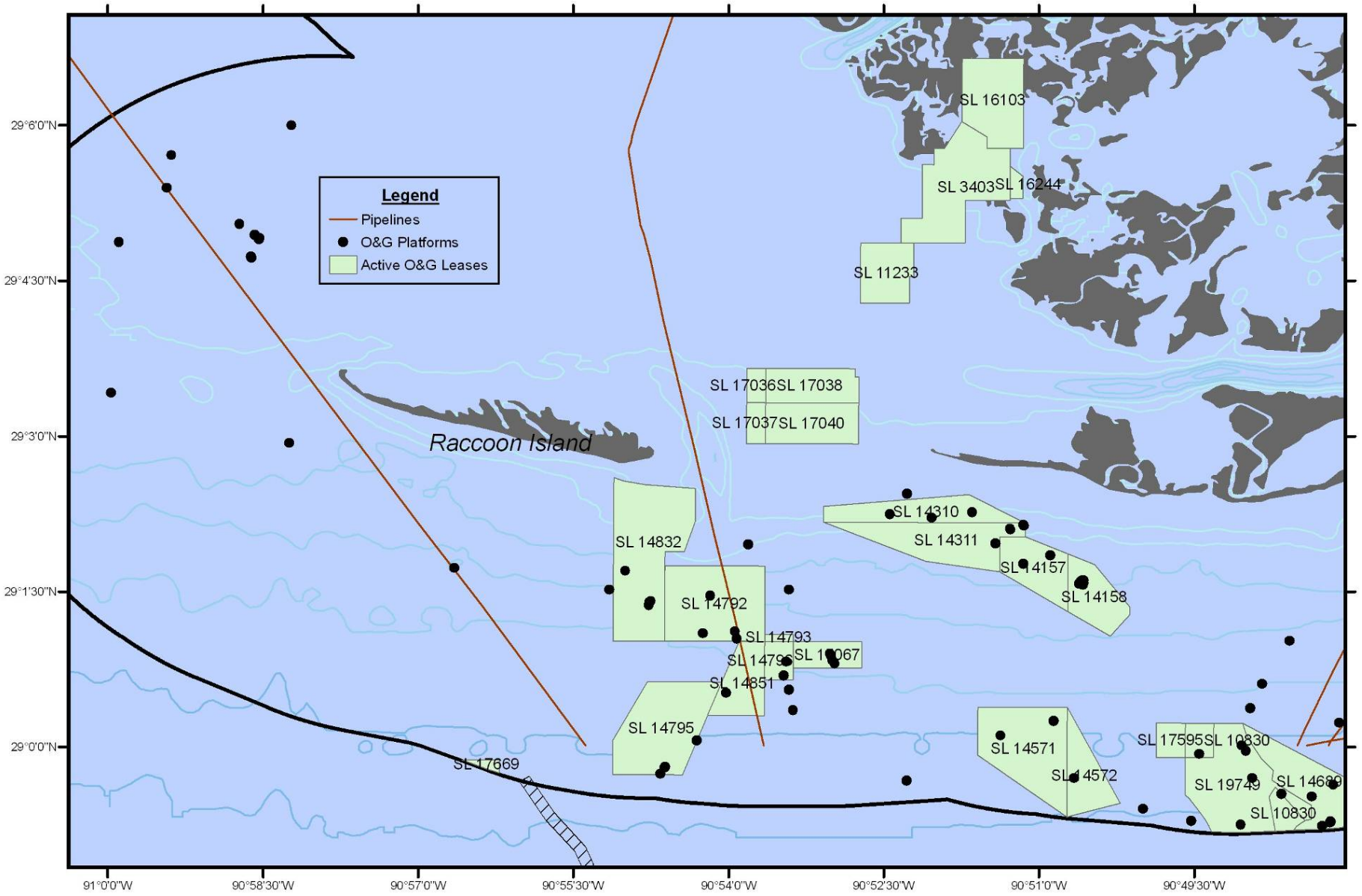
Overall, social and economic conditions for Terrebonne Parish residents are comparable to the rest of Louisiana. The per capita income for the parish is $16,500 compared to the state average of $16,900. Terrebonne's median household income of $35,200 is greater than the state's median of $32,600. Terrebonne Parish's family poverty rate of 15.8 percent is the same as the state average. The unemployment rate for Terrebonne is 3.3 percent, a full percent lower than the state unemployment rate of 4.3 percent. Terrebonne's median residential property value of $80,500 is slightly higher than the state median value of $80,000.

Agriculture and fishing in particular are important industries in Terrebonne Parish. Commercial fishery landings in Terrebonne Parish were reported at 3.6 million pounds worth $8,860,987 in 2002 (LSU Ag Center, 2003). Shrimp and crab landings for Terrebonne Parish in 2002 were estimated at $32,471,115 and 37,071,000 pounds, respectively. Freshwater landings in 2002 amounted to 1,050 pounds of catfish and 574,373 pounds of crawfish. Terrebonne Parish's marsh and wetlands are the backbone of this industry and culture. Estimates show Terrebonne Parish to be losing vital wetlands at a rate of 5,500 acres per year.

The Gulf of Mexico commercial fisheries and recreational resources are substantial in the project area. The Gulf of Mexico provides nearly 21 percent of the commercial fish landings in the continental U.S. annually. Nearly all commercial and recreational species of finfish (menhaden, reef fish (snappers and groupers) and pelagics (trout, redfish, mackerel, amberjack, tuna, etc.)) as well as shellfish (e.g. shrimp and blue crab) depend heavily on estuarine habitats for part or all of their life cycles.

The Gulf of Mexico has one of the highest concentrations of oil and gas activity in the world. Major offshore infrastructure includes bottom-founded pipelines, surface platforms, caissons, well protectors, and wellhead structures. A more detailed discussion of the onshore and offshore infrastructure present along coastal Louisiana is available in Section 3.3.5 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004). Figure 8 shows active state leases towards the east and southeast of the project area. Most of the state oil and gas infrastructure occurs immediately south of the eastern end of the barrier islands. The Trunkline Gas Company and Williams Energy Services / Transco pipelines (Figure 2) extend from the OCS to the west and east of the island and may be impacted by pipeline laying and retrieval during placement, as well as dredge plant maneuvering and tender vessel anchoring. Existing and planned infrastructure in the area of proposed dredging, OCS in Ship Shoal blocks 64 and 71, has

Figure 8. Active state leases east and southeast of the project area.



been identified and mapped in Figure 9. There are six active leases in these two blocks (Table 4). Two leases are within the initial primary lease term.

Table 4. Active outer continental shelf leases in the project area.

Active Lease	Block(s)	Lease Status	Lease Holder
G12346	64	Unit	BP Exploration & Production Inc.; PetroQuest Energy, L.L.C.
G27125	64	Primary	BHP Billiton Petroleum Inc.
G27126	71	Primary	BHP Billiton Petroleum Inc.
G12347	71	Unit	PetroQuest Energy, L.L.C.
00058	64	Unit	PetroQuest Energy, L.L.C.
00059	71	Unit	PetroQuest Energy, L.L.C.

No bottom-found surface structures or pipelines exist within the borrow area, but an eight (8) inch natural gas pipeline is within a kilometer of the borrow area's southern limit. Of all OCS infrastructure, pipelines have the greatest potential to be directly or indirectly impacted by the dredging activities. Table 4 lists the pipeline segments that occur in the project area.

Table 5. Active and abandoned pipelines in the project area.

Pipeline Segment	Status	Code	Size (in.)	Operator	Block(s)	Location
2676	Abandoned	Bulk Gas	3	Mobil Oil Exploration & Production	64	West
2641	Abandoned	Oil	4	Mobil Oil Exploration & Production	64,71	West
1553	Active	Gas	8	Transcontinental Gas	64,71	West
1536	Active	Gas	8	Transcontinental Gas	71	South
14521	Active	Bulk Gas	6	Petroquest Energy LLC	71	South
14522	Active	Gas Lift	2	Petroquest Energy LLC	71	South
5769	Abandoned	Gas	16	Northern Natural Gas Company	71	South
9954	Active	Gas	30	Trunkline Gas Company LLC	64,71	East
9957	Active	Gas	30	Trunkline Gas Company LLC	64,71	East
11371	Active	Gas	8	Maritech Resources Inc	64,71	East

There is only one active caisson in Ship Shoal Block 71, operated by PetroQuest Energy under Lease G12347. A well protector has been removed from block 64, formerly operated by Mobil Oil on Lease 00058. Pilings supporting jacketed structures were removed to at least 15 ft below seafloor. Also, the site was cleared of debris resulting from activities to a radius of 600 ft (183 m), a requirement for any abandonment of caissons and well protectors. Table 6 catalogs a single completed well and five permanently plugged and abandoned wells in the two block area. A brief explanation of well completion can be found in the MMS Final Multisale EIS (USDOI, MMS, 2007). The wellhead structure and surface casing of permanently abandoned wells should be severed and removed at least 15 ft (4.6 m) below the seafloor. Abandonment also includes the sealing of all downhole, perforated intervals and filling the casing with plugs of cement.

Figure 9. Existing and planned infrastructure.

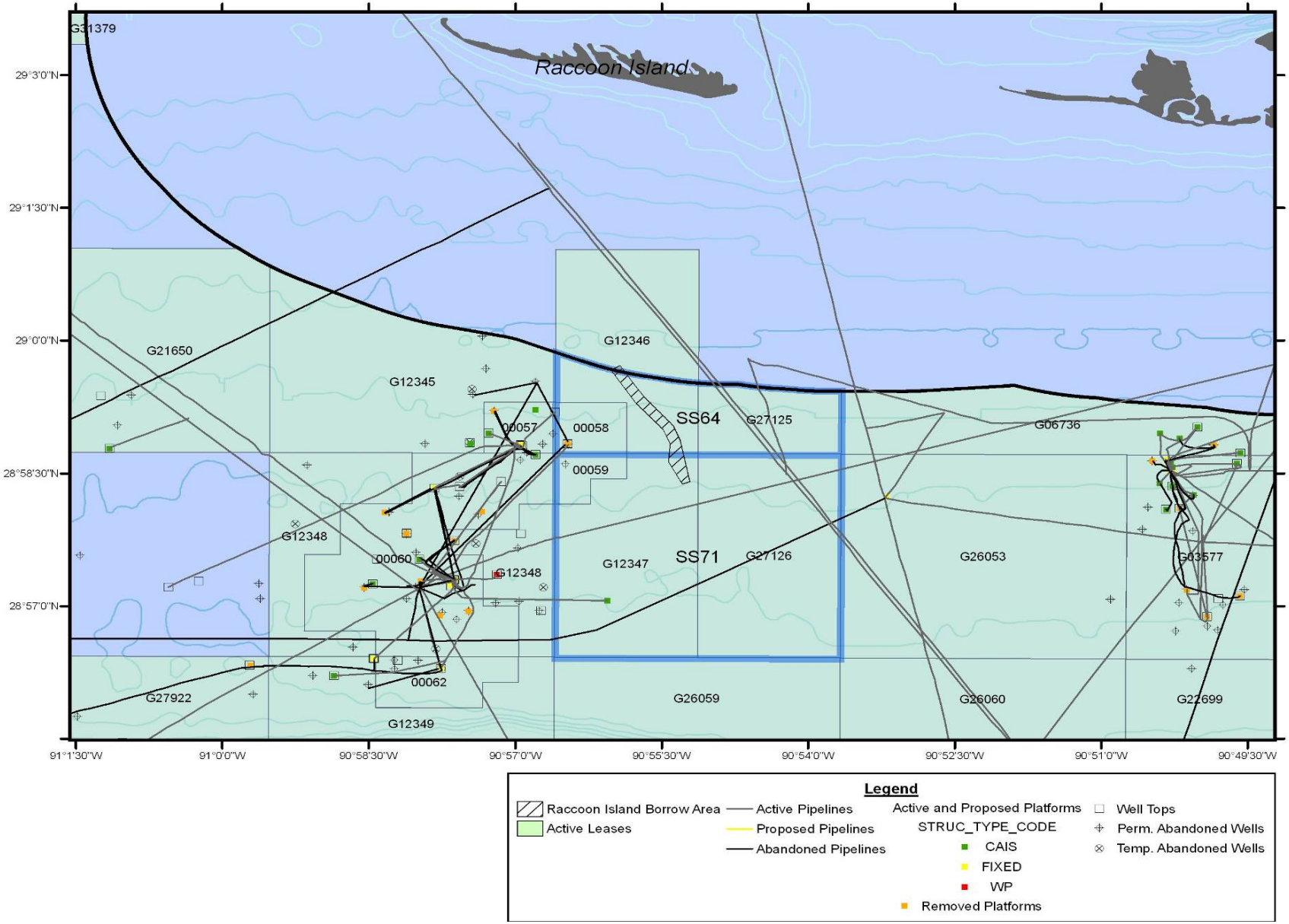


Table 6. Completed and abandoned wells in the project area.

Well	Borehole Status	Block(s)	Operator
177110009500	Permanently Abandoned	64	PetroQuest Energy, L.L.C.
177110009600	Permanently Abandoned	64	PetroQuest Energy, L.L.C.
177110009700	Permanently Abandoned	71	PetroQuest Energy, L.L.C.
177110009800	Permanently Abandoned	64	PetroQuest Energy, L.L.C.
177110009900	Permanently Abandoned	64	PetroQuest Energy, L.L.C.
177114141000	Completed	71	PetroQuest Energy, L.L.C.

4.0 ENVIRONMENTAL EFFECTS AND COMPARISON OF ALTERNATIVES

The original Project EA / Final Plan (USDA-NRCS 2005) addressed the environmental effects of the TE-48 project alternatives included impacts to physical and biological resources and subsequently issued a Finding of No Significant Impact (FONSI) on March 24, 2005. The MMS also addressed the environmental effects of multi-project dredging in the vicinity of Ship Shoal, including impacts to physical and biological resources, in its Environmental Assessment (USDOI, MMS, 2004) completed in April 2004. The analyses provided in both documents are incorporated by reference.

Detailed information relative to the Phase B Marsh Creation component was not available at the time either document was completed, and therefore, the proposed action warrants additional evaluation given the complete development of Phase B project plans, including identification of a borrow site and finalized plans and specifications on the placement area. The current project has not changed other than to determine a definitive marsh creation acreage of 68 acres instead of 60 acres and rather than construct a retaining dike, which would have allowed the dredge material to spill over the back of the island, the project will build a containment dike to effectively create a marsh creation cell so as to prevent damage to existing island vegetation that currently serves as crucial avian habitat. The containment dike modification is considered an additional precautionary measure to prevent potential adverse impact to existing habitat and therefore is expected to have no effect on the original findings of no significant impact either. However, the availability of more detailed information on Phase B, including identification of a borrow site and full development of plans and specifications of the marsh creation component of the project, allows for comprehensive NEPA review of the following environmental effects and comparison of alternatives.

Potentially adverse, direct and indirect, and short-term and long-term impacts were classified using no impact, not significant, and significant categories. Not significant impacts were further classified as minor and moderate. Potentially significant impacts can be mitigated to reduce the level of impact if the viability of the affected resource or activity is not threatened and full recovery is possible once the impacting agent is eliminated. The assessment of impact levels was made based on factors of scale, duration, uniqueness, and abundance/scarcity, and the potential that mitigation could offset anticipated impacts.

4.1 Effects on Physical Resources

4.1.1 No Action Alternative

The no action alternative will have no effect on the current status and trends of physical resources on either the island placement area targeted for marsh creation or the offshore borrow area. The north side of the island will likely continue at a minimum to erode at current rates.

4.1.2 Preferred Action

4.1.2.1 Effects on Climate and Meteorology

The preferred alternative is not expected to have an impact on climate or meteorological conditions.

4.1.2.2 Effects on Coastal Geology and Geomorphology

Under the preferred alternative, materials dredged from an offshore borrow area would stabilize the island and create additional marsh habitat. Although approximately eight acres of subtidal open water area will be filled in, it will be replaced by subaerial intertidal marsh which has been rapidly deteriorating on the island. The formation of the intertidal marsh along with the outer retainer dike will provide protection for the establishment and stabilization of the newly created marsh, and therefore reduce erosion on the island's north face. The new marsh platform will also promote barrier overwash, a physical process essential for barrier island migration and maintenance. Therefore, it is expected that there will be a net benefit to the barrier island from the proposed action.

The proposed action includes the construction of a back-barrier marsh platform approximately 4,800 feet long and 150 to 700 feet wide (Figure 4). The amount of consolidation caused by this material was estimated from sediment cores collected from within the marsh creation area (Soil Testing Engineers, Inc. 2003). It was determined that a construction fill elevation of +2.5 feet NAVD 88 would yield desirable marsh elevations for most of the project area (Figure 5). Filling to this elevation, the created marsh platform would settle to an elevation of approximately +1.6 feet NAVD 88 for most of the 20 year project life, encouraging long-term barrier island maintenance by natural processes. Including relative sea level rise, it was estimated that most of the created marsh platform would become intertidal around year 3, and would be in the upper intertidal zone (i.e., between Mean High Water [MHW] and Mean Tide Level [MTL]) for the remainder of the project life.

Containment dike breaches would be located in strategic places to maintain tidal influence to the marsh and improve its habitat value. An approximately 3 acres section of the containment dike system located adjacent to the island will be constructed at an elevation of +5 ft. The island currently has no existing area at dune elevation (+5 ft NAVD 88). The creation of +5 ft elevation in this 3 acre section along with the remaining 11 acres of supratidal area (+2.5 to 4.9 ft) will further stabilize the island by creating more upland habitat that better protects back-barrier marsh from storm surge overtopping and island breaching. Vegetative plantings will also stabilize soil, increase retention of recently deposited sediment, and encourage additional sedimentation and elevation development through organic production. Since the dredge material

being used consists of naturally occurring material deposited in the Gulf over time by riverine and coastal processes, the marsh creation would constitute a net increase of material in the coastal marsh system.

Approximately 11,000 feet of dikes will be constructed to contain the dredge fill material. The dikes will be constructed using sandy sediment mechanically-dredged from within the marsh creation area. Dikes on the island-side of the marsh platform will be placed on the existing shoreline, whereas the bayside dikes will be placed on subtidal bottoms with an average depth of -1.5 feet NAVD 88 (Figure 5). A slope stability analysis was also performed on the proposed bay-side containment dike design (Soil Testing Engineers, Inc., 2003). The analysis produced acceptable safety factors for the soils in the vicinity of where the dikes will be constructed for the given design parameters and configurations. The bayside dike will provide for additional wind-wave attenuation (USDA, NRCS, 2007). Openings will be cut in the bayside dikes at the locations indicated allow tidal exchange between Caillou Bay and the created back-barrier marsh. These tidal openings will have 10H:1V side slopes, a bottom width of 10 feet, and will be excavated to a bottom elevation of +2.5 feet NAVD 88 (USDA, NRCS, 2007).

4.1.2.3 Effects on Geology and Geomorphology of Offshore Borrow Area

Under the preferred alternative, dredging will result in the creation of a pit up to twenty feet deeper than the surrounding seafloor. It is expected that the pit will completely fill in less than 10 years, to near pre-dredging bathymetric contours, based on observations and modeling of the relatively deeper Peveto Channel borrow pit used offshore Holly Beach, LA (Nairn et al., 2007). The time required for the Raccoon Island pit to fill will be dictated by local and temporally dynamic hydrodynamic processes, as well as bed load and suspended sediment concentrations. Other potential impacts include the localized disturbance of natural sediment sorting and layering within the borrow area due to possible changes in grain size. Although the pit is likely to fill with relatively finer-grained sediment than existing sediment in the project area, the potential impact is minor given the availability of similar mixed-grained seafloor adjacent to the project area.

4.1.2.4 Effects on Physical Oceanography and Processes

The creation of up to a 20 foot pit relative to the surrounding seafloor may have minor near-field and far-field impacts on physical processes.

Potential near-field, or local, impacts include changes in wave and circulation dynamics. The creation of a pit may lead to changes in wave refraction and shoaling (Nairn et al., 2007). Wave refraction generally takes place over the seaward edge of the pit and leads to wave focusing at the pit margins. In general, the wave height will decrease over and inshore of the pit. The extent of wave recovery depends on the pit dimensions, degree of focusing, relative seafloor depth, and bottom-wave interaction, but is expected to occur in less than 4 times the pit length (Nairn et al., 2005). The effect is less for smaller pits; therefore, narrower and shallower pits tend to have a proportionally smaller effect, since wave refraction and focusing is reduced. However, elongated pits (length perpendicular to wave crest) tend to result in a higher disturbance of the wave field and require longer distances for wave recovery. Any disturbance to wave conditions is expected to be within natural variability of the incident wave climate and decrease in importance as the pit naturally fills.

A wave impact analysis using the STWAVE wave transformation model (Smith et al., 2001) was conducted to evaluate potential impacts due to the borrow area excavation and modification to the offshore wave climate. Simulations were run for 11 test cases described in Table 6 for both

the pre-excavation bathymetry and hypothetical post-excavation bathymetry (SJB Group/CEC, 2006). Each case consisted of running one coarse grid simulation and two nested grid simulations (pre- and post-excavated). A total of 33 simulations were run. For each case, the pre-excavated calculated wave heights and directions were subtracted from the post-excavated calculated wave heights and directions to compute corresponding differences caused by the proposed borrow area.

The "average condition" simulation results (Table 7: Cases 1 through 3) predicted that the proposed borrow area reduced wave height by up to 0.7 ft within the borrow area. The area of influence correlated with the angle of the offshore wave direction. The "storm condition" simulation results (Table 7: Cases 4 through 11) predicted a more pronounced effect of the borrow area on the wave height. Wave heights increased east and west of the borrow area on the order of one to two feet. Within the borrow area, wave heights generally decreased.

Table 7. Input wave parameters of STWAVE simulation cases.

Case #	Description	Offshore Wave Height (ft)	Offshore Wave Period (s)	Real World Angle (deg)	Wind Speed (ft/s)	Water Stage (ft, NAVD88)	Γ	nn
1*	SE average	3.1	4.5	135.0	18	1.0	3.3	4
2*	SSE average	3.8	4.9	157.5	21	1.0	3.3	4
3*	ESE average	2.8	4.3	112.5	18	1.0	3.3	4
4**	1-yr storm	18.3	9.9	197.0	64	1.6	3.3	4
5**	5-yr storm	21.2	10.6	197.0	71	4.0	4.0	8
6**	10-yr storm	22.5	10.9	197.0	72	5.9	4.0	8
7**	20-yr storm	23.7	11.5	197.0	78	7.7	4.0	8
8**	50-yr storm	25.4	12.0	197.0	85	9.5	4.0	10
9**	100-yr storm	26.7	13.0	197.0	98	10.3	5.0	12
10***	Katrina	22.9	16.0	130.0	94	7.2	6.0	20
11***	Rita	46.1	13.4	155.0	120	5.2	5.0	12

* based on WIS statistics
** based on extreme wave height analysis for various return periods
*** based on NOAA/NCEP analysis wave data (Western North Atlantic model)

Pit creation also leads to short-lived changes in the flow field within and above the pit and at the adjacent seafloor (Nairn et al., 2005; Nairn et al., 2007). Flow attraction results from the dynamic potential for the relatively deeper pit to pull water towards the pit in the direction of the dominant flow. Consequently, the flow speed and the resulting bed shear stress increase over the pit margin on the upstream side of the flow. Flow is correspondingly increased directly in the lee of the pit and decreased along two lobes off the downstream edge of the pit. It is important to note that the project area may also experience reversing flow direction depending on the meteorological conditions. In general, flow speeds actually slow over the pit and lead to enhanced sedimentation, whereas increased flow over margins lead to pit margin erosion. Numeral modeling and bathymetric/ADCP observations at the Peveto Channel borrow area have confirmed this behavior (Nairn et al., 2005; Nairn et al., 2007).

Pit margin erosion in muddy seafloor settings has been modeled and observed to extend for hundreds of meters adjacent to the pit, resulting in vertical elevation changes of up to 2-3 feet. Margin erosion is greatest early in the pit evolution process; the rate of pit infilling may be relatively constant initially, but decelerates exponentially for the latter part of the infilling

process. The pit is expected to fill relatively rapidly due to the reduction of flow speed over the pit that allows enhanced diffusion of sediment into the pit. Pit infilling occurs at a rate dependent on several factors including the pit dimensions and geometry, flow speed and orientation relative to the pit, and most importantly, background suspended sediment concentration. The Peveto Channel dredge pit was monitored for a four-year period following dredging, during which the pit filled more than two-thirds its dredged depth (Nairn et al., 2007).

Potential far-field impacts include the transforming effects on waves that ultimately propagate landward from the borrow area to the surf zone, where obliquely breaking waves and differential wave setup drive longshore sediment transport. It is possible that the gradients in breaking wave height, angle, and wave setup could be affected by wave interaction with the modified seafloor. Wave modeling showed the potential for minor impacts to the nearshore wave climate or sediment transport patterns in both average condition and storm condition analyses. In the "average condition" simulation, the differences in wave heights were minor (less than 0.1 ft) between the 11-ft isobath, which represents the long-term depth of closure, and Raccoon Island. Wave direction was affected insignificantly; the difference was on the order of one to two degrees. The potential impact of dredging was also simulated using a hypothetical "storm conditions." Storm conditions caused larger wave direction differences throughout the computational domain. The pattern of the differences depended on the offshore wave direction applied at the boundary. When waves were approaching Raccoon Island perpendicular (Table 6: Cases 4 through 9), the borrow area caused the waves to refract up to two degrees to the west at the west end of the island and up to two degrees to the east at the east end of the island. The magnitude of the effect was reduced in the immediate vicinity of Raccoon Island. This analysis does not account for the strong wave dissipation over muddy bottom common landward of Ship Shoal which would naturally make waves more diminutive (Sheremet et al., 2005). These minor changes in wave characteristics resulting from excavating the proposed borrow area are not expected to adversely impact Raccoon Island and are well within the range of natural variability.

4.1.2.5 Effects on Soil Distribution and Types

The dredge material used for marsh construction will consist of naturally occurring material deposited in the Gulf over time by the Mississippi River. Dredge materials naturally sort according to grain size during placement; however, the bulk of the material identified for the project from the borrow area consists of finer materials (average grain size 0.11 mm; 24.6% coarse fraction) and is preferable for marsh creation because of the higher silt and clay content. No significant impacts are expected on soil conditions.

4.1.2.6 Effects on Water Quality

Two different phases of operation could impact water quality: the dredging phase and the placement phase. Potential consequences associated with the offshore dredging required for implementation of the preferred alternative include: (1) increased turbidity in the water column at the dredge site and at the construction location; (2) exhumation of buried trash and debris; (3) discharges from the dredge vessel, and (4) local enhancement of hypoxic or anoxic conditions.

During dredging, material would be collected from the borrow area with a cutterhead or hopper dredge. When a hydraulic dredge is used, a turbidity plume results from the bottom agitation and as water is decanted overboard as the vessel or scow hopper fills with dredge material. Finer silts and clays may be discharged into the water and remain in suspension for longer periods of time than the heavier sand materials. The discharge would occur in waters approximately 20 to 30 ft deep and is expected to settle fairly rapidly in a matter of hours to days (depending on wave

and current intensity). Turbidity and suspended particulate matter levels in the water column above the preferred borrow area normally fluctuate due to seasonal riverine inputs and discharge rates and bottom-disturbing waves and currents. The increased turbidity is expected to impact water quality only in the immediate area of the dredging operations (W.F. Baird & Associates, 2004). Re-suspension by waves and current agitation and introduction of suspended sediment by Atchaflaya are highly variable and may mask any contributive turbidity caused by dredging (Kobashi et al., 2007).

The U.S. EPA and U.S. Coast Guard regulations require the treatment of waste (e.g., sewage, gray water) from dredges and tender/service vessels and prohibit the disposal of debris into the marine environment (USDOI, MMS, 2004). The Louisiana Department of Environmental Quality (LDEQ) also requires a Louisiana Pollution Discharge Elimination System (LPDES) permit and Storm Water Pollution Prevention Plan (SWPPP) for routine discharges associated with construction activity. As such, the dredge contractor will be required to implement a marine pollution control plan to minimize any direct impacts to water quality from construction activity. Implementation of the control measures required under this permit and plan, and applied to all activities in the entire project area, would ensure that any incremental contribution is minor in context of the normal discharges from the Mississippi and Atchafalaya Rivers.

No accidental spills of diesel fuel or produced oil and natural gas from pipeline rupture are expected during the proposed action. If an accidental spill did occur on the Outer Continental Shelf, it would most likely be between 0 and 50 bbl (USDOI, MMS, 2007). Sections 4.3.1.3 and 4.4.2 of the MMS Final Multi-sale EIS (2007) discuss in detail the risk of accidental oil spills from OCS activities and the potential impact on water quality (Section 4.4.2). A small, accidental spill would locally affect water quality within near-surface waters, but the spill could be cleaned and/or, depending on the size, would biodegrade naturally within several weeks (USDOI, MMS, 2007).

Dissolved oxygen content could potentially be impacted by increasing biological oxygen demand in the immediate area of the disturbed site. However, the relatively small volume of the disturbed sediment and overlying water column is expected to rapidly mix with the greater shallow Gulf volume and rapidly dissipate any effects of low dissolved oxygen. The creation of a deep pit may encourage limited horizontal and vertical mixing within the pit, which may be prone to stratification (Palmer et al., 2008). The pit may become hypoxic or anoxic when deposition of organic matter from surface water is high, and it is metabolized by biological processes (Nairn et al., 2007). The degree and duration of hypoxic/ anoxic conditions largely depends on natural conditions and infilling rate. The degree of low dissolved oxygen conditions are primarily related to coastal circulation, relative water depth, stratification, river discharge, and organic matter deposition. The regional low dissolved oxygen conditions associated with nutrient loading and the Gulf's hypoxic zone may diminish the influence of the pit itself.

Section 401 of the Clean Water Act, as well as LAC 33:IX.1507, require a water quality certification (WQC) to permit discharge to state and inland waters, including wetlands. During dike construction, turbidity levels may temporally increase in a relatively small area of the estuary behind the barrier island. During placement, dredge material will be pumped into a fully contained marsh creation cell thereby limiting disturbance to the targeted marsh creation site and minimizing impacts to the surrounding area. Once the material is settled, breaches in the containment dike will allow tidal exchange into the newly created marsh. Some export of dredge material will occur, but is expected to have minimal adverse impact to surrounding waters. A WQC (WW 080117-05/AI 136257/CER20080001) was obtained from the LDEQ during the Corps' Section 404 review and permitting process in April 2008.

4.1.2.7 Effects on Air Quality

Potential effects on air quality are similar to those discussed in detail in Section 4.2.2 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004) and are incorporated by reference. Terrebonne Parish is in an attainment area, and therefore, it is not subject to the conformity review provisions. Other sources of air emissions in the proposed project area are associated with the oil and gas industry, commercial vessel traffic, and commercial and recreational fishing activities.

Potential air quality impacts will be localized and short in duration, and largely associated with emissions from diesel engines powering the dredge. Emissions occur during dredging, propulsion between dredge site and mooring buoy, and pump-out operations. Additional emissions would result from tugs and tender vessels used to place and relocate scows, pipelines, and mooring buoys. On the island, impacts from diesel emissions would result from bulldozers, graders, and/or trucks. Emissions would occur over a period of about four to six months with most emissions occurring at the borrow area and between the borrow area and mooring just off of the island. The emissions would consist predominantly of nitrogen oxides, with smaller amounts of carbon monoxide, sulfur dioxide, particulate matter, and volatile organic compounds (VOCs). Prevailing winds would rapidly dissipate airborne pollutants and emissions would be limited to the project's construction phase.

MMS conducted an air quality modeling exercise using the Offshore & Coastal (OCD) model for a larger proposed project at New Cut between East and Trinity Islands in the Terrebonne Basin. The highest concentrations of criteria pollutants were predicted to occur within less than 1 km (3280 feet) of the dredging activity (USDOI, MMS, 2004); therefore, it is expected that the majority of emissions will occur over OCS waters. Criteria pollutants are expected to be lower and well within ambient standards over the barrier island because of diffusion processes over the distance between the borrow area and the marsh creation site. The preferred alternative would have no long-term adverse impact on present conditions.

4.1.3 Cumulative Effects on Physical Resources

The effects on water quality from the proposed Raccoon Island Shore Protection/Creation project would be limited to the dredging location and the slurry discharge site, and would occur over an area of <10 acres at any specific time during continuous dredging. Impacts on water quality would consist of increased turbidity, exhumation, and resuspension of any buried debris or sediment contaminants, and possibly a temporary increase in the BOD within the water column (USDOI, MMS, 2004). These impacts would occur within the region influenced by the seasonal fluctuations of the Mississippi and Atchafalaya Rivers' discharges. Routine discharges from the dredge or service vessel are expected to be within allowable limits. An accidental oil spill is not expected; however, if one occurred, it would likely consist of <100 gal of diesel fuel. Such a spill would biodegrade at sea and not make landfall. Air quality impacts from any individual project would be low. Cumulative impacts from all proposed and potential future and maintenance projects as well as all other emission sources in the area would be small.

4.2 Effects on Biological Resources

4.2.1 No Action Alternative

Under the no action alternative, biological resources will continue to be lost as the island erodes. Consequently, fisheries and wildlife habitat will be lost, including vast nesting habitat for the endangered brown pelican. The no action alternative will have no effect on the offshore borrow site.

4.2.2 Preferred Action

4.2.2.1 Effects on Beach and Intertidal Habitats

Beach habitat is mainly confined to the gulf (south) side of the island and is not expected to be directly impacted with the Phase B portion of the project (USDA, NRCS, 2005). However, the preferred alternative will benefit the beach in the long-term by significantly increasing the width of the island and reducing the vulnerability of the island to major breaches during major storm events. Intertidal habitat exists on the bay side of the island where marsh creation will take place, however much of the bank has eroded directly into the vegetation community. Therefore, the preferred alternative will have no adverse impacts on intertidal areas and may in fact increase intertidal area with the increased marsh-bay interface.

4.2.2.2 Effects on Open-Water Habitats

Under the preferred alternative, dredging and placement activities may result in minor, short-term impacts to open water habitats with increased turbidity in the water column at the dredge site and at the placement site, potential exhumation of trash and debris from the borrow site, and discharges from the dredge vessel. Use of Best Management Practices (BMP's), the provisions of the pollution prevention plan, and strict adherence to the Clean Water Act guidelines and other applicable regulations will avoid or minimize any potential impacts.

4.2.2.3 Effects on Benthic Habitats

A general discussion of the potential consequences of dredging offshore and construction activity can be found in Section 4.3.2 of the MMS Multi-Project Environmental Assessment (2004) and is incorporated by reference. The preferred alternative would involve a moderate disturbance to a relatively small area of seafloor in the vicinity of the borrow pit. The immediate direct effect of dredging is the entrapment of benthic primary producers, infauna, epifauna, and other sessile macroinvertebrates. The Louisiana continental shelf supports the same types of benthic invertebrates that comprise soft sediment assemblages, primarily polychaete worms, various crustaceans, and bivalve and gastropod mollusks (Baker et al., 1981). Analysis of sediment core samples taken after dredging has demonstrated that remaining benthics are decimated in the footprint of dredging often by smothering and burial (Frojan et al., 2008). Increased turbidity may also interfere with filter feeders and organisms that feed by sight. Colonizers of defaunated borrow areas area typically dominated by fast growing, opportunistic r-selected macrofauna

species, especially polychaetes. Succession occurs where r-selected colonizers are joined by a more diverse range of larger k-selected species (Palmer et al., 2008).

Indirect effects include changes in sediment size and transport dynamics in the vicinity of dredging, as well as changes to the water column caused by stratification and reduced water quality conditions. Localized physical changes have been observed in other locations following dredging including: 1) lower sand content; 2) higher silt/clay content; 3) poorer sorting (greater variation in grain size of sediment); and 4) accumulation of fine sediment (Jutte et al., 2002; Diaz et al., 2004; Palmer et al., 2008). Changes in sediment composition and accumulation rates, often related to variability in natural processes, can alter the suitability for burrowing, feeding, or larval settlement for some benthic species and result in different biological assemblage (NRC, 1995; Newell et al., 1998). Studies investigating the recovery of benthic communities following dredging (e.g., Blake et al., 1996; Newell et al., 1998; Van Dolah et al., 1992; Van Dolah et al., 1998; Posey and Auphin, 2002; Brooks et al., 2006; Diaz et al., 2006) have indicated that communities of similar total abundance and diversity can be expected to re-colonize dredge sites within several years. However, there is uncertainty whether the new benthic communities will fill the same trophic function and provide the same energy transfer to higher trophic levels as the original communities (Michel et al., 2007). Indirect impacts to benthic communities may include changes to dissolved oxygen content in both near-bottom waters and surficial sediments. The occurrence of low oxygen conditions would be expected to further limit the ability of benthic organisms to colonize the recovering area. At low oxygen levels, macroinvertebrates and larger fauna are replaced or outlasted by small opportunistic polychaetes (Rabalais et al., 2002; Palmer et al., 2008).

Much of the dredging recovery research has been conducted in borrow areas characterized by relatively shallow dredge cuts. The Peveto Channel excavation pit offshore Holly Beach, LA, dredged approximately 35 ft deep, was observed to be physically and biologically different from the surrounding area approximately three years after dredging (Palmer et al., 2008). The pit environment was differentiated by relatively smaller grain size and a less diverse and less abundant macrofaunal community, even though the pit had already infilled approximately 25 ft (out of 35 ft). The most dominant species inside the pit was the polychaete *Paraprionospio pinnata* compared to the polychaete *Mediomastus ambiseta* outside the pit. High accretion rates (~8 ft/yr) may be deleterious to some organisms and hinder the succession or recovery of the pre-existing fauna. Decreasing accretion rates over time should allow more diverse benthic communities to populate the pit (Nairn et al., 2007). In an area episodically affected by hypoxia, it is possible that stratification in the borrow pit may increase the probability of hypoxia (Palmer et al., 2008). However, the intensity, duration, and frequency of such events are unknown and would largely be dictated by naturally occurring processes. Later stages of colonization depend on environmental conditions after cessation of dredging. In the case of the Raccoon Island pit, the relatively shallower dredge depth (20 feet) should reduce the physical and biological recovery time.

Since impacts are localized and short-lived, no long-term significant impacts on benthic habitat and resources are expected. Nearshore benthic communities in the preferred borrow area already inhabit a dynamic environment subject to perturbations and disturbances, such as high turbidity from river discharge, tropical storms and hypoxia, which have the potential to degrade benthic community structure to a much larger degree (USDOI, MMS, 2004). Moreover, there is vast and comparable muddy habitat on the shallow Louisiana shelf to support these benthic communities.

4.2.2.4 Effects on Emergent and Submerged Aquatic Vegetation

The preferred alternative will create 68 additional acres of salt marsh habitat, including both herbaceous wetland species dominated by smoothcord grass (*Spartina alterniflora*) and woody species dominated by black mangrove (*Avecinnia germinans*). Although the preferred alternative would adversely affect 68 acres of subtidal area, the conversion of open-water area to intertidal marsh will also provide critical habitat for numerous estuarine-dependent fisheries species and seabird communities. The additional land creation on the island will prolong the life of the island by providing stability where erosion has been degrading gulfside mangrove communities. No impact to SAV is expected since it has not been documented to occur on or near the island in recent history.

4.2.2.5 Effects on Wildlife Resources

4.2.2.5.1 Coastal Birds

The increase in subaerial habitat through marsh creation is expected to have a significant positive impact on nesting and colonial water bird use as well as that of migratory neotropical and shorebird species. A large portion of the newly created land mass is expected to become vegetated by woody species (primarily mangrove), which is considered critical habitat for migrating neotropical birds in fall and spring and for colonial nesting waterbird habitat, particularly the endangered brown pelican (refer to section 4.3.2.1 for more detail on impacts to threatened and endangered species). While construction is expected to cause minor disturbance to the various coastal bird species that utilize the island habitat, timing restrictions (LAC 76:III.331) specified by the Louisiana Department of Wildlife and Fisheries will minimize any potential for disturbance and impact.

4.2.2.5.2 Mammal and Reptile Resources

No mammals or reptiles are anticipated to be adversely effected by the preferred alternative. Dredging at the borrow area or dredge vessel transport has the potential to cause some disturbance (including noise (Richardson et al., 1995)) to sea turtles, Atlantic bottle-nosed dolphins or rare manatees; however, the mobility of this species will allow for avoidance by the species (refer to section 4.3.2.1 for more detail on impacts to threatened and endangered species). Because the marsh creation cell will be contained off of the terrestrial portion of the existing island, there should be no adverse impact to mammals or reptiles inhabiting the island.

4.2.2.6 Effects on Fishery Resources

Potential effects on fish are similar to those discussed in detail in Sections 4.3.6 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004). Finfish species could potentially be harmed at the borrow area by entrainment in the dredge. Other impacts of the dredging would be disturbance to seafloor habitat and suspension of solids in the water column that may impact demersal and pelagic species through disruption of vision and gill function. However, adult, mobile aquatic species would be expected to move away from the project area during construction and return following completion of the construction (Van Dolah et al., 1992). Juveniles are likely more vulnerable than adults due to their slower swimming speed. Invertebrates and fish that are not able to move out of the immediate vicinity of

construction would likely be injured as suspended particulates cause gill clogging (W.F. Baird & Associates, 2004). Short-term moderate effects on pelagic fish eggs and larvae in the immediate area may occur. Finfish species that have eggs and larvae in surface waters may be impacted by the hopper dredge making numerous transits through the borrow area; any eggs in the path of the dredge are likely to be destroyed by the ship's propeller. Because eggs and larvae are widely distributed over the continental shelf, egg destruction is not expected to cause significant impacts to fish populations.

Other potential impacts to demersal fish and mobile invertebrate species include: 1) loss and or modification to benthic prey resources; 2) degradation of nursery or spawning area; and 3) susceptibility to the hypoxia in the lower part of the water column (evaluated based on mobility) (Diaz et al., 2004). If the higher trophic levels are food-limited, the loss of prey production will be directly proportional to net loss in production of predators. However, the preferred borrow area does not represent unique habitat on the shallow inner shelf; therefore, motile species are likely to move to near by equivalent habitat. As with resident benthic communities, the nearshore fisheries communities near the preferred borrow area already are subjected to frequent perturbations and disturbances such as high turbidity from river discharge, tropical storms and hypoxia. These factors all routinely affect communities on a much broader scale than the scope of this project. Most pelagic species are highly mobile and will avoid construction disturbance. Those species that are immobile are subject to entrapment may perish but populations will rapidly recolonize disturbed areas following construction. Refer to section 4.3.2.2 for further information on effects to EFH.

4.2.3 Cumulative Effects on Biological Resources

The impacts on biological resources from the proposed Raccoon Island Shore Protection / Creation project are minimal to negligible. The proposed removal of 830,000 yd^3 of sand from the borrow area would not result in significant adverse effects on sensitive coastal resources. Modeling indicates that very large volumes of sand could be removed from Ship Shoal with no adverse effects on sensitive coastal resources (USDOI, MMS, 2004). Ship Shoal has an estimated 216 mi^2 of crest area with sand thickness >1 m. Neither the total volume of sand requested nor the range in estimated sea-bottom area disturbed is significant. Significance is judged on the basis of comparison to the total volume of requested sand, and the total area potentially subject to direct disturbance from dredging.

The total volume of sand present and potentially available for shoreline and barrier island restoration projects from just the crest area of Ship Shoal is approximately 146,500,000 yd^3. Total requested sand for the project is approximately 830,000 yd^3 (< 0.1 percent of the total estimated sand available on Ship Shoal). The total maximum sea-bottom area subject to direct disturbance by dredging is 0.28 mi^2; minimal compared to the maximum estimated shoal crest area of 216 mi^2 with sand thicker than >1 m. The impact on benthic communities caused by the bottom area actually disturbed would be determined by the depth sand is dredged. Nearshore benthic communities on Ship Shoal already inhabit a dynamic environment subject to perturbations and disturbances, such as high-turbidity from river discharge, tropical storms, and hypoxia, which have the potential to degrade benthic community structure to an equivalent and greater degree.

No significant long-term impacts to the nearshore benthic community as a whole are expected because recolonization of sediment exposed in dredged areas would occur rapidly, within 2-3 years. Although the number of individuals, species, and biomass of benthic infauna may approach predredging levels within 2-3 years, recovery of predredging community composition and trophic structure may take longer. The area of adjacent and equivalent habitat on Ship Shoal

that lies outside of the proposed sand borrow polygon is substantial. Large numbers of individual invertebrates and infaunal organisms would be killed during exposure or transplantation into incompatible environments as they are swept up by the dredge draghead, transported, and redeposited onshore. Alteration of the sediment grain size and reduction of infaunal populations will also have an indirect effect on the recolonization and composition of certain demersal fish and other epibenthic predators. While some dredged areas may create depressions or swales that temporarily reduce or impair the shoal's capacity as a refuge from hypoxic conditions, the area affected would be small and the impairment would be temporary. Therefore, these impacts are not expected to be significant in relation to the entire shoal area that is available as habitat.

4.3 Effects on Critical Biological Resources

4.3.1 No Action Alternative

Under the no action alternative, critical habitat of the endangered brown pelican will continue to be lost as the north side of the island erodes through the nesting habitat. The continued degradation of the island will also impact EFH and potential sea turtle habitat with continued decline and eventual loss of the island.

4.3.2 Preferred Alternative

4.3.2.1 Effects on Threatened and Endangered Species

Potential effects on protected coastal birds, fish, sea turtles and marine mammals are similar to those discussed in detail in the Final Plan / Project EA (USDA, NRCS, 2005), Sections 4.3.3 and 4.3.4 of the Final EA for the Use of OCS Sand Resources from Ship Shoal (USDOI, MMS, 2004), and MMS' Multi-Project Biological Assessment for Ship Shoal (Appendix I). U.S. FWS service provided a letter of concurrence of no adverse affect for listed species on June 3, 2008. Formal consultation with NMFS for multi-project dredging in the vicinity of Ship Shoal was completed in 2005 (Consultation Number F/SER/2003/01247) and reviewed for applicability to this project in 2008 (Eric Hawk, e-mail correspondence on 6/26/2008).

Dredging and placement activities are not expected to result in any bird fatalities, but may result in short-term behavior modification and temporarily displacement from preferred habitat. Potential impacts include a temporary localized increase in turbidity, noise disturbance to any birds roosting or foraging in the project area, and reduced access to aquatic prey organisms (FWS, 2008). Such impacts are expected to be minor since island construction will be conducted during the non-nesting period and in accordance with LDWF regulations for the Isles Dernieres. Over the long-term, the new 68 acre habitat created by the proposed project would also be available for potential nesting and foraging by diverse bird groups and individuals.

Sea turtles and Gulf sturgeon identified as potentially being present within the proposed project area may be adversely affected (USDOI, MMS, 2004). NMFS determined that leatherback and Hawksbill sea turtles were not likely to be affected since those species prefer pelagic offshore waters and tropical reef and hard-bottom habitats compared to sandy and muddy seafloor habitat (Appendix II). Since Gulf sturgeon is generally not found west of the Mississippi River, NMFS also concluded Gulf sturgeon were not likely to be adversely affected (Appendix II). Similarly, the five whale species, some of which are observed only occasionally in the Gulf, rarely occur in

nearshore waters. Based on the improbability of their presence and low likelihood dredged interaction (albeit collisions are possible), NMFS determined whales were not likely to be adversely affected (Appendix II).

NMFS determined that loggerhead, green, and Kemp's ridley sea turtles were vulnerable to take from certain dredge operations (Appendix II). Potential direct impacts include noise disruption, collisions between equipment and tender vessels, and dredge entrainment resulting in fatality. However, notable differences in impacts to sea turtles are expected and depend on the use of cutterhead or hopper dredge. Hydraulic cutterhead dredges are unlikely to kill or injure sea turtles since the cutterhead encounters a relatively smaller area of seafloor per unit time, allowing more time for avoidance (Appendix II). Artificial lighting used during nighttime construction can also affect adults and hatchlings, which can be strongly attracted to light sources. Hatchlings moving toward construction lights and away from the relative sanctuary of the ocean may face an increased fatality rate. Indirect impacts include interference with resting habitats, disturbance to benthic foraging habitats and water quality, and disruption of prey base, such as benthic invertebrates, demersal fish, and shellfish. Nearshore habitat for foraging sea turtles is present in sufficient quantity such that removal of relatively small areas of habitat will not cause measurable adverse affects. These less productive benthic areas are expected to be recolonized as the borrow pit fills. Turtles should be able to avoid temporary degradation of water quality associated with the borrow pit since they are highly mobile. Provided the reasonable and prudent measures required by NMFS for hopper dredging (Appendix II) are followed as prescribed (including the use of intake and overflowing screening, draghead deflectors, observers, and reporting), the proposed impact on threatened and endangered turtles would be minor.

4.3.2.2 Effects on Essential Fish Habitat (EFH)

Short-term and localized, adverse effects on EFH and fish resources associated with the proposed action may result from dredge entrainment, coastal and marine water quality and bottom habitat degradation, as well as accidental offshore pollutant discharge. In general, mobile fish would be able to swim clear of the operating dredge and tender vessels; only the less motile finfish and shellfish would be expected to be entrained in the dredge and be killed (Van Dolah et al., 1992). While several species of shrimp occur ephemerally in the project area, the muddy area and adjacent Ship Shoal do not appear to be particular sanctuaries or unique habitats (Craig and Crowder, 2005; Grippo et al., in preparation).

Since the majority of fish species are estuary dependent, the loss of shallow open water habitat and temporary environmental degradation during construction of the marsh and placement of dredge material has potential to adversely affect EFH and fish resources since marsh and shallow estuaries serve as vital nursery habitat. Some species may experience short-lived functional impairment through decreased water quality, affecting feeding and respiratory faculty. However, in the long term, the preferred alternative is expected to greatly improve EFH by re-establishing 69 acres of complex back-barrier island habitat and protecting existing marsh habitat from further erosion or physical impact. Marsh, inner marsh, and marsh edge habitat would increase with the vegetative plantings and hydrological features added post-construction. Detrital material, formed by the breakdown of emergent vegetation, would contribute to the aquatic food web and ecosystem. Decreases in erosion rates and tidal scour also would protect back-barrier SAV, estuarine mud bottoms, and marsh ponds.

The preferred alternatives could potentially benefit a range of species, including brown shrimp, white shrimp, red drum, gray snapper, Spanish mackerel, King mackerel, blue fish, cobia, bonnethead shark, sharpnose shark, and lane snapper, since these species depend on various

types of estuarine features during their life cycles. Short-term, unavoidable, adverse impacts to brown shrimp, white shrimp, red drum, gray snapper, and Spanish mackerel would occur during the construction phase of the project as marsh is filled. However, post-construction increases in quality and quantity of the marsh would offset these impacts. Turbidity would return to ambient conditions immediately following construction.

Although unexpected to occur, dredge discharges or diesel spills or pipeline rupture during dredging and placement activities can impact fish and habitat. A detailed description of potential effects of hydrocarbons on fish is provided in Section 4.4.10 of the Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012 EIS (USDOI, MMS, 2007). Any accidental spills that do occur are likely to be relatively small, and therefore, will also be rapidly dispersed, unless spills contact barrier island or back-barrier shoreline. In open water, floating eggs and larvae, and juveniles with limited mobility may be killed. Fatality and injury could occur by direct ingestion or ingestion of contaminated prey, or through uptake through gills and epithelium by adult fish. Generally, sub-adults and adults will be able to avoid a spill, limiting the deleterious effects.

Short-term adverse indirect impacts to EFH could result from dredging the offshore borrow area. Turbidity of the water column would increase during dredging activities, affecting pelagic and shallow EFHs of brown shrimp, white shrimp, red drum, king mackerel, bluefish, cobia, dolphin, bonnethead, sharpnose, lane snapper, and other pelagic and reef fish. Turbidity would be expected to return to ambient conditions once dredging is complete (W.F. Baird & Associates, 2004). Estuary-dependent fish species and demersals may be present in the offshore area, but do not necessarily exhibit sole preference for the muddy habitat type found in the proposed area. Because of the nature of the deep borrow pit and its expected short-term impact on local circulation, dissolved oxygen levels, sedimentary characteristics, and impacts on benthic communities may affect higher trophic levels of epibenthic predators and demersal fish (Michel et al., 2007). Again, the footprint of the dredge area is relatively small compared to similar and undisturbed muddy habitat and benthic communities on the shallow inner shelf. Abundance, biomass, diversity, and species composition are locally decreased immediately following dredging activities. As the borrow pit fills, re-colonization of the dredged area is expected by migration of larval, juvenile, and adult organisms into the de-faunated area, although initial species richness will be reduced (Diaz et al., 2004; Brooks et al., 2006). Initial re-colonizers may not be the same species that were present in the area prior to dredging. Other potential short-term impacts to EFH include behavior modification, such as movement of prey species away from the borrow area because of noise and interruption of feeding or spawning. Because hundreds of thousands of acres of similar substrate are available outside of the relatively small area to be dredged, no significant effects on EFH from biologically coupling to physical perturbations are expected. The potential short-term and localized consequences of the proposed action are minor, especially when balanced by the long-term improvement in estuarine EFH by re-establishing inter-tidal creeks and marsh and protecting marsh habitat from erosion.

4.3.3. Cumulative Effects on Critical Biological Resources

Negligible impacts are expected to threatened coastal and marine birds and would be restricted to behavior modifications and temporary displacements from preferred nesting, roosting, or feeding areas caused by the temporary disturbances of dredging and placement of fill materials. The marsh creation project takes place adjacent to critical habitat for nesting brown pelicans, but the project is scheduled to take place during the non-nesting period.

Negligible impacts on fish and EFH are expected despite the possibility that shoal waters over Ship Shoal may act to attract fish or provide a refuge from hypoxic conditions (USDOI, MMS, 2004). This conclusion is based on the OCS area of sea bottom on the shoal that is potentially

affected. It is very small (approximately <1%) relative to the available and unaffected habitat areas on Ship Shoal. No estuary-dependent or demersal fish species require Ship Shoal or a sandy bottom substrate to sustain its life cycle, although estuary-dependent fish and demersals can be found there. For example, Condrey and Gelpi (2009) recently found that Ship Shoal is an important offshore spawning/hatching/foraging ground for a large segment of the Gulf of Mexico blue crab fishery from at least April to October. During this time, mature female blue crabs appear to be in a continuous spawning cycle, producing new broods approximately every 21 days while actively foraging on the Shoal to supply the necessary energy for this continuous reproductive activity. Sand mining on the Shoal is expected to locally impact blue crab fecundity and food supply. In addition, increases in suspended sediment associated with dredging may increase mortality of crab larvae. Consequently, Condrey and Gelpi (2009) caution that large-scale sand mining practices on Ship Shoal, which could significantly disrupt blue crab spawning, should be carefully considered.

No managed fish species occupying the OCS is potentially impacted by the proposed sand dredging project. Although pink shrimp may inhabit sand habitat, they prefer calcareous sediments and are only present in low numbers in the Ship Shoal area. On Ship Shoal, the development of seasonal hypoxic conditions may be minimal due to aeration of these shoal waters by wave activity. Fish species inhabiting the crestal area of the shoal could be completely unaffected by hypoxic perturbations on the adjacent OCS.

Fish populations could be indirectly impacted in two ways. First, hypoxic conditions on the adjacent OCS may attract fish to more aerated shoal waters, inflating fish populations in this area. Second, a larger population of fish is more dependent on the vitality and abundance of local food sources. If invertebrate food resources available to fish in the sandy substrate are stressed by physical disruption of bottom area during dredging it pressures the fish population. The maximum aerial extent of this sea bottom disruption, however, has been shown to be very small relative to available and unaffected habitat. Although these indirect affects are acknowledged, their impact on fish and EFH is negligible to very minor. Ship Shoal is not a known habitat for the threatened Gulf sturgeon at any time of the year. No impacts on the Gulf sturgeon would be expected from the proposed action.

Other activities not related to dredging programs use the same OCS space and can have adverse impacts on sea turtle populations inhabiting or transiting these shoal waters. Sea turtles are highly migratory and not strict residents of the action area; therefore, they are likely to be affected by human activities both within and outside the action area and throughout their geographic range. The proposed dredging and beach nourishment activity, onshore and offshore, would likely be coincident with turtle nesting season, which takes place from late spring through mid fall. The amount of activity at any one time, both onshore and offshore, would not be expected to interfere to any significant degree with sea turtle nesting, hatchlings, or sea turtle migration through the nearshore area.

4.4 Effects on Cultural Resources

4.4.1 No Action Alternative

The no action alternative will have no effect on cultural resources.

4.4.2 Preferred Alternative

4.4.2.1 Terrestrial Archeological Cultural Resources

The preferred alternative would have no adverse effect on any cultural resources listed on or eligible for listing in the National Register of Historic Places. No significant terrestrial cultural resources are known to exist in the project area.

The Chitimacha Tribe of Louisiana has indicated that the project area is located within the aboriginal Chitimacha homelands (Corps 404 permit, MVN-2008-0143 CQ, June 18, 2008). However, no known prehistoric or historic cultural resources, including tribal resources, are known to exist in the project area.

4.4.2.2 Offshore Archeological Cultural Resources

Dredging operations may severely disturb or destroy a historic shipwreck causing the loss of potentially important historic archaeological information (Michel et al., 2004). There are no known historic resources in the offshore portion of the project area, but magnetic and acoustic anomalies identified in remote sensing surveys must be considered. Magnetometer surveys resulted in the identification of one pipeline, one anomaly cluster that may represent a pipeline, and three anomaly clusters, designated Targets 5, 6 and 7, that may represent significant submerged cultural resources. All of these anomaly clusters will be avoided during dredging and construction operations by the minimum standards set by MMS (Nairn et al. 2005) of at least 200 ft. No potentially significant side scan sonar or sub-bottom profiler contacts were identified during remote sensing data analyses.

The proposed offshore borrow area is the individual channel course of a late Holocene distributary channel of the Mississippi River (Lafourche delta lobe). These areas have the high potential for the occurrence and preservation of prehistoric archeological deposits. It is not possible to identify and evaluate the archaeological potential of all geomorphologic features beneath the seafloor because of seismic signal attenuation. It is possible, although unlikely, that dredging operations may disturb or destroy prehistoric archaeological resources within the proposed project area. The only way to mitigate the potential impacts from the dredging activities is to monitor dredge material and modify operations if there is indication of any impact to a prehistoric archaeological site. A random archaeological monitoring plan could be designed for and implemented at the marsh creation site to examine placed marsh fill for items that may have prehistoric, historic, archaeological, or cultural value. Such evidence would include, but is not limited to, burned bone, burned shell, burned vegetative matter, charcoal, concentrations of shell or fragments of rock used in tool manufacture (e.g., chert, quartzite, or obsidian). Visual inspections and shovel tests, using standard archaeological survey procedures and spatially documented using GPS, should occur at least every two weeks. If professional archaeologists discover items of archaeological interest within the fill material, operations must be suspended immediately until further notification. The location where the items were found will be noted and cross-referenced to the location of the dredge when the items were dredged form the borrow area. Alternatively, dredge material could be monitored in the hopper or scows during actually dredging operations. If there is a chance find that is determined to be significant, the dredge will be relocated to another section of the proposed borrow area.

With the described avoidance and monitoring mitigation, the potentially adverse impacts would be minor.

4.4.3 Cumulative Impacts on Cultural Resources

The project can anticipate potential adverse impacts on historic archaeological resources and offshore OCS infrastructure. Mitigations would remove the likelihood of these impacts occurring. Impacts are possible on historic archaeological resources because knowledge of the locations of all known shipwrecks in the relatively shallow waters of the inner continental shelf is incomplete (USDOI, MMS, 2004). The potential impacts of the proposed action on historic archaeological resources can be avoided if a remote sensing survey is conducted in advance of the proposed dredging activities. No impacts on prehistoric archaeological resources or the existing equities of environmental justice would be expected.

4.5 Effects on Social and Economic Resources

4.5.1 No Action Alternative

Under the no action alternative, habitat for commercially and recreationally important species would continue to decline. The coastal protection to inland resources afforded by the physical presence of the island would be lost.

4.5.2 Preferred Action Alternative

The preferred alternative would not be expected to affect social and economic resources adversely. Under the preferred alternative, marshes created in the project area would provide forage, nursery, and grow-out sites for a variety of commercially and recreationally important fisheries species. Improvements to barrier-island and marsh habitats would affect fisheries resources positively and indirectly support nearby businesses that provide services to recreational and commercial fishing parties. During the period of construction, a small increase in employment of dredge operators, crew members, and other construction-related technicians would occur.

4.5.2.1 Commercial Fisheries Resources

Commercial fisheries could be impacted from mechanical disturbance of the sea bottom on those fish or shellfish species with benthic lifestyles inhabiting the featureless sandy bottoms in the area of Ship Shoal (USDOI, MMS, 2004). Impacts on the shrimp fishery are expected to be negligible because brown and white shrimp prefer mud bottoms (Defenbaugh ,1976; Williams, 1965). Though pink shrimp are thought to prefer sand bottoms, they prefer calcareous sediments and are only present in the Ship Shoal area in low densities. Commercial fishing is likely to be adversely affected with respect to fisheries dependant on the bottom habitat of the borrow areas, primarily shrimp trawling. Commercially important pelagic species fished on the inner OCS, such as menhaden, feed on midwater plankton. An additional indirect affect could occur on commercial fisheries as a result of increased fish landings in summer months from the shoal waters on Ship Shoal. If fish congregate in shoal waters as a refuge from hypoxic conditions, they are vulnerable to increased taking, and perhaps overfishing, by commercial fisherman who ply the area during the summer when hypoxic conditions are present in adjacent, deeper water on the OCS.

4.5.2.2 Recreational Resources

The impact-producing factors associated with sand dredging, transport, and beach nourishment that could affect recreational resources include (1) increased turbidity and water quality degradation from resuspended organic matter in the dredge plume, (2) material spills from the dredge vessel, (3) visual impacts from shore, (4) temporary unavailability of preferred recreational fishing space due to presence of the dredge vessel or dredge plume, and (5) degradation of dredged areas on Ship Shoal that may be habitat for fish desired by recreational fishers.

Visitors attracted to the northern GOM coast are responsible for thousands of local jobs and billions of dollars in regional economic activity. Most recreational activity occurs along shorelines and includes such activities as beach use, boating, camping, water sports, recreational fishing, and bird watching. The offshore location of the dredge operations limits the affects that the dredge plume (i.e., increased turbidity and water quality degradation from resuspended organic matter) or diesel spills can have on recreational resources. Because dredging will be taking place in relatively clean offshore environments, no chemical contaminants would be expected in the dredge plume. No accidental spills from the dredge vessel would be expected; however, the possibility exists and would be acted upon in the timely manner. These impact-producing factors would have no practical effects on recreational activities that take place onshore, including area beaches, which are not accessible by land. The Isles Dernieres barrier islands are precluded from land transportation access, and only people venturing there in private or charter boats would even know that sand placement operations for beach nourishment were taking place.

Only waterborne recreational activities such as boating, fishing, or diving would potentially be affected by the offshore presence of the dredge vessel, dredge plume, or service vessel. Pleasure craft may encounter the dredge vessel while in operation, but motorboats are highly mobile and they can just move on to equivalent and unoccupied areas. The dredge vessel or surface plume may disturb surface waters and occupy space sought by recreational fishers in private boats or charters; however, the footprint of these temporary impacts is so small and the undisturbed equivalent area that is available is so vast that the impact is negligible. There are no artificial reef sites anywhere near the proposed sand borrow areas; therefore, potential diving attractions do not exist. The consequences of boaters encountering the dredge vessel in operation are insignificant and may consist of nothing more than experiencing unpleasant odors.

Recreational fishers may be impacted by degraded sea-bottom areas subject to dredging. Game fish dependent on vital and healthy sea bottom may be temporarily displaced until bottom conditions and food source trophic structure is reestablished in 2-3 years (Coastline Surveys Limited, 1998; Newell et al., 1998).

Visual or aesthetic impacts from shore are possible if anyone deliberately sets out to visit these isolated barrier islands. The dredge ship could be viewed from the islands of the Isles Dernieres barrier arc because a sea-level observer is capable of viewing a ship at sea up to 11-15 mi (18-24 km) depending on atmospheric conditions. The area within approximately a 35-mi (56-km) radius of the dredging locations on Ship Shoal, however, is completely uninhabited except for workers on OCS production platforms. The nearest habitation is the hamlet of Cocodrie, Louisiana.

4.5.2.3 Oil and Gas Infrastructure

The preferred alternative would provide increased storm protection to oil and gas infrastructure located landward of the barrier island. However, dredging, anchoring, and pipeline laying may pose some risk to existing pipelines and related infrastructure in the vicinity of the borrow area and in the shallow inner shelf seaward of Raccoon Island (USDOI, MMS, 2004). No wellhead structures or boreholes are within the proposed borrow area; therefore, no hazards to wells or abandoned casing or casing stubs are expected. Potential impacts to pipelines include mislocated anchoring or spudding, exhumation by suction draghead or cutterhead, and snagging or puncturing an exhumed pipeline by dredging equipment. The worst case scenario resulting from dredging, anchoring, spudding, or pipeline laying would be a pipeline rupture followed by release of oil or natural gas. A shallow hazards survey has been conducted to locate pipelines, since pipelines are known to shift as a result of strong bottom boundary layer forcing and bed movement during storms and hurricanes. MMS has notified all offshore leaseholders and pipeline operators in Ship Shoal lease blocks of the proposed action. To avoid impacts to infrastructure, all excavation will be required to be performed within the horizontal and vertical limits of the approved borrow area. At least 1000 ft buffers from existing infrastructure will be required in construction plans and specifications to avoid direct or indirect impacts to oil and gas infrastructure, including potential rupture and exposure. The dredge operator will also be required to have continuous electronic positioning equipment that will accurately and continuously compute and plot the position of the dredge; that location information will be regularly reported to both USDA and MMS. The dredge operator will also be required to establish lighted marker buoys along the perimeter of the approved borrow area; it is recommended that submerged pipelines within ¼ mile of the beach landing and pipeline crossings also be marked with lighted buoys. Pit margin erosion is expected to occur rapidly immediately after dredging at the offshore borrow area, and the associated physical processes may uncover pipelines that are required to have at least 3 feet overburden. Exhumed pipelines are more vulnerable to damaged by other activities, as well as lateral movement as a result of strong waves and currents. The MMS will require a suite of pre- and post-bathymetric surveys extending at least 350 m from the borrow pit to monitor pit infilling and margin erosion. Adherence to these mitigation measures will avoid impact to oil and gas infrastructure.

4.5.2.4 Environmental Justice

Federal agencies are directed by Executive Order 12898 to assess whether their actions would have a disproportionate and negative effect on the environment and health of people of ethnic or racial minorities or those with low income. No disproportionate impacts on ethnic or racial minorities or poor people would result from this action.

4.5.3 Cumulative Effects on Social and Economic Resources

Adverse impacts would be expected on commercial and recreational fisheries that are dependent on, or that inhabit, the sea bottom in the proposed borrow areas (USDOI, MMS, 2004). No managed fish species in the OCS, however, requires Ship Shoal or a sandy bottom substrate to sustain its life cycle. Although estuary-dependent fish, shellfish, and demersals can be found on Ship Shoal, most do not exhibit preferences for the habitat type found in the proposed borrow polygon as opposed to extensive adjacent shoal water habitat that is equivalent. Shrimp and demersal fisheries may be adversely affected through a combination of (1) removed or degraded bottom substrates, (2) creation of bottom topography that restricts circulation or ponds hypoxic bottom water, and (3) temporary removal of invertebrate food sources that inhabited borrowed areas. A space-use conflicts between

commercial fisheries and the dredging operation will be minimized by (1) proper marking of the offshore mooring buoy and slurry pipeline location and (2) notifying fishers through such mechanisms as the U.S. Coast Guard *Local Notice to Mariners*, a free publication available to all fishers. If fish congregate in shoal waters as a refuge from hypoxic conditions, they are vulnerable to increased taking, and perhaps overfishing, by commercial fisherman who ply the area during the summer when hypoxic conditions are present in adjacent, deeper water on the OCS.

Negligible impacts on the region's population and educational level would be expected. Minimal impacts on the region's employment levels, existing onshore infrastructure, land-use patterns, navigation patterns, port usage, and recreational resources could be expected.

Adverse impacts are possible on OCS offshore infrastructure as a result of the potential to damage OCS pipelines during, or as a result of, the dredging operation. A ruptured pipeline can cause an oil spill less than or equal to 1,000 bbl, according to the spill analysis MMS performed for the latest CPA/WPA Multisale Final EIS (USDOI, MMS, 2002). Direct impacts from the dredging operation itself are possible. Also possible are indirect impacts caused by exhumation of pipeline segments, making them more vulnerable to both the dredging operation itself and to other potential hazards. Direct and immediate impacts can take place by one or a combination of the following events or conditions: (1) exhuming a pipeline while removing sand, (2) snagging or damaging a pipeline with the dredging draghead, and (3) damaging a pipeline's corrosion protection, increasing the change for early failure or the need for replacement earlier than would otherwise have been contemplated. If exhumation does not directly impact the pipeline during the dredging operation, indirect impacts can result from a pipeline becoming more vulnerable to damage by subsequent and unrelated activities such as (1) snagging on shifting or rupture potential during high seas in hurricanes and storms. No impacts on existing offshore OCS surface platforms, subsea production structures, or wells would be expected because they do not occur within proposed sand borrow sites. The potential impacts of the proposed action on existing OCS pipelines can be avoided if mitigation of a 1,000 ft (305 m) required setback distance is maintained between dredging sites and existing OCS infrastructure.

5.0 CONSULTATION AND PUBLIC PARTICIPATION

The restoration and protection of coastal wetlands in Louisiana is a leading concern of the state's citizens. Many state, federal, and local agencies and special interest groups have taken an active role in the conservation of Louisiana's wetlands. Public involvement and input in solving the state's coastal land loss problems are crucial to the success of the program.

This document has been coordinated with appropriate congressional, federal, state, and local interests, as well as other interested parties. The supplemental EA and the associated unsigned Finding of No Significant Impact will be sent to:

U.S. Department of the Interior, Minerals Management Service
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
    Habitat Conservation Division, Baton Rouge, LA
    Protected Resources Division, St. Petersburg, FL
U.S. Department of Army, Corps of Engineers, New Orleans District
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources
    Coastal Management Division
    Coastal Restoration Division

Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer, Division of Archaeology
Louisiana Universities Marine Consortium

Representatives from the Louisiana Department of Natural Resources/Coastal Restoration Division (LDNR/CRD), LDNR/Coastal Engineering Division (LDNR/CED) and LDWF participated in multiple field investigations of the project area with NRCS personnel. The LDNR/CRD & CED, and LDWF provided technical data and assistance to NRCS. Comments received from the Louisiana Coastal Wetlands Conservation Restoration Task Force agencies and landowners on the development of the Corps' Section 404 permit application were considered.

6.0 RECOMMENDED PLAN

6.1 Purpose and Summary

The primary objectives of the Raccoon Island Shoreline Protection and Marsh Creation project are to significantly reduce the wave energy impacting the gulf shoreline, create an intertidal buffer to extend the longevity of existing and created bayside dune and supratidal areas, and provide additional critical nesting, foraging, and resting habitat for brown pelicans, colonial waterbirds, and neotropical migrants. Project objectives will be accomplished by using structural and non-structural means to dampen wave energies from the Gulf of Mexico, create approximately 68 acres of barrier island habitat and incorporate vegetative plantings utilizing woody and herbaceous plant species. The alternatives developed have been analyzed for their ability to meet project objectives and avoid or minimize impacts to critical resources. The Shoreline Protection/Marsh Creation alternative has been determined to most adequately meet project objectives, while enhancing and protecting native resources. Geotechnical and survey data has been collected by LDNR and NRCS to determine whether the marsh creation measures will have the ability to accomplish project objectives. The critical parameters analyzed were soil foundation conditions for the marsh creation area and the quality and source of dredged borrow material.

7.0 PROPOSED MEASURES

7.1 Proposed Project Features

Create approximately 68 acres of additional barrier island habitat (marsh creation);
Plantings of woody and herbaceous plant species.

7.2 Structure Descriptions

An earthen containment dike encompassing the marsh creation cell will be constructed on the bayside of the island to be filled with sediment dredged from a selected borrow site located offshore approximately 3.8 miles from the island. The project will create a total of 68 acres consisting of 54 acres of subaerial intertidal habitat, 11 acres of subaerial supratidal habitat 2.0-4.9 ft NAVD 88, and 3 acres of subaerial supratidal (dune) habitat ≥5 ft NAVD 88.

7.3 Non-Structural Descriptions

Appropriate application of vegetation plantings will be made on newly created disposal areas. The selection of plant species will be based on the finished elevations of subareal and intertidal habitat. For example, protected intertidal zones in the marsh creation area will be planted with a combination of black mangrove and smooth cordgrass. Areas at marsh elevation will be planted with marshhay cordgrass. Areas of high marsh through dune elevation may be planted with a combination of marshhay cordgrass and bitter panicum (*Panicum amarum*). On higher elevations (≥5 ft NAVD 88), plantings of other woody plant species, such as wax myrtle, marshelder, matrimony vine, or Hercules club (*Zanthoxylum clava-herculis*), may also be determined appropriate. Final design and species composition of all vegetation applications will be determined in consultation with LDWF and LDNR.

8.0 MITIGATION MEASURES

- Implement a marine pollution control plan to minimize any impacts to water quality from construction activity.
- Provided a trailing suction hopper dredge is used to dredge offshore sediment, the suite of non-discretionary measures and conservation recommendations identified in the 2004 NMFS biological opinion (F/SER/2003/01247) will be followed to minimize the impacts to and incidental take of protected sea turtles. The biological opinion, authorized for use for this project by NMFS, specifies the terms and conditions to implement the reasonable and prudent measures. Reasonable and prudent measures include but are not limited to the use of intake and overflow screening, use of sea turtle deflector dragheads, lighting requirements, observer and reporting requirements, and sea turtle relocation trawling. If three turtles of any combination are taken by a hopper dredge, re-initiation of consultation will be implemented.
- Construction activities will be compliant with LDWF regulations (LAC 76:III.331) for the Isles Dernieres Barrier Islands Refuge at all times.
- Collection of bathymetric data at the borrow area pre-construction at most two months before and post-construction no more than one month after, approximately one year, and approximately three years after the completion of dredging. The extent of the bathymetric survey will extend at least 350 m beyond the limits of the borrow area.
- Implement a minimum no-dredge setback distance of 305 m (1000 ft) from existing pipelines (locations verified by remote sensing survey) to avoid any impact to pipelines. The perimeter of the borrow area will also be delineated by lighted buoy. All dredges must have continuous GPS positioning capability and the GPS unit must be installed as close to the cutterhead as practicable.
- Avoidance of potential historic archaeological targets in the vicinity of the borrow area.
- Implement a field program to monitor for prehistoric archaeological resources dredged from the offshore borrow area.

9.0 PERMITS AND COMPLIANCE

All necessary permits and approvals will be obtained before project construction commences. Applicable federal statutes are shown in Table 1. The proposed action is not expected to cause adverse environmental impacts requiring environmental mitigation.

Table 8. Environmental compliance.

STATUTE	COMPLIANCE
Archaeological and Historic Preservation Act	Pending*
Clean Air Act, as amended	Full
Coastal Barrier Resources Act (PL 97-348; 1982)	Full
Coastal Zone Management Act of 1972, as amended	Full
Endangered Species Act of 1973, as amended	Full
Executive Order 11988, Floodplain Management	Full
Executive Order 11990, Protection of Wetlands	Full
Farmland Protection Policy Act	Full
Federal Water Pollution Control Act (Clean Water Act)	Full
National Environmental Policy Act of 1969, as amended	Pending*
National Historic Preservation Act of 1966, as amended	Pending*
Marine Mammal Protection Act	Pending*
Outer Continental Shelf Lands Act	Pending*
Magnuson-Stevens Fishery Conservation and Management Act	Pending*
Subtitle B, Highly Erodible Land Conservation, and Subtitle C, Wetland Conservation, of the Food Security Act of 1985	Full
Wild and Scenic River Act, as amended	Full
Executive Order 13186, Protection of Migratory Bird Habitat Migratory Bird Treaty Act	Full

* Full compliance and applicable documentation will be completed prior to construction.

10.0 COSTS, FINANCING, AND INSTALLATION

Total project cost was estimated and includes all aspects of planning, engineering, administration, landrights acquisition, construction, inspection, monitoring, and operations and maintenance.

Planning, engineering, design, and pre-construction monitoring of the TE-48 Project have been funded under CWPPRA. NRCS has completed the 30% Design Review level for Phase B on October 24, 2007 and 95% Design Review on December 19, 2007. The project will be cost-shared between the federal sponsoring agency (NRCS) and the State of Louisiana (LDNR). Pursuant to the Louisiana Coastal Wetlands Conservation Plan's approval on November 30, 1997, the federal government provides 85% of the project cost and the State of Louisiana provides the remaining 15%.

Project implementation and management will be administered by NRCS in cooperation with LDNR/Office of Coastal Restoration and Management (OCRM).

11.0 OPERATION, MAINTENANCE, AND REHABILITATION

As phases of the Raccoon Island Shore Protection/Marsh Creation Project are approved for construction, funding for post-construction monitoring, operation, maintenance, and rehabilitation is made available on a 3-year cycle over the 20-year project life. LDNR is responsible for monitoring. Operation, maintenance, and rehabilitation will be administered by LDNR in cooperation with NRCS.

12.0 CONCLUSION

The United States Department of Agriculture, Natural Resources Conservation Service finds no significant long-term adverse impacts to wetlands, water quality, air quality, threatened or endangered species, species managed by Gulf of Mexico Fishery Management Council or their essential habitat, other fish and wildlife resources, recreational or socio-economic resources, or cultural resources associated with the Raccoon Island Shore Protection/Marsh Creation Project (TE-48). Project implementation is expected to reduce the rate of gulf shoreline retreat, enhance and protect existing critical barrier island habitat, and create new habitat for avian species. The project may produce net long term benefits to some project area resources.

13.0 LIST OF DOCUMENT PREPARERS

Name	Present Position	Employer
Ron Boustany	Natural Resources Specialist	Natural Resources Conservation Service
Geoffrey Wikel	Oceanographer	Minerals Management Service
Loland Broussard	Civil Engineer	Natural Resources Conservation Service
Cindy Steyer	Coastal Vegetative Specialist	Natural Resources Conservation Service
Mike Carloss	Biologist Program Manager	La. Dept of Wildlife & Fisheries (former NRCS employee)
Adele Swearingen	Office Automation Assistant	Natural Resources Conservation Service

14.0 LITERATURE CITED

Baker, J.H., D.W. Jobe, C.L. Howard, K.T. Kimball, J. Janousek, and P.R. Chase. 1981. Ecological investigations of petroleum production platforms in the central Gulf of Mexico. Vol. I: Southwest Research Institute, 21-189 pp.

Barras, J.A. 2007. Satellite images and aerial photographs of the effects of Hurricanes Katrina and Rita on coastal Louisiana: USGS Data Series 281. Internet website: http://pubs.usgs.gov/ds/2007/281. Accessed November 2008.

Barry Vittor & Associates, Inc. 1985. Tuscaloosa Trend regional data search and synthesis study. U.S. Department of the Interior, Minerals Management Service, OCS Study MMS 85-0056.

Barry Vittor & Associates, Inc. 2003. New Cut Marsh Restoration and Whiskey Island West Flank Restoration Projects using Ship Shoal sediment: survey, data collection and analysis for use by EPA in determination of impacts from the use of Ship Shoal sand. Final report prepared for the Environmental Protection Agency, Dallas, TX. 38 pp. + appendices.

Baustian, M.M. 2005. Benthic communities in the northern Gulf of Mexico hypoxic area: potential prey for demersal fish. Master Thesis, Louisiana State University.

Blake , N.J., L.J. Doyle, and J.J. Culter. 1996. Impacts and direct effects of sand dredging for beach nourishment on the benthic organisms and geology of the west Florida Shelf. OCS Report MMS 95-0005, U.S. Department of the Interior, Minerals Management Service, 109 pp.

Brooks, R.A., C.N. Purdy, S.S. Bell, and K.J. Sulak. 2006. The benthic community of the eastern U.S. continental shelf: a literature synopsis of benthic faunal resources. *Continental Shelf Research* 26: 804-818.

Coastal Environments, Inc. 1977. Cultural resources evaluation of the Northern Gulf of Mexico Continental Shelf. Prepared for interagency Archaeological Services, Office of Archaeology and Historic Preservation, National Park Service, U.S. Department of the Interior, Baton Rouge, LA.

Condrey, R.E. and C. G. Gelpi. 2009. Blue crab (*Callinectus sapidus*) use of the Ship/Trinity/Tiger Shoal Complex as a nationally important spawning/hatching/foraging ground: discovery, evaluation, and sand mining recommendations based on blue crab, shrimp, and spotted seatrout findings. USDOI-Mineral Management Service Report no. 1435-01-04-CA-32806. 55 pp.

Chabreck, R. D. and R. E. Condrey. 1979. Common vascular plants of the Louisiana marsh. Sea Grant Pub. No. LSU-T-79-003. Louisiana State University Center for Wetland Resources. Baton Rouge, LA. 116 p.

Coastal Planning and Engineering Incorporated. 2004. Raccoon Island sediment budget, Terrebonne Parish, Louisiana. LDNR Contract No. 2503-03-08. State/ Federal Project No. TE-48. 33 pp. plus appendices.

Coastal Research Laboratory. 2000. Barataria Barrier Island Restoration: Shoreline Change Analysis. Coastal Research Laboratory, Department of Geology and Geophysics, University of New Orleans. New Orleans, LA. September 2000. 36 pp.

Conner, W. H. and J. W. Day. 1987. The ecology of Barataria Basin, Louisiana: an estuarine profile. Fish and Wildlife Service. Biological Report 85(7.13). July 1987. 166 pp.

Craig, J. K. and Crowder, L. B. 2005. Hypoxia-induced habitat shifts and energetic consequences in Atlantic croaker and brown shrimp on the Gulf of Mexico shelf. *Marine Ecology Progress Series* 294:79-94.

Craig, N. J., L. M. Smith, N. M. Gilmore, G. D. Lester, and A. M. Williams. 1987. The natural communities of coastal Louisiana – classification and description. Louisiana Natural Heritage Program, Louisiana Department of Wildlife and Fisheries. Prepared for Louisiana Department of Natural Resources Coastal Management Division. 149 pp.

Defenbaugh, R.E. 1976. A Study of the Benthic Macroinvertebrates of the Continental Shelf of the Northern Gulf of Mexico. Ph.D. dissertation, Texas A&M University, College Station, TX. 476 pp.

Deutschmann, P. 1949. They danced until they died. Coronet 25. 22:143-145.

Diaz, R.J. and R. Rosenberg. 1995. Marine benthic hypoxia: A review of its ecological effects and the behavioural responses of benthic macrofauna. *Oceanography and Marine Biology, An Annual Review* 33:245-303.

Diaz, R.J., G.R. Cutter, and C.H. Hobbs. 2004. Potential impacts of sand mining offshore of Maryland and Delaware: Part 2—biological considerations. *Journal of Coastal Research* 20(1):61-69.

Diaz, R.J., C.O. Tallent, and J.A. Nestlerode. 2006. Benthic Resources and Habitats at the Sandbridge Borrow Aera: A Test of Monitoring Protocols. In: Hobbs, C.H. (Ed.) , Field Testing of a Physical/Biological Monitoring Methodology for Offshore Dredging and Mining Operations. U.S. Deptartment of the Interior, Minerals Management Service, MMS OCS Report 2005-056.

Dubois, S., C.G. Gelpi, R.E. Condrey, M.A. Grippo, J.W. Fleeger. In preparation. Diversity and composition of macrobenthic community associated with sandy shoals of the Louisiana continental shelf. Biodiversity and Conservation.

Fleeger, J. and M. Grippo. In preparation. The Meiofauna Community of Ship Shoal.

Frojan, C., S.E. Boyd, K.M. Cooper, J.D. Eggleton, and S. Ware. 2008. Long-term benthic responses to sustained disturbance by aggregate extraction in an area off the east coast of the United Kingdom. *Estuarine, Coastal, and Shelf Science* 79:204-212.

Georgiou, I.Y., D.M. Fitzgerald, and G.W. Stone. 2005. The impact of physical processes along the Louisiana coast. In: Finkl, C.W. and Khalil, S.M., (eds.), Savings America's Wetland: Strategies for Restoration of Louisiana's Coastal Wetlands and Barrier Islands," *Journal of Coastal Research*, Special Issue No. 44, pp 72-89.

Godfrey, R. K. and J. W. Wooten. 1979. Aquatic and Wetland Plants of Southeastern United States. 3 Vols. University of Georgia Press. Athens.

Gosselink, J. G. 1984. The ecology of delta marshes of coastal Louisiana: a community profile. U. S. Fish and Wildlife Service.

Greene, K. 2002. Beach Nourishment: A Review of the Biological and Physical Impacts. ASMFC Habitat Management Series. Washington, D.C. 174 pp.

Grippo, J.W. Fleeger, R. Condrey and K.C. Carman. In preparation. High Benthic Microalgal Biomass Found on Ship Shoal, North-central Gulf of Mexico.

Gulf Engineers Consultants (GEC). 2001. Hazardous, toxic, and radioactive wastes (HTRW) investigation for Barataria island restoration project. Submitted to U. S. Army Corps of Engineers, New Orleans District. October 2001.

Gulf of Mexico Fishery Management Council (GMFMC). 1998. Generic amendment for addressing essential fish habitat requirements in the following Fishery Management plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States waters; Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Coastal Migratory Pelagic Resources (Mackerel) in the Gulf of Mexico and South Atlantic; Stone Crab Fishery of the Gulf of Mexico; Spiny Lobster Fishery of the Gulf of Mexico; Coral and Coral Reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, 3018 U.S.Highway301 N., Suite 1000, Tampa, Florida 33619.

Gulf of Mexico Fishery Management Council (GMFMC). 2004. Final Environmental Impact Statement for the Generic Amendment to the following fishery management plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Stone Crab Fishery of the Gulf of Mexico, Coral and Coral Reef Fishery of the Gulf of Mexico, Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic; Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council, The Commons at Rivergate, 3018 U.S.Highway 301 N., Suite 1000, Tampa, Florida 33619.

Gulf of Mexico Fishery Management Council (GMFMC). 2005. Final Generic Amendment Number 3 for Addressing Essential Fish Habitat Requirements, Habitat Areas of Particular Concern, and Adverse Effects of Fishing in the following Fishery Management Plans of the Gulf of Mexico: Shrimp Fishery of the Gulf of Mexico, United States Waters, Red Drum Fishery of the Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico, and South Atlantic Stone Crab Fishery of the Gulf of Mexico, Spiny Lobster in the Gulf of Mexico and South Atlantic, Coral and Coral Reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, The Commons at Rivergate, 3018 U.S.Highway301 N., Suite 1000, Tampa, Florida 33619.

Hoese, H. D. and R. H. Moore. 1998. Fishes of the Gulf of Mexico – Texas, Louisiana, and adjacent waters. Second Edition. Texas A&M University Press. College Station. 422 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.

Kobashi, D., F. Jose, and G.W. Stone. 2007. Impacts of fluvial fine sediments and winter storms on a transgressive shoal, off south-central Louisiana, U.S.A., Journal of Coastal Research, SI 50, 858-862.

Kobashi , D., F. Jose, Y. Lou, and G.W. Stone. In preparation. Wind-driven dispersal of fluvially-derived fine sediment for two contrasting storms: extra-tropical and tropical storms, Atchafalaya Bay/Shelf, south-central Louisiana, U.S.A. Submitted to MMS.

Kulp, M., S. Penland, S. J. Williams, C. Jenkins, J. Flocks, and J. Kindinger. 2005. "Geological Framework and Sediment Resources for Restoration of the Louisiana Coastal Zone. In: Finkl, C.W. and Khalil, S.M., (eds.), Savings America's Wetland: Strategies for Restoration of Louisiana's Coastal Wetlands and Barrier Islands," *Journal of Coastal Research*, Special Issue No. 44, pp 56-71.

Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1999. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices. Appendix E – Region 3 Supplemental Information. Louisiana Department of Natural Resources. Baton Rouge, La.

Louisiana State University Agricultural Center. 2003. Louisiana summary of agriculture and natural resources. 324 pp.

Louisiana Universities Marine Consortium (LUMCON). 2007. Hypoxia in the northern Gulf of Mexico. Internet website: http://www.gulfhypoxia.net/. Accessed November, 2008.

McBride, R.A., S. Penland, B.E. Jaffe, S.J. Williams, A.H. Sallenger, and K.A. Westphal. 1989. Erosion and deterioration of the Isles Dernieres barrier island arc-Louisiana, U.S.A: 1853-1988. *Transactions of the Gulf Coast Association of Geological Societies* 39:431-444.

McBride, R. A. and M. R. Byrnes. 1995. A megascale systems approach for shoreline change analysis and coastal management along the Northern Gulf of Mexico. *Transactions of the Gulf Coast Association of Geological Societies*. 45:405-414.

McBride, R.A. and M.R. Byrnes. 1997. Regional variations in shore response along barrier island systems of the Mississippi River Delta Plain: historical change and future prediction. *Journal of Coastal Research* 13(3):628-655.

McBride, R. A., S. Penland, M. W. Hiland, J. S. Williams, K. A. Westphal, B. E. Jaffee, and A. H. Sallenger. 1992. Analysis of barrier island shoreline changes in Louisiana from 1853 to 1989. In: Williams, S. J., S. Penland, and A. H. Sallenger (eds.), Louisiana Barrier Island Erosion Study – Atlas of Barrier Island Shoreline Changes in Louisiana from 1853 to 1989. U. S. Geological Survey. Series I-2150-A:36-97.

Michel et al. 2004. Archaeological damage from offshore dredging: recommendations for pre-operational surveys and mitigation during dredging to avoid adverse impacts. U.S. Department of the Interior, Minerals Management Service, Herndon, VA. OCS Report MMS 2004-005. 75 pp. + Appendices.

Michel, J., R. Nairn, C. H. Peterson, S. W. Ross, R. Weisberg, and R. Randall. 2007. Critical Technical Review and Evaluation of Site-Specific Studies Techniques for the MMS Marine Minerals Program. Minerals Management Service, MMS OCS Report 2007-047. 47 pp. + appendices.

Murray, S.P. 1997. An observational study of the Mississippi-Atchafalaya coastal plume: final report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 98-0040. 513 pp.

Nairn, R.B., Q. Lu, and S.K. Langendyk. 2005. A study to address the issue of seafloor stability and the impact on oil and gas infrastructure in the Gulf of Mexico. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, L.A. OCS Report MMS 2005-043, 179 pp. + Appendices.

Nairn, R.B., Q. Lu, S.K. Langendyk, M.O. Hayes, P.A. Montagna, T.A. Palmer, and S.P. Powers. Examination of the Physical and Biological Implications of Using Buried Channel Deposits and other Non-Topographic Offshore Features as Beach Nourishment Material. U.S. Dept. of the Interior, Minerals Management Service. OCS Study MMS 2007-048. 231 pp. + appendices.

Natural Research Council (NRC). 1995. Beach Nourishmetn and Protection. Washington, DC: National Academy Press. 334 pp.

Newell, R.C., L.J. Seiderer, and D.R. Hitchcok. 1998. The impact of dredging works in coastal waters: a review of the sensitivity to disturbance and subsequent recovery of biological resources on the seabed. *Oceanography and Marine Biology Annual Review* 36:127-178.

O'Connell, M.T., C. D. Franze, E. A. Spalding, and M. A. Poirrier. 2005. Biological resources of the Louisiana coast: Part 2. Coastal animals and habitat associations. *Journal of Coastal Research* 44:146-161.

Palmer, T. A., P. A. Montagna, and R. B. Nairn. 2008. The effects of a dredge excavation pit on benthic macrofauna in offshore Louisiana. *Environmental Management* 41:573-583.

Patillo, M., T. E. Czapla, D. M. Nelson, and M. E. Monaco. 1997. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries. Rockville, MD. NOAA/NOS Strategic Environmental Assessments Division II. Species Life History Summaries: 377.

Pearson, C.E., S.R. James, Jr., M.C. Krivor, S.D. El Darragi, and L. Cunningham. 2003. Refining and Revising the Gulf of Mexico Outer Continental Shelf Region High-Probability Model for Historic Shipwrecks: Final Report. Volume II: Technical Narrative. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2003-061, 195 pp., 3 volumes.

Penland, S, J. R. Suter, and R. Boyd. 1985. Barrier island arcs along abandoned Mississippi River deltas, in Oertel, G. F., and Leatherman, S. P., eds., Barrier Islands: Marine Geology. 63:197-233.

Penland, S, J. R. Suter, and R. A. McBride. 1987. Delta plain development and sea level history in the Terrebonne coastal region, Louisiana, in Kraus, N. C., ed.: New York, American Society of Civil Engineers, Coastal Sediments '87, p. 1689-1705.

Penland, S., R. Boyd, and J.R. Suter. 1988. Transgressive depositional systems of the Mississippi Delta plain: a model for barrier shoreline and shelf sand development. *Journal of Sedimentary Petrology* 58(6):932-939.

Penland, S. and K. Ramsey. 1990. Relative sea-level rise in Louisiana and the Gulf of Mexico: 1908-1988. *Journal of Coastal Research* 6:323-342.

Penland, S., Connor, P.F., Jr., Beall, A., Fearnley, S. and Williams, S.J. 2005. "Changes in Louisiana's Shoreline: 1855-2002. In: Finkl, C.W. and Khalil, S.M., (eds.), Savings

America's Wetland: Strategies for Restoration of Louisiana's Coastal Wetlands and Barrier Islands," Journal of Coastal Research, Special Issue No. 44, 7-39.

Posey, M. and T. Alphin. 2002. Resilience and stability in an offshore benthic community: response to sediment borrow activities and hurricane disturbance. *Journal of Coastal Research* 18:685-697.

Rabalais, N.N., R.E. Turner, and W.J. Wiseman, Jr. 2002. Gulf of Mexico hypoxia, A.K.A. "The Dead Zone". Annual Review of Ecology and Systematics. Vol. 33. p. 235-263.

Rabalais, N. N., N. Atilla, C. Normandeau, and R.E. Turner. 2004. Ecosystem history of the Mississippi River-influenced continental shelf revealed through preserved phytoplankton pigments. *Marine Pollution Bulletin* 49:537-547.

Radziejewska, T., J.W. Fleeger, N.N. Rabalais, and K.R. Carman. 1996. Meiofauna and sediment chloroplastic pigments on the continental shelf off Louisiana, U.S.A. Continental Shelf Research 16:1699-1723.

Richardson, W.J., C.R. Green, C.I. Malme, and D.H. Thompson. 1995. Marine mammals and noise. Sand Diego, CA: Academic Press. 576 pp.

Ritter, C and P.A. Montagna. 1999. Seasonal hypoxia and models of benthic response in a Texas Bay. Estuaries 22(1): 7-20.

Sheremet, A., A. J. Mehta, B. Liu, G.W. Stone. 2005. Wave–sediment interaction on a muddy inner shelf during Hurricane Claudette. Estuarine, Coastal and Shelf Science 63:225–233.

Silas, U. 1890. Last island. The Weekly Thibodaux Sintinel. August 9, Nichols State University Archives. Thibodaux, LA (typed copy).

SJB Group, Inc. and Coastal Engineer Consultants, Inc. (SJB/CEC). 2006. Offshore Geophysical and Geotechnical Survey Report for Raccoon Island Shoreline Protection/Marsh Creation Project – Phase B (TE-48). LDNR Contract No. 2503-05-47. 49 pp. plus appendices.

Soil Testing Engineers, Inc. 2003. Report of geotechnical investigation Raccoon Island Shoreline Protection/Marsh Creation (TE-48), Terrebonne Parish, Louisiana. Report prepared for Louisiana Department of Natural Resources, Baton Rouge, LA and SJB Group, Inc. Engineers, Baton Rouge, Louisiana. LDNR Contract No. 2503-03-24. 9 pp. plus appendices.

Smith, J. R., A. R Sherlock, and D. T. Resio. 2001. STWAVE: Steady-state spectral wave model, user's guide for STWAVE. Version 3.0. ERDC/CHL SR-0101. Vicksburg, MS, Coastal Hydraulics Laboratory, U.S. Army Engineers Research and Development Center.

Stone, G.W., Grymes, J.M., Dingler, J.R. and Pepper, D.A. 1997. Overview and significance of hurricanes on the Louisiana coast, U.S.A., *Journal of Coastal Research* 13(3):591-710.

Stone, G.W. and X. Zhang. 2001. A longshore sediment transport model for Isles Dernieres. Report prepared for the U.S. Environmental Protection Agency, 26 p.

Stone, G. W., B. Liu, Q. He, and X. Zhang. 2003. Supplemental beach, nearshore, and wave current monitoring due to unanticipated coastal response at the Raccoon Island breadwater demonstration. Louisiana State University.

Stone, G.W., Liu, B., Pepper, D. A., and Wang, P. 2004. The importance of extratropical and tropical cyclones on the short-term evolution of barrier islands along the northern Gulf of Mexico, *Marine Geology*, 210, 64-78.

Stowe, W.C. 1982. Diatoms epiphytic on the emergent grass Spartina alterniflora in a Louisiana salt marsh. *Transactions of the American Microscopical Society*. 101:162-173.

Suter, J. R., S. Penland and K. E. Ramsey. 1991. Nearshore Sand Resources of the Mississippi River Delta Plain: Marsh Island to Sandy Poin. Coastal Geology Technical Report No. 8. Louisiana Geological Survey, Baton Rouge, LA, U.S.

Tetra Tech EM, Inc. 2004. Barataria Plaquamines Barrier Island Complex project, CWPPRA project Fed No. BA-38 – Pass La Mer to Chaland Pass and Pelican Island – Environmental Assessement. Plaquamines Parish, Louisiana. Report to U. S. Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Baton Rouge, LA. Marsh 2004.

Thomson, G.G., T.J. Campbell, and D.W. Mann. 2004. Raccoon Island Project (TE-48) Sediment Budget. Final Report. Prepared for Louisiana Department of Natural Resources. 33 pp.

U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS). 2005. Project Plan and Environmental Assessment for Raccoon Island Shore Protection/Marsh Creation Project (TE-48). U.S. Department of Agriculture, Natural Resources Conservation Service. 33 pp. plus Appendices.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2003. Field notes from investigations conducted by NRCS, LDWF, and LDNR personnel on April 23, 2002, June 18, 2002, and April 2, 2003, in the Raccoon Island project area.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2005. Project Plan and Environmental Assessment – Raccoon Island Shoreline Protection/Marsh Creation Project TE-48 Terrebonne Parish, Louisiana. Final Plan EA for Phase I project. 33 pp.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2007. Preliminary Design Report for Raccoon Island Shoreline Protection/Marsh Creation Project (TE-48). U.S. Department of Agriculture, Natural Resources Conservation Service. Alexandria, Louisiana. 60 pp. plus appendices.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2007. Raccoon Island Shoreline Protection and Marsh Creation Project (TE-48) Phase B, 95% Preliminary Design Report. U.S. Department of Agriculture, Natural Resources Conservation Service. Alexandria, LA. 64 pp. plus appendices.

U.S. Department of Commerce. National Marine Fisheries Service. 2007a. Report to Congress on the impact of Hurricanes Katrina, Rita, and Wilma on commercial and recreational fishery habitat of Alabama, Florida, Louisiana, Mississippi, and Texas. July 2007. Internet website: http:// www.nmfs.noaa.gov/msa2007/docs/Fisheries_Report_Final.pdf. Accessed November 2008.

U.S. Department of Commerce. National Marine Fisheries Service. 2008a. Fish stock sustainability index (FSSI): Summary of stock status determination changes from April 1, 2008 through June 30, 2008. Status of U.S. fisheries, second quarter update. Internet website: http://www.nmfs.noaa.gov/sfa/domes_fish/StatusoFisheries/2008/2ndQuarter/Q22008FSSISummaryChanges.pdf. Accessed November 2008

U.S. Department of Commerce. National Marine Fisheries Service. 2008b. Marine recreational fisheries statistics survey, Gulf of Mexico. Internet website: http://www.st.nmfs.gov/st1/recreational/index.html. Accessed November 2008.

U.S. Department of Interior, Minerals Management Service. 2004. Environmental Assessment for the issuance of non-competitive leases for the use of Outer Continental Shelf sand resources from Ship Shoal, offshore central Louisiana for coastal and barrier island nourishment and hurricane levee construction. U.S. Department of Interior, Minerals Management Service, Herndon, VA.

U.S. Department of Interior, Minerals Management Service. 2007. Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012, Western Planning Areas and Central Planning Areas – Final Environmental Impact Statement. 2 Vols. U.S. Department of Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS EIS/EA MMS 2007-018.

U.S. Environmental Protection Agency. 2006a. Summary of water testing: Hurricanes Katrina and Rita. Internet website: http://www.epa.gov/katrina/testresults/water/index.html. Accessed November, 2008 (last updated January 6, 2006).

U.S. Environmental Protection Agency, 2007. National estuary program coastal condition report – NEP CCR. Internet website: http://www.epa.gov/owow/oceans/nepccr/index.html. Accessed November, 2008.

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, Marine Resources Research Institute, South Carolina Marine Resources Division, Charleston, SC, 159 pp.

Van Dolah, R.F., B.J. Digre, P.T. Gayes, P. Donovan-Ealy, and M.W. Dowd. 1998. An evaluation of Physical Recovery Rates in Sand Borrow Sites used for Beach Nourishment Projects in South Carolina. Final Report, Marine Resources Research Institute, South Carolina Marine Resources Division, Charleston, South Carolina Center for Marine and Wetland Studies, Coastal Carolina University, Conway, South Carolina; U.S. Army Corps of Engineers, Charleston District, South Carolina submitted to the Minerals Management Service. 77 pp.

Visser, J. M. and C. E. Sasser. 1998. Vegetation surveys of Raccoon Island 1994 – 1998. Final report prepared for Louisiana Department of Wildlife and Fisheries. October 1998.

Walker, N.D. and A. B. Hammack. 2000. Impacts of Winter Storms on Circulation and Sediment Transport: Atchafalaya-Vermilion Bay Region, Louisiana, U.S.A. *Journal of Coastal Research* 16(4):996-1010. West Palm Beach (Florida), ISSN 0749-0208.

W.F. Baird & Associates Ltd. and Research Planning, Inc. 2004. Review of Existing and Emerging Environmentally Friendly Offshore Dredging Technologies. U.S. Department

of the Interior, Minerals Management Service. MMS OCS Report 2004-076. 95 pp. + appendices.

Wicker, K. M., G. C. Castille, D. J. Davis, S. M. Gagliano, D. W. Roberts, D. S. Sabins, and R. A. Weinstein. 1982. St. Bernard Parish: a study in wetland management. Prepared for St. Bernard Parish Police Jury. Chalmette, Louisiana. 132 pp.

Williams, A.B. 1965. Marine decapod crustaceans of the Carolinas. U.S. Dept. of the Interior, Fish and Wildlife Service, Washington D.C. *Fishery Bulletin* 65(1):298 pp., 252 figs.

Williams, J.S., S. Penland, and A.H. Sallenger, eds. 1992. Atlas of Shoreline Changes in Louisiana from 1853 to 1989. Prepared by the U.S. Geological Survey in cooperation with the Louisiana Geological Survey. Reston, VA. 103 pp.

Williams, S.J., G.W. Stone and A.E. Burrus. 1997. A perspective on the Louisiana wetland loss and coastal erosion problem. *Journal of Coastal Research* 13(3):593-594.

Williams, P. R. 1998. Nekton assemblages associated with the barrier island habitats of East Timbalier Island, Louisiana. M.S. Thesis. Louisiana State University. 120 pp.

Zervas, Chris E., 2001. Sea level variations of the United States 1854-1999, NOAA Tech. Rep. NOS CO-OPS 36, National Ocean Service, NOAA. 186 pp.

APPENDICES

Appendix A

Agency Correspondence

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

Mr. Kevin D. Norton
State Conservationist
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

MAY 2 2 2008

Dear Mr. Norton:

Thank you for your April 15, 2008, letter requesting that the Minerals Management Service (MMS) become a cooperating agency during the required National Environment Policy Act (NEPA) process for Phase B of the Raccoon Island Shore Protection/Marsh Creation Project (TE-48). The MMS understands that the Natural Resources Conservation Service (NRCS) will be preparing a supplemental Environmental Assessment (EA) specific to the proposed Outer Continental Shelf (OCS) borrow area and the marsh creation site in state waters. The supplemental EA should address the environment and significant resources potentially affected by dredging operations, transport, and placement, as well as the range of potential consequences of the proposed action (Attachment).

The MMS welcomes the opportunity to participate in the NEPA effort and agrees to serve as a cooperating agency. Since the NRCS has also applied for a U.S. Army Corps of Engineers' Section 404 permit, we encourage you to coordinate with all federal agencies to minimize duplication in complying with environmental requirements. As a cooperating agency we expect to: participate in the NEPA process at the earliest possible time; participate in the scoping process; assume, on the request of NRCS, responsibility for developing information and preparing environmental analyses for which the MMS has special expertise; make available staff support at the lead agency's request to enhance the interdisciplinary capability of the NRCS and use our own funds to accomplish these responsibilities.

The MMS also recognizes the importance of reinitiating, and agrees to participate in, the required Endangered Species Act (ESA) Section 7 consultation; the Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat consultation (Section 305); the National Historic Preservation Act (NHPA) Section 106 process; and the Coastal Zone Management Act Section 307 consistency determination. As the lead federal agency for ESA Section 7 and the Essential Fish Habitat consultations, the NRCS must notify the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) of its lead role and MMS' cooperating role. The MMS would expect NRCS, as lead agency, to work with MMS to ensure existing biological opinions from FWS and NMFS are applicable to MMS' part of the Federal action and/or expect to jointly submit the ESA Section 7 and Essential Fish Habitat assessments to FWS and NMFS. As per 36 CFR 800.2(2), the MMS expects NRCS to be the lead federal agency for NHPA Section 106 compliance, with the MMS acting in a consulting role.

It is the MMS policy to negotiate a new agreement for each use of OCS material; therefore, this agreement only applies to the NEPA and environmental requirements for this maintenance cycle. The final NEPA document, as well as the outcome of other environmental requirements, may be used to establish stipulations of conditions in a future negotiated agreement.

The MMS looks forward to working with you during this process. We ask that the following staff be included on all communication regarding this project, Mr. Geoffrey Wikel, Environmental Division, (703) 787-1283 and Mr. Roger Amato, Leasing Division, (703) 787-1282. If you would like to discuss any of these items further, please contact Mr. Geoffrey Wikel at (703) 787-1283.

Sincerely,

Gregory J. Gould
Chief, Environmental Division

cc: Ms. Renee Orr
Chief, Leasing Division

Mr. Loland Broussard
Project Manager, NRCS

bc: Official File
AD/OMM
Chief, ED
Chief, EAB
Stright, EAB
Wikel, EAB
Chief, LD
Amato, LD
ED RF

LMS:ENVD:MS4042:MStright:5/20/08:N:ENV/BEA/Correspondence/raccoon_MMS_response_NEPA_05132008.doc

Attachment

Please refer to the content list provided below to ensure that the subaerial and subaqueous environment, resources, and potential impacts are fully addressed in the supplemental EA. The EA prepared by Tetra Tech/NMFS for the Barataria Plaquemines Barrier Island Complex Project in Louisiana is an excellent example, and it is available for download from the internet at http://lacoast.gov/reports/env/BA-38ea304.pdf.

In the supplemental EA, the MMS recommends that particular focus be given to:

- potential impacts to protected species, fisheries and fish habitat, and benthic communities and benthic habitat in the vicinity of dredging.
- potential impacts to oil and gas infrastructure and consequences of said impacts. An infrastructure survey, including but not limited to, pipelines, platforms, wellhead appurtenances, unexploded ordinances and communication cables, should be completed for the proposed borrow area. MMS recommends a detailed description of the infrastructure along with an account of the mitigation measures NRCS will take to ensure that the proposed activities will not damage the identified infrastructure.
- potential impacts to archaeological resources. A detailed archeological survey should be performed pursuant to MMS NTL 2005-G-07 with magnetometer survey line spacing no greater than 30 m: http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2005%20NTLs/05-g07.html.
- developing full equipment use and emissions scenarios for dredging, transport, and placement in order to make an adequate determination on air quality conformity.
- potential impacts of dredging and altering bathymetry on the incident wave field. The results of the existing wave modeling analysis should be incorporated into the EA.

Department of the Interior Minerals Management Service's
Suggested Content List for an Environmental Assessment

EA Sections and Items	✓
Executive Summary	
Introduction	
Project Location & Setting	
Borrow Area	
Placement Area	
Purpose and Need for Action	
Authority	
Alternative, Including Preferred Action	
No Action Description	
Alternative(s) Description	
Significant Resources in Affected Environment	
Physical Resources	
Geology	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

June 3, 2008

Mr. Ron Boustany
Natural Resources Specialist
Natural Resources Conservation Service
646 Cajundome Boulevard, Suite 180
Lafayette, Louisiana 70506

Dear Mr. Boustany:

Please reference your April 28, 2008, letter (received in this office on May 6, 2008) requesting our updated review and concurrence with the Natural Resources Conservation Service's (NRCS) determination that Phase B of the proposed Raccoon Island Shore Protection/Marsh Creation Project is not likely to adversely affect the endangered brown pelican (*Pelecanus occidentalis*), the threatened piping plover (*Charadrius melodus*), or its designated critical habitat. Authorized by the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), Phase B of the proposed project would involve creating approximately 68 acres of dune, supratidal, and intertidal habitat by installing a retention dike and depositing dredged material on the bayside of the island, in Terrebonne Parish, Louisiana. A secondary project objective is to provide additional avian habitat by planting woody and herbaceous species on dune and supratidal areas. The U.S. Fish and Wildlife Service (Service) has reviewed the information you provided, and offers the following comments in accordance with provisions of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

As you know, brown pelicans are currently known to nest on Raccoon Island. In spring and summer, nests are built in mangrove trees or other shrubby vegetation, although occasional ground nesting may occur. Brown pelicans feed along the Louisiana coast in shallow estuarine waters, using sand spits and offshore sand bars as rest and roost areas. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

The piping plover, as well as its designated critical habitat, also occur on Raccoon Island. Piping plovers winter in Louisiana, and may be present for 8 to 10 months annually. They arrive from the breeding grounds as early as late July and remain until late March or April. Piping plovers feed extensively on intertidal beaches, mudflats, sandflats, algal flats, and wash-over passes with no or very sparse emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Roosting areas may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. In most areas, wintering piping plovers are dependent on a mosaic of sites distributed throughout the landscape, because the suitability of a particular site for foraging or roosting is dependant on local weather and tidal conditions; thus, plovers may move among sites as environmental conditions change. Major threats to this species include the loss and degradation of habitat due to development, disturbance by humans and pets, and predation.

Piping plover designated critical habitat identifies specific areas that are essential to the conservation of the species. The primary constituent elements for piping plover wintering habitat

are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support those habitat components. Constituent elements are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide), and associated dune systems and flats above annual high tide. Important components (or primary constituent elements) of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting plovers. On Raccoon Island, designated critical habitat ". . . includes the entire island where primary constituent elements occur to the MLLW [mean low low water]" (66 Federal Register, No. 132, Page 36127).

According to your letter, Phase A of the subject CWPPRA project has been constructed, while Phase B has received approval from the CWPPRA Task Force for construction funding. Phase B would involve creating approximately 68 acres of barrier island habitat on the bayside as a northward extension of the existing island. Proposed structural features include installing a retention dike between two peninsulas to enclose a large open water area, then backfilling that area with hydraulically dredged material. Non-structural features would involve planting the newly created dune and supratidal areas with woody and herbaceous plant species to compliment the existing island habitat. Protection and creation of woody habitat would ensure the availability of neotropical bird habitat, which is important during both the spring and fall migrations, and colonial waterbird nesting habitat. Depending upon the type of dredged material used for the project, beach habitat may also be increased on the vegetated bayside portion of the island.

The short-term effects of Phase B of the subject CWPPRA project may include a temporary localized increase in turbidity and suspended solids, and periodic noise disturbance to any birds (e.g., brown pelicans and/or piping plovers) loafing or roosting on the island and/or foraging within the project area. Access to aquatic prey organisms may also be temporarily limited by certain structural measures in the immediate project area; however, those bird populations should not be significantly affected due to the abundance of nearby suitable habitat. Furthermore, NRCS does not expect disruptions to nesting brown pelicans because construction would be conducted during the non-nesting period (i.e., September 15 to March 31) and in accordance with the Louisiana Department of Wildlife and Fisheries' (LDWF) regulations for the Isles Dernieres Barrier Islands Refuge.

Based on your letter, short-term effects during construction of Phase B may temporarily disturb existing designated piping plover critical habitat by increasing turbidity and suspended solids; however, no use of heavy machinery would be necessary on the existing island. All work (including deposition of fill material) and access to the project area would occur in open water on the bayside of the island. In the long-term, NRCS anticipates that construction of the terminal groin and additional breakwaters (Phase A) would offset the high rate of shoreline retreat and land loss on the Gulf-side of Raccoon Island, while the creation of additional dune, supratidal and intertidal habitat on the bayside of the island (Phase B) would help to further stabilize the existing habitat and any new habitat created (sand/land accretion) by the additional breakwaters. Overall, the NRCS believes that the entire project as proposed would protect and increase existing nesting and foraging habitat for the brown pelican and piping plover, respectively.

Based on the above information, the Service concurs with the NRCS' determination that Phase B of the proposed action is not likely to adversely affect the brown pelican, the piping plover, or its

designated critical habitat. Therefore, no further ESA consultation with the Service would be required for the proposed action unless there are changes in the scope or location of the project elements, or the project has not been initiated within one year. If the proposed action has not been initiated within one year, follow-up consultation should be accomplished with the Service prior to making expenditures to ensure that the threatened and endangered species information is up-to-date. If the scope or location of the proposed action is changed, consultation should occur as soon as such changes are made.

We appreciate the NRCS' continued cooperation in the conservation of endangered and threatened species, and their critical habitat. If you have any questions or require additional information, please contact Ms. Brigette Firmin (337/291-3108) of this office.

Sincerely,

James F. Boggs
Supervisor
Louisiana Field Office

cc: FWS, Panama City, FL (Attn: Patty Kelly)
Corps of Engineers, New Orleans, LA
NMFS, Baton Rouge, LA
LDNR, CMD, Baton Rouge, LA
LDNR, CRD, Baton Rouge, LA
LDWF, New Iberia, LA (Attn: Mr. Michael Carloss)
LDWF, Natural Heritage Program, Baton Rouge, LA

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

Dr. Roy Crabtree
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
Office of the Regional Administrator
263 13th Avenue, South
St. Petersburg, Florida 33701

JUL 18 2008

Dear Dr. Crabtree:

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) is seeking authorization from the Minerals Management Service (MMS) to obtain approximately 450,000 cubic yards of sediment, via hopper and/or hydraulic cutterhead dredge, from Ship Shoal Blocks 64 and 71 on the Outer Continental Shelf (OCS) in order to create 68 acres of marsh in Phase B of the Raccoon Island Shoreline Protection / Marsh Creation Project (Attachment). The MMS is required under the Endangered Species Act (ESA) to consult with the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) to ensure that the proposed use of the offshore borrow area does not jeopardize the continued existence of ESA-listed species or adversely modify any designated critical habitat.

On September 19, 2005, NOAA Fisheries issued an ESA Section 7 biological opinion (BO) (Consultation Number F/SER/2003/01247) and associated Incidental Take Statement to the MMS for hopper and cutterhead dredging in the vicinity of Ship Shoal offshore of coastal Louisiana, declaring multiple project dredging would not result in jeopardy to any ESA-listed species or adversely modify any designated critical habitat. Based on recent guidance provided by Mr. Eric Hawk (via e-mail on June 26, 2008), the MMS will serve as the lead federal agency and use the existing BO to comply with the ESA. Although the USDA will be the federal agency entering into contract for dredging, the MMS will assume full responsibility for the requirements of the BO.

The MMS will ensure relevant observer, trawling, screening, dredge outfitting, and necroposy requirements are assigned to the NRCS through a negotiated agreement and conveyed to the dredger via the contract vehicle. Subject to the reinitiating conditions, the MMS presumes that no further consultation with NOAA Fisheries is required, either by the MMS or the NRCS.

We look forward to further cooperation with you on this and future projects to ensure the conservation of endangered and threatened marine species. If you have any questions or require additional information, please contact Ms. Jill Lewandowski at Jill.Lewandowski@mms.gov or (703) 787-1703.

Sincerely,

James J. Kendall
Chief, Environmental Division

Attachment

cc: Mr. Eric Hawk, NOAA Fisheries
Mr. Ron Boustany, USDA NRCS
Mr. Loland Broussard, USDA NRCS
Ms. Jill Lewandowski, MMS Environmental Division
Mr. Geoffrey Wikel, MMS Environmental Division
Mr. Roger Amato, MMS Leasing Division
Ms. Stephanie Gambino, MMS GOMR Office of Leasing and Environment

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

Mr. Jim Boggs
U.S. Fish and Wildlife Service
Louisiana Field Office
646 Cajundome Boulevard, Suite 400
Lafayette, Louisiana 70506

JUL 18 2008

Dear Mr. Boggs:

On March 31, 2006 and June 3, 2008, the Fish and Wildlife Service (Service) issued Endangered Species Act (ESA) Section 7 concurrence letters to the United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) indicating the proposed coastal restoration project along Raccoon Island (Terrebonne Parish, Louisiana) was not likely to adversely affect the brown pelican, the piping plover, or designated critical habitat. Although the Raccoon Island Shoreline Protection / Marsh Creation Project includes dredging an offshore borrow area on the Outer Continental Shelf (OCS), the Service elected not to consult on the West Indian manatee given its extremely low potential in the project area or on protected sea turtles since there are no known nesting sea turtles in the project area.

The USDA NRCS has recently requested authorization from the Minerals Management Service (MMS) to use an offshore borrow area, located in Ship Shoal Blocks 64 and 71 and covered under the Outer Continental Shelf Lands Act, 43 U.S.C. § 1337(k). Consequently, the MMS is required under the ESA to consult with the Service to ensure that the use of the borrow area does not jeopardize the continued existence of ESA-listed species or adversely modify any designated critical habitat.

Although the MMS and NRCS entered into an agreement that the NRCS would serve as the lead agency, we do not believe that the NRCS notified the Service of MMS's involvement. This letter serves to request concurrence from the Service that MMS's authorization of the use of OCS sediment will not contribute to additional take or further affect ESA-listed species or designated critical habitat as this authorization is purely administrative in nature. Further, the MMS requests acknowledgement from the Service that MMS has met its ESA Section 7 requirements for this project. Please note that the MMS did receive an e-mail confirmation of our ESA compliance from Ms. Brigette Firmin of your staff on July 10, 2008, but would now appreciate a more formal response by letter.

Please provide a written response regarding this concurrence no later than 30 days from receipt of this letter. If you have any questions or require additional information, please contact Ms. Jill Lewandowski at Jill.Lewandowski@mms.gov or (703) 787-1703. We appreciate your cooperation and assistance in this matter.

Sincerely,

James J. Kendall
Chief, Environmental Division

cc: Ms. Brigette Firmin, FWS
Mr. Ron Boustany, USDA NRCS
Mr. Loland Broussard, USDA NRCS
Ms. Jill Lewandowski, MMS Environmental Division
Mr. Geoffrey Wikel, MMS Environmental Division
Mr. Roger Amato, MMS Leasing Division
Ms. Stephanie Gambino, MMS GOMR Office of Leasing and Environment

Appendix B

Agency Review Comments

From: Diane Hewitt [mailto:Diane.Hewitt@LA.GOV]
Sent: Tuesday, March 03, 2009 1:52 PM
To: Boustany, Ron - Lafayette, LA
Subject: DEQ SOV: 90210/0320 Raccoon Island Shoreline

March 3, 2009

Ron Boustany
USDA-NRCS
646 Cajundome Blvd.,Ste.180
Lafayette, LA 70506
ron.boustany@la.usda.gov

RE:

90210/0320	Raccoon Island Shoreline
	Nat. Resources Conservation Serv.
	Terrebonne Parish

Dear Mr. Boustany:

The Department of Environmental Quality, Office of Environmental Assessment and Office of Environmental Services received your request for comments on the above referenced project. Please take the appropriate steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

There were no objections based on the limited information submitted to us. However, the following comments have been included. Should you encounter a problem during the implementation of this project, please make the appropriate notification to this Department.

The Office of Environmental Services/Permits Division recommends that you investigate the following requirements that may influence your proposed project:

- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify their LPDES permit before accepting the additional wastewater.
- LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact Melissa Conti at (225) 219-3078 to determine if your proposed improvements require one of these permits.
- All precautions should be observed to control nonpoint source pollution from construction activities.
- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps to inquire about the possible necessity for permits. If a Corps permit is required, part of the application process may involve a Water Quality Certification from LDEQ.
- All precautions should be observed to protect the groundwater of the region.

- Please be advised that water softeners generate waste waters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact DEQ, Water Permits to determine if special water quality based limitations will be necessary
- Any renovation or remodeling must comply with LAC 33:III.Chapter 28.Lead-Based Paint Activities, LAC 33:III.Chapter 27.Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation) and LAC 33:III.5151.Emission Standard for Asbestos for any renovations or demolitions.

Currently, Terrebonne Parish is classified as an attainment parish with the National Ambient Air Quality Standards for all criteria air pollutants.

Please forward all future requests to Ms. Diane Hewitt, LDEQ/Performance Management/ P.O. Box 4301, Baton Rouge, LA 70821-4301 and we will expedite it as quickly as possible.

If you have any questions, please contact me at (225)219-4079 or by email at diane.hewitt@la.gov. Permitting questions should be directed to the Office of Environmental Services at 225-219-3181.

Sincerely,

Diane Hewitt
LDEQ/Community and Industry Relations
Business and Community Outreach Division
Office of the Secretary
P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301
Phone: 225-219-4079
Fx: 225-325-8208
Email: ***diane.hewitt@la.gov***

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Washington, DC 20240

MAR - 6 2009

Mr. Ron Boustany
U.S. Department of Agriculture
Natural Resources Conservation Service
646 Cajundome Boulevard, Suite 180
Lafayette, Louisiana 70506

Dear Mr. Boustany:

The Minerals Management Service (MMS) has reviewed the January 2008 draft Supplemental Environmental Assessment (EA) prepared by the Natural Resources Conservation Service (NRCS) for the proposed Raccoon Island Phase B Marsh Creation Project (TE-48). As a cooperating agency, the MMS appreciates the opportunity to review the draft EA and is pleased to provide the following comments for your use as you prepare the final document.

General Comments

The draft EA is well-written, adequately describes the affected resources in the project area, and succinctly analyzes the potential impacts from the proposed action on those resources. The draft EA makes practical use of the MMS's April 2004 EA, which evaluated the proposed use of Outer Continental Shelf (OCS) sand resources from Ship Shoal in multiple coastal restoration projects along coastal Louisiana. Several sections of the draft EA could be further streamlined by referencing and summarizing the NRCS's March 2005 Project Plan and EA.

The draft EA would benefit from a concise summary of the proposed federal action in a "Description of Proposed Action" section. The description of the proposed action could parse information from the preferred alternative presented in section 2.2.2, as the preferred alternative and proposed action are much the same. Since the preferred alternative may involve the use of sand resources located on the Outer Continental Shelf, the proposed action should also address the connected action (40 CFR 1508.25) of the MMS's issuance of a negotiated agreement. Also, it is not clear in the draft EA if the proposed mitigation is considered part of the proposed action. If the mitigation measures are proposed as part of the action, the potential effects of the proposed mitigation, for example trawling on sea turtles, should be evaluated.

The Cumulative Effects sections (4.1.3, 4.2.3, 4.3.3, 4.4.3, and 4.5.3) of the draft EA use information presented in the MMS's EA (2004) without proper citation. If the NRCS determines that the analysis is appropriate to the proposed action, the analysis should be incorporated by reference and summarized. Since the proposed action will occur on the adjacent muddy shelf, and not the sandy, unique environment of Ship Shoal, parts of the analysis are not fitting. Recent research sponsored by the MMS also negates some of the assertions concerning the quality and importance of Ship Shoal habitat. Moreover, much of the analyses in these impacts section are redundant with that of the other effects sections. Time crowded perturbations, space crowded perturbations, as well as indirect and synergistic impacts should be evaluated in context of other

past, present, and reasonably foreseeable future actions. Other activities of importance occurring in the vicinity of the project area may include other coastal restoration projects, navigation channel maintenance, commercial and recreational fishing, and oil and gas development.

While the MMS appreciates the practicality of having a NEPA document that analyzes use of either a trailing suction hopper dredge or cutterhead dredge for the proposed action, it would be helpful if a table was included in the Effects section that compares the potentially different effects related to the use of the different dredge types.

More specific comments and suggested revisions are presented by section, paragraph, and page number in the enclosed table. If you have any questions, please contact Geoffrey Wikel at (703) 787-1283 or Geoffrey.Wikel@mms.gov.

Sincerely,

James F. Bennett
Chief, Branch of Environmental Assessment

Enclosure

Location			Comment
Page	**Paragraph**	**Section**	
ii		TOC	Add section number "3.4.2" to "Offshore Archeological Cultural Resources (Borrow Area)" in the Table of Contents.
ii		TOC	Correct spacing between "4.1.2.3" and "Effects on Geology and Geomorphology of Offshore Borrow Area" in the Table of Contents.
ii		TOC	Correct section number to "4.1.3" for "Cumulative Effects on Physical Resources" in the Table of Contents.
ii-iii		TOC	Add "Effects on" to section titles for sections 4.4.2.1, 4.4.2.2, 4.5.2.1, 4.5.2.2, 4.5.2.3, and 4.5.2.4 in the Table of Contents.
2		ES	The mitigation plan states that the construction window will be limited to non-nesting periods. Specify the relevant period.
2	1	ES	Indicate that the "8 originally constructed breakwaters" were completed in 1997.
2	2	ES	"Council of Environmental Quality" should be revised to "Council on Environmental Quality."
3		ES	Acronyms and initialisms used in the mitigation measures should be specified at first use.
4	2	1..0	"Council of Environmental Quality" should be revised to "Council on Environmental Quality."
4	3	1	Remove the word "existing." It is understood that there is already habitat there since it is being expanded.
5	4	1.4	Last sentence: use acronym for FONSI since the term has been previously defined.
5	4	1.4	Consider rearranging the first sentence to make it less confusing. State that "From 1978 to 1988, the area of Raccoon Island decreased from 350 acres to 200 acres."
7	Figure 2	1.3	It would be helpful to show the proposed borrow area in relation to Ship Shoal, since much of the analysis is incorporated by reference from the MMS EA (2004).
9	2-3	1.5	There is some inconsistency in the proposed action regarding the creation of dune habitat. Section 1.5 indicates that the source material does not contain a significant enough sand fraction to construct the 3 acres of proposed dune. However, Sections 2.2.2, 4.1.2.2, 6.0,

			and 7.0 suggest otherwise. Ensure consistency throughout the document.
9	1	1.6	Use acronym for CWPPRA since the term has been previously defined.
9	2	12	"supratidal habitat". Habitat misspelled.
9	4	1.5	The purpose and function of the 30% CWPPRA Task Force and 95% CWPPRA Task Force design meetings may need to be specified.
10	1	1.6	NMFS is in the National Oceanic and Atmospheric Administration, Department of Commerce.
10	3	1.6	Replace "will" with "may" to describe the involvement of the MMS in the proposed action to avoid the perception of pre-determinism.
10	3	1.6	Add a period at the end of the sentence.
11	2	2.2.1	"The no-action alternative assumes that the NRCS and MMS will not enter into a negotiated agreement for access to OCS sediment in the vicinity of Ship Shoal." Revise accordingly.
11	2	2.2.2	"These borrow areas will be filled in during the marsh creation phase." Revise accordingly.
11	2	2.2.2	Ensure consistent use of the project volume requirement. The preferred alternative states 700,000 cubic yards (actual proposed dredge volume), whereas other sections, such as section 4.2.3, state 830,000 cubic yards (which is the projected volume available in the primary cut).
14	4	2.2.2	Clearly state (if it is the case) that native species will be used for herbaceous and woody plantings.
17	1	3.1.2	"The Isles Dernieres extend more than 20 miles ..." Delete extra "s" from "extends."
18	2-3	3.1.2	The presentation of the references provided in these paragraphs is inconsistent with the style used in the rest of the document (Author, Year).
18	4	3.1.2	"While these events battered the island and temporarily resulted in sand material deficits, new material tends to begin to be redeposited immediately after each event ..." Revise accordingly.
18	4	3.1.2	Delete extra spacing after the second to last sentence.

19	1	3.1.3	The statement that "the material general coarsened to the north" is not consistent with the SJB Group's Offshore Geophysical and Geotechnical Report.
19	1	3.1.3	Remove the extra space between "24.6" and the percentage sign.
19	5	3.1.4	Revise "when currents reach magnitudes …" accordingly.
19	6	3.1.4	"The wave and wind rose diagrams for a twenty year period indicate dominant wave and wind directions are from the southeast." Revise accordingly.
21		3.1.5	Section 3.1.5 is presented verbatim from the NRCS's 2005 EA. This section should be incorporated by reference and summarized as appropriate.
22	3	3.1.6	"Coastal waters are turbid due to the suspended sediments from the Mississippi and Atchafalaya Rivers' discharge and from coastal erosion." Delete "in the longshore currents" from the current sentence to clarify its meaning.
23	2	3.1.7	"Air quality over OCS waters is discussed in detail in Section 3.1.2 of the Final EA …, and the discussion is incorporated by reference." Revise accordingly.
24	3	3.2.3	Change "Howver" to "However."
25		3.2.4	Section 3.2.4 is presented verbatim from the NRCS's 2005 EA. This section should be incorporated by reference and summarized as appropriate.
26	5	3.2.5.1	The statement, "Therefore, construction activities will be coordinated with LDWF, USFWS, LDNR, and NRCS, and contractors will be required to minimize habitat disturbance." This is a mitigation measure that belongs in the Effects discussion.
27	2	3.2.5.1	"Baird's sandpiper" should be capitalized; "dunlin" is misspelled.
28	4	3.2.6	It may be helpful to describe the average species abundance for keystone species during the proposed dredging window.
29	2	3.2.6	The Williams, 1998 reference is missing a space after the comma.
30	2	3.3.1	The paragraph describing the behavior of piping plovers appears to be missing citation(s).
30	3	3.3.1	There is an extra parenthesis in the last sentence following "coastal and riverine habitats …"
31	1	3.3.1	"…ridley sea turtles" should read "…Kemp's ridley sea turtles…" Revise accordingly.

32	Table 3	3.3.2	Table 3 does not include all the species addressed in section 3.3.2. Add pink and royal shrimp, stone crab, red drum, other reef fish, and other sharks.
34	2	3.3.2.1	Change "Pind" to "Pink."
35	2	3.3.2.4	The text states that red snapper spawn offshore from May to October; does this mean the fishes are less likely to be in the proposed area?
38	2	3.4.2	Move the first sentence of this paragraph, which provides a definition of archaeological resources, to the first sentence of Section 3.4.1.
39	3	3.4.2	The last paragraph of section 3.4.2 is an effects determination and belongs in the equivalent Effects section (4.4.2.2). Note that the MMS has indicated that at least a 200 ft buffer is required for Targets 5, 6, and 7.
39	5	3.5	What year are these statistics based on? There may have been major changes or population shifts given the hurricane events in recent years.
39	7	3.5	Include appropriate references for the statistics concerning commercial fishing.
43	1	3.5	"Table 6 catalogs a single completed well …" The text incorrectly refers to Table 5.
44	1	4.1.1	The description indicates that there are no effects under the no action alternative, but then goes on to describe continued erosion of the barrier island. Are there other related negative impacts due to ongoing or enhanced erosion?
44	5	4.1.2.2	The three acres of dune creation is not currently included in the proposed action. If this is still part of the project plan, the preferred alternative should be updated in Section 2.2.2.
46	2	4.1.2.4	"Pit margin erosion in muddy seafloor settings has been modeled and observed …"
47		4.1.2.5	Will the proposed marsh creation include the use of organic supplements (N or P), or will the proposed salt-marsh vegetation have to achieve transplant success without supplements? Also, should "soil quality", including soil's nutrient regime (percent OM, C/N ratios) and structure be addressed? Vegetation success depends on adequate nutrient levels, salinity, and existing soil structure. The EA may need to specifically address how the existing sediment nutrient regime and structure will be altered with the placement of dredged material.
47		4.1.2.5	Clarify and/or elaborate on why sediment characterized by 0.11mm average grain size is "preferable" for marsh creation?

47		4.1.2.6	If any fertilizers, pesticides, herbicides, or fungicides are planned to be added to the soil during plantings, it would be appropriate to make a statement as to why those applications may or may not affect water quality.
49	2	4.1.2.7	The preferred alternative indicates the proposed action will last for up to 120 days; however, the effects section indicates the proposed activity may last for up to six months. The estimated project duration should be consistent throughout the document.
49	4	4.2.3	Section 4.2.3 repeats the following sentences: "Air quality impacts from any individual project would be low. Cumulative impacts from all proposed and potential future and maintenance projects as well as all other emission sources in the area would be small." "Air quality impacts from any individual project would be low. Cumulative impacts from all proposed and potential future and maintenance projects as well as all other emission sources in the area would be minimal."
50	2	4.2.2.1	The statement "much of the bank is cut directly into the vegetation community with the continued erosion" is not clear.
50	3	4.2.2.2	The proposed mitigation includes the use of Best Management Practices (BMPs); however, what those BMPs are or where they can be found is not articulated.
50	4	4.2.2.3	"A general discussion of the potential consequences of dredging offshore and construction activity can be found in Section 4.3.2 of the MMS Multi-Project Environmental Assessment (2004) and is incorporated by reference." Revise accordingly.
51	1	4.2.2.3	While it is likely that the borrow area will be re-colonized by benthic communities within several years, the potential is increased by the fact that the site will not be regularly dredged.
52	2	4.2.2.5.1	The timing restrictions imposed by LDWF should be delineated, indicating the relative importance on the mitigation of impacts. Also, DeFeo et al. (2009) in Estuarine, Coastal, and Shelf Science, 81, 1-12 provides an excellent review of impacts to avian species.
52	2	4.2.2.5.1	This subsection should indicate that the effects on endangered or threatened species are discussed in more detail in 4.3.2.1
52	2	4.2.2.5.1	Discuss if the herbaceous plantings will provide food suitable for waterfowl (seeds for ducks and shoots for geese).
52	3	4.2.2.5.2	The timing restrictions imposed by LDWF should be discussed here as well, indicating the relative importance on the mitigation of impacts to mammals and reptiles. The same is true for critical species in 4.3.2.1.

52	3	4.2.2.5.2	This subsection should indicate that the effects on endangered or threatened species are discussed in more detail in 4.3.2.1.
52	3	4.2.2.5.2	The statement that "no mammals or reptiles are anticipated to be adversely affected by the preferred alternative" needs to be reworded. Section 4.3.2.1 indicates that protected species of sea turtles may be affected.
52	4	4.2.2.6	This subsection should indicate that the effects on Essential Fish Habitat are discussed in more detail in 4.3.2.2
52	4	4.2.2.6	The timing restrictions imposed by LDWF regarding placement is also relevant to offshore dredging and should be discussed here as well, indicating the relative importance on the mitigation of impacts to fishes. The same is true for EFH in 4.3.2.2.
52	2&3	4.2.2.5	Coastal Birds and Mammal and Reptile subheadings should not be underlined.
56		4.3.3	Preliminary research suggests that Ship Shoal may be important mating and nursery habitat for blue crab; therefore, there could be impacts on blue crabs moving on and off the Shoal. (Note: You may need to contact the principal investigators, Richard Condrey and Carey Gelpi at Louisiana State University, to get the clearest picture of possible impacts and to get a personal communication reference). Regardless, the conclusion that negligible impacts are expected due to the temporary nature and limited scale of disturbance seems appropriate.
58		4.4.3	The statement that "no managed fish species in the LCS requires Ship Shoal or a sandy substrate to sustain its life cycle" may be inaccurate. Again, recent research conducted by the LSU shows that Ship Shoal may in fact be very important to the blue crab fishery.
58		4.4.3	The discussion of environmental justice and commercial fisheries does not belong in the to "Cumulative Effects on Cultural Resources" section, but rather "Cumulative Effects on Social and Economic Resources" (4.5.3)
58	1	4.4.2.2	The setback requirements are different whether the target is a submerged cultural resource or if it is oil and gas infrastructure. Nairn et al. (2005) (name of first author misspelled) provides a rubric for determining the appropriate set-back, which fundamentally depends on the nature of the seafloor sediment.
58	2	4.4.2.2	"If there is a chance find that is determined to be significant, the dredge will be relocated to another section of the proposed borrow area." Revise accordingly.
59	2	4.4.2.2	"The project can anticipate potential adverse impacts on historic archaeological resources and offshore OCS infrastructure. Mitigations would minimize the likelihood of these

			impacts occurring. Impacts are possible on historic archaeological resources because knowledge of the locations of all known shipwrecks in the relatively shallow waters of the inner continental shelf is incomplete. The potential impacts of the proposed action on historic archaeological resources can be minimized if a remote sensing survey is conducted in advance of the proposed dredging activities. No impacts on prehistoric archaeological resources or the existing equities of environmental justice would be expected...." Revise accordingly.
59	3	4.5.2	"The preferred alternative would not be expected to affect ..." Revise accordingly.
59	4	4.5.2.1	This discussion is excerpted from the MMS EA (2004) and is specific to Ship Shoal, which is characterized by a different, sandy seafloor environment. Comparison to the muddy or mixed grained bottom at the proposed borrow may be inappropriate. Aspects of this effects analysis need to be reconsidered. Other parts should be incorporated by reference and summarized herein.
61	1	4.5.2.3	The statement "provided these mitigation measures are adopted" implies they are discretionary measures, when they are not.
61	1	4.5.2.3	"At least 1000 ft buffers from existing infrastructure will be required in construction plans and specifications to avoid direct or indirect impacts to oil and gas infrastructure, including potential rupture and exposure." Revise accordingly.
61	3	4.5.3	"The space-use conflicts between commercial fisheries and the dredging operation will be minimized by (1) proper marking of the offshore borrow area and mooring buoy location and (2) notifying fishers through such mechanisms as the US Coast Guard *Local Notice to Mariners*, a free publication available to all fishers." Revise accordingly.
63		7.0	Are the proposed supplemental measures actually part of the Recommended Plan (6.0)? Or are those actual supplemental measures? Reorganize as appropriate.
63		7.2	Figure 4 suggests the proposed containment dike completely surrounds the marsh creation site. The imprecise language used here suggests that the dike will only be constructed on the bayside of the island, compared to completely around the proposed marsh creation area located on the bayside of the island.
64		8.0	The mitigation measures outlined in section 8.0 will be required by the MMS. The language used should be revised to reflect that the measures shall be implemented.
64		8.0	"The perimeter of the borrow area shall be delineated by lighted buoy." Revise accordingly.

64		8.0	The proposed mitigation states that the construction window will be limited to non-nesting periods. Specify the relevant period.
65		9.0	An additional paragraph should be provided to illustrate compliance with Section 404b of the CWA, Section 401 of the CWA, Section 7 of the ESA, etc.
3, 64		ES & 8.0	For mitigation measure 5, indicate that "the GPS unit must be installed as close to the cutterhead as practicable." Past accidents have resulted from the GPS being mounted at some other point on the dredge, such as in the wheel house. That imprecision, plus uncertainty associated with the location of infrastructure, has caused a dredging operation offshore Louisiana to rupture a gas pipeline – resulting in an explosion and fire.
10,50, 56,&60			Replace the term "emplacement" with "placement" or "placement of dredged material."
39-43		3.5	Consider reorganizing section 3.5 into "Commercial Fisheries," "Recreational Resources," and "Oil and Gas Infrastructure" subsections to parallel the equivalent organization in the Effects section. Aspects of section 3.5 are presented verbatim from the NRCS's 2005 EA. Relevant material (first three paragraphs) should be incorporated by reference and summarized as appropriate.
59-60		4.5.2.2	The Effects on Recreation Resources analysis is excerpted from the MMS EA (2004). Information specific to other projects, including dredging on Ship Shoal, may not be analogous; for example, all the distances provided in this subsection are inaccurate. Aspects of this effects analysis need to be reconsidered. Other parts should be incorporated by reference and summarized herein.
67-75		14.0	Formatting of the references is not consistent.
			The following offers several stylistic comments. The article "the" is used inconsistently. The USDA, NRCS, MMS, FWS, and LDNR are examples of initialisms; "the" should precede the use of initialism. In comparison, NOAA and NMFS, which are pronounced as words, are acronyms; use of the article "the" is not necessary. Occasionally, the authors provide a metric conversion, but at other times it is not offered. Conversions should be presented consistently throughout the document. Lastly, the document uses an inconsistent format when presenting ranges of numbers: sometimes using 10 to 20 ft, and other times, 10-20 ft. The use of a common format is recommended.

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

March 9, 2009 F/SER46/PW:jk
225/389-0508

Mr. Britt Paul, Assistant State Conservationist
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Dear Mr. Paul:

NOAA's National Marine Fisheries Service (NMFS) has received your letter dated January 23, 2009, transmitting the draft Supplement Environmental Assessment (SEA) titled "**Raccoon Island Shore Protection/Marsh Creation Project (TE-48) Phase B - Marsh Creation.**" The draft SEA evaluates Natural Resources Conservation Service's (NRCS) proposal to create 54 acres of intertidal marsh and 14 acres of supratidal habitat on the bayside of Raccoon Island. The project is authorized for engineering and design under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). This document supplements the 2005 Environmental Assessment (EA) for construction of rock breakwaters on the gulfside of the island and substantially incorporates by reference the Mineral Management Service's (MMS) 2004 EA on the issuance of leases for the use of sand from Ship-Shoal for barrier island restoration and hurricane levee construction. Pursuant to our Findings with the CWPPRA agencies, the National Environmental Policy Act document is to serve as initiation of coordination of an Essential Fish Habitat Assessment with NMFS.

NMFS has reviewed the draft SEA and finds it to be thoroughly prepared. We appreciate the efforts of NRCS in cooperation with MMS in that regard. We offer the following comments for your consideration in completing the final SEA.

SECTION 2.2.2, ALTERNATIVE 2: MARSH CREATION USING AN OCS BORROW AREA (PREFERRED ALTERNATIVE)

Page 11, paragraph 3. This section identifies that 14 acres of supratidal habitat would be created. Based on the provided dike dimensions in Figure 5, it appears 11 acres of supratidal habitat would be created initially from the containment dikes. We recommend that the document be revised to correctly state the supratidal acreage anticipated to be created under this alternative, and to describe which project features would result in the creation of supratidal habitat. We also recommend the SEA discuss disposal options for fill excavated from the proposed dike breaches. That sediment could be used to create additional elevations conducive to the establishment of marsh, unvegetated flats, or shallow water habitat.

Page 11, paragraph 5. This section states that 700,000 cubic yards of OCS sediment would be mined, whereas the Executive Summary states that 830,000 cubic yards would be mined. We recommend the document be revised to correct this inconsistency, or to provide clarification.

Page 14, paragraph 3. The document states that 500,000 cubic yards of sediment would be used to create 54 acres of intertidal habitat. Please clarify that is the correct amount of fill volume necessary to create the marsh elevations and how this volume relates to the total excavation volume described elsewhere in the document.

SECTION 3.2.6, FISH RESOURCES

Page 29, paragraph 4. Dolphin are mentioned in the Fishery Management Plan as part of the fishery, but are not included in the management unit and no specific regulations apply. Suggest deleting all references to dolphin from the SEA.

SECTION 3.3.2, ESSENTIAL FISH HABITAT

Page 32, Table 3. Based on the 2005 generic amendment to the Fishery Management Plans and the plans themselves, essential fish habitat (EFH) has not been designated in the project area for gray snapper, Spanish mackerel, bluefish, dolphin, or Atlantic sharpnose shark. Accordingly, we recommend those species be deleted from the table and associated text. We recommend that the table be revised to include juvenile dog snapper as occurring in estuarine and marine systems in mangrove and emergent marsh.

SECTION 4.1.2.2, EFFECT ON COASTAL GEOLOGY AND GEOMORPHOLOGY

Page 44, paragraph 4. This section of the SEA states that the selected construction elevation of +2.5 feet NAVD 88 would settle to +1.6 feet NAVD 88 by the end of the 20-yr project life. These details are different that those in Section 2.2.2, page 14, which states that +2.5 feet is identified as a maximum elevation which is expected to settle to +1.6 feet following five years of consolidation. We recommend the document be revised for clarification and consistency to state the proposed construction grade, including any planned vertical tolerance, and to identify how long it is anticipated to take for the construction elevation to settle to +1.6 feet. Although NMFS finds short term habitat losses up to five years acceptable while fill sediments settle to intertidal elevation, design goals that create long term supratidal elevations such that intertidal elevation is not achieved until target year 20 could be cause for our concern.

SECTION 4.2.2.6 EFFECTS ON FISHERY RESOURCES

Pages 52 and 53. Based on the ongoing work by Condrey et al. (in preparation), we encourage the careful consideration of the timing of dredging effects on aggregations of gravid blue crab and subsequent spawning. Early recommendations from that research effort suggested consideration of potential dredging windows to avoid or minimize impacts on blue crab year class recruitment. Although the final determination may continue to be no significant impact to blue crabs, we recommend that the SEA be revised to identify this potential impact to blue crabs at Ship Shoal and to discuss options to avoid those impacts.

SECTION 4.3.2.2 EFFECTS ON ESSENTIAL FISH HABITAT

Pages 55 and 56. This section of the document should be revised to reflect the direct loss of bottom substrate and water column designated as EFH for various species and life stages that would result from creation of 68 acres of island habitat. We also recommend that this section,

Section 8.0 Mitigation Measures, or Section 9.0 Permit Compliance, be revised to state that losses of EFH (bottom substrate and water column) would compensated for by the creation of 54 acres of intertidal marsh elevations. This section also should be revised to delete species identified above under Section 3.3.2.

We have no EFH Conservation recommendations to provide on the NEPA document and this concludes the required coordination on the EFH assessment. We appreciate the opportunity to review and comment on the draft SEA.

Sincerely,

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

c:
FWS, Lafayette
EPA, Landers
LA DNR, Consistency
F/SER4, Dale
F/SER46, Swafford
Files

Boustany, Ron - Lafayette, LA

From: Dustin White (DNR) [Dustin.White@LA.GOV]
Sent: Monday, March 09, 2009 2:32 PM
To: Boustany, Ron - Lafayette, LA
Subject: OCPR TE-48 Supplemental EA Comments

Ron,

Through our project team, the Office of Coastal Protection and Restoration offers the following bulleted comments in reference to the Supplemental Environmental Assessment for the Raccoon Island Shore Protection/Marsh Creation Project.

- Page 4: First paragraph of Introduction: piping plover does not nest on Raccoon Island. It is wintering habitat for the species.
- Page 4 – Section 1.1: Is TE-48 B going to construction this year? The EA states that construction will begin in May 2009. Has MMS signed the borrow area MOU?
- Page 21 – First paragraph: The magnitude of long shore transport should be expressed as a rate (i.e., 45000 cubic yards per year?)
- Page 26 – Section 3.2.51, last sentence: The inclusion of furbearers in a list of birds seems odd.
- Page 28 – The new scientific names for white shrimp and brown shrimp are *Litopenaeus setiferus* and *Farfantepenaeus aztecus*, respectively.
- Page 30 – Fourth paragraph, last sentence: "engendered" should be "endangered".
- Page 32 – Table 3, Red Drum row: "postlargae" should be "postlarvae".
- Page 47 – Section 4.1.2.5, line 5: "course fraction" should be "coarse fraction".
- Page 50 – Section 4.2.2.3, line 6: "macrovertebrates" should be "macroinvertebrates".
- Page 50 – Section 4.2.2.3, line 11: "defaunted" should be "defaunated".
- Page 51 – Last paragraph, line 3: "perterbations" should be "perturbations".
- Page 57 and throughout rest of document: What is LCS? Should this be OCS?
- Page 57 – First paragraph, line 2: It is stated that pink shrimp prefer sand habitat and they prefer calcareous sediments. Which substrate is preferred? Reword this sentence.
- Page 58 and 59 – Section 4.4.3: The sentences about fish should be removed as this section deals with cultural resources.
- Page 63 – Section 7.2: There seems to be an inconsistency regarding the acreage of supratidal acreage created. Earlier in the document (page 11) it is stated that all 14 acres are supratidal, not 11 acres with 3 acres of dune.
- Page 64 – Section 8.0: Is MMS requiring that the borrow area be surveyed approximately 1 month, 1 year, and 3 years after construction?

If you have any questions, please feel free to contact me.

Dustin White
Project Management Branch
Office of Coastal Protection and Restoration
450 Laurel St., 12th Floor, 1210 - O
Baton Rouge, LA 70801
(225) 342-4512
(225) 242-3418 FAX

Appendix C

LAC 76:III.321 and 331
LDWF Regulations for Isles Dernierers Barrier Island Refuge

DECLARATION OF EMERGENCY

Department of Wildlife and Fisheries
Wildlife and Fisheries Commission

Isles Dernieres Barrier Islands Refuge
(LAC 76:III.321 and 331)

The Wildlife and Fisheries Commission does hereby establish emergency regulations for the management of the Isles Dernieres Barrier Islands Refuge which includes Wine Island, East Island, Trinity Island, Whiskey Island, and Raccoon Island. Formerly, three of these islands, i.e., Wine, Whiskey, and Raccoon Islands, were included within the Terrebonne Barrier Islands Refuge and were regulated under provisions of LAC 76:III.321. By promulgation of this declaration of emergency, the Terrebonne Barrier Islands Refuge regulations found at LAC 76:III.321 are hereby repealed.

A declaration of emergency is necessary to regulate public access to the Isles Dernieres Barrier Islands Refuge in order to ensure that those members of the public utilizing the public use area on Trinity Island enjoy a clean and healthful environment and in order to minimize contact with the numerous species of colonial seabirds that utilize the islands as nesting habitat in the spring and summer months. This declaration of emergency will become effective on May 6, 1999 and shall remain in effect for the maximum period allowed under the Administrative Procedure Act or until adoption of the final rule.

Title 76
WILDLIFE AND FISHERIES
Part III. State Game and Fish Preserves and Sanctuaries
Chapter 3. Particular Game and Fish Preserves and Commission

§321. Terrebonne Barrier Islands Refuge

Repealed.

AUTHORITY NOTE: Promulgated in accordance with R.S. 56:6(18), R.S. 56:761 and R.S. 56:785.

HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 19:910 (July 1993), repealed LR 25:

§331. Isles Dernieres Barrier Islands Refuge

A. Regulations for Isles Dernieres Barrier Islands Refuge

1. Regulations for Wine Island, East Island, Whiskey Island, and Raccoon Island

a. Public access by any means to the exposed land areas, wetlands and interior waterways of these islands is prohibited. Requests to access exposed land areas, wetlands and interior waterways shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands, or of planning and implementing island restoration projects.

b. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in writing by the Secretary or his designee for the uses provided for in Paragraph 1.a. above.

c. Boat traffic is allowed adjacent to the islands in the open waters of the Gulf and bays; however, boat traffic is prohibited in waterways extending into the interior of the islands or within any land-locked open waters or wetlands of the islands.

d. Fishing from boats along the shore and wade fishing in the surf areas of the islands is allowed.

e. Littering on the islands or in Louisiana waters or wetlands is prohibited.

f. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

2. Regulations for Trinity Island

a. Public access is allowed in a designated public use area. An area approximately 3,000 linear feet by 500 linear feet is designated as a public use area, the boundaries of which will be marked and maintained by the Department. The designated public use area shall extend westward from the western boundary of the servitude area reserved by Louisiana Land and Exploration Company in the Act of Donation a distance of approximately 3,000 linear feet and northward from the southern shoreline within this area by a distance of approximately 500 linear feet. Public recreation such as bird-watching, picnicking, fishing and overnight camping is allowed in this area. Travel on or across this area shall be limited to foot or bicycle traffic only. No use of all-terrain vehicles or other vehicles powered by internal combustion engines or electric motors shall be allowed.

b. Public access to all exposed land areas of Trinity Island, other than the public use area, is prohibited. Requests to access these exposed land areas shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands or of planning and implementing island restoration projects.

c. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in writing by the Secretary or his designee for the uses provided for in Paragraph 2.b. above.

d. Any member of the public utilizing the designated public use area shall be required to have a portable waste disposal container to collect all human wastes and to remove same upon leaving the island. Discharge of human wastes, including that within the disposal container, onto the island or into Louisiana waters or wetlands is prohibited.

e. Littering on the island or in Louisiana waters or wetlands is prohibited.

f. Carrying, possessing, or discharging firearms, fireworks, or explosives in the designated public use area is prohibited.

g. Boat traffic is allowed adjacent to the island in open waters of the Gulf and bays and within the man-made canal commonly known as California Canal for its entire length to its terminus at the bulkhead on the western end of the canal. No boat traffic is allowed in other man-made or natural waterways extending into the interior of the island or in any land-locked open waters or wetlands of the island.

h. Fishing from boats or wade fishing in the surf areas of the island is allowed.

i. Houseboats may be moored in designated areas along the California Canal. An annual permit shall be required to moor a houseboat in the canal. The required permit may be obtained from the Department of Wildlife and Fisheries New Iberia Office.

j. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

B. Violation of any provision of these regulations shall be considered a Class Two Violation, as described in R.S. 56:115(D), 56:764, and 56:787.

AUTHORITY NOTE: Promulgated in accordance with R.S. 56:6(18), R.S. 56:109, and R.S. 56:781 et seq.

HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 25:

Bill A. Busbice, Jr.
Chairman

9905#041