

## **APPENDIX D**

### **404(b)(1) WATER QUALITY REPORT**

## Volume IV APPENDIX D:

### 404(b)(1) Water Quality Report

#### 1.0 Project Description

##### 1.1 Location and General Description

The project, located in LCA Subprovince 3, provides for the restoration of the Timbalier and Isles Dernieres Barrier Island chains located in Terrebonne and Lafourche Parishes, Louisiana. The study area (Figure 1) is located in the 3<sup>rd</sup> Congressional District. The study area consists of the barrier islands being considered for restoration as well as the offshore borrow areas. The borrow areas are depicted on Figure 2.

###### Isles Dernieres Reach

The Isles Dernieres Reach represents a barrier island arc approximately 22 miles long in the southern reaches of Terrebonne Parish and extends from Caillou Bay east to Cat Island Pass. Raccoon, Whiskey, Trinity, East, and Wine, the primary islands that comprise the Isles Dernieres barrier island chain, are backed by Bay Blanc, Bay Round, Caillou Bay and Terrebonne Bay, and bordered by the Gulf of Mexico (GOM) on the seaward side. The remnant of Wine Island is located in Wine Island Pass, about midway between East and Timbalier Islands.

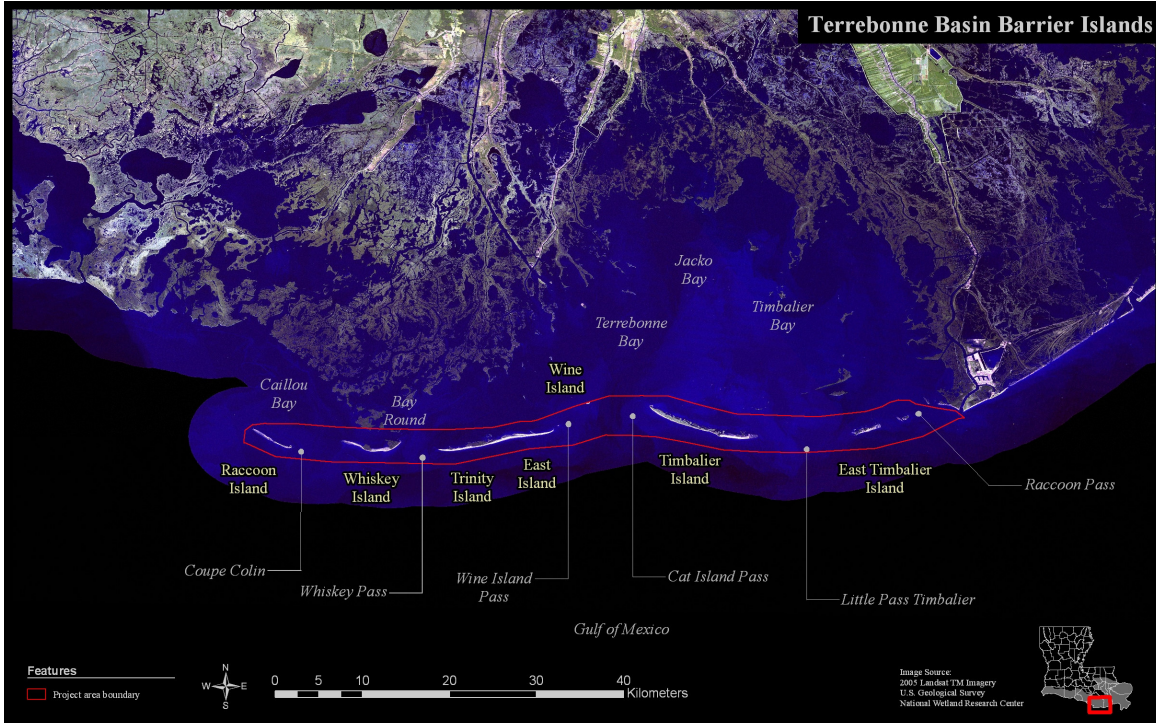
###### Timbalier Reach

The Timbalier Reach is comprised of Timbalier Island and East Timbalier Island. Timbalier and East Timbalier Islands are on the western edge of the Lafourche barrier shoreline and are located about 60 miles southwest of New Orleans, Louisiana. This barrier island shoreline is approximately 20 miles long and backed by Terrebonne and Timbalier Bay to the north and delimited by Raccoon Pass to the east and Cat Island Pass to the west. The islands range from 0.1 to 0.6 miles wide, with low elevations.

###### Borrow Areas

Ship Shoal is the largest and easternmost of a series of sand shoals on the inner continental shelf of Louisiana and contains approximately 1.6 billion cubic yards of fine sand. The elongated shoal lies parallel to the coast approximately 8 to 12 miles (12 to 19 km) south of the Isles Dernieres Reach and measures approximately 31 miles (50 km) in an east-west direction. The potential borrow areas identified within the shoal include Ship Shoal MMS Lease Blocks 87, 88, 89, 94 (Ship Shoal) and South Pelto Blocks 12, 13, 14, 18, and 19 (South Pelto).

Several closer sand sources, previously identified for other coastal restoration project will also be used for construction of the NER. These include: Whiskey Island Restoration Borrow Area 3a (Whiskey Island), New Cut TE-37 Borrow Area (New Cut), and Raccoon Island TE-48 Borrow Area (Raccoon Island). These proposed borrow areas are shown on Figure 2.



**Figure 1. Terrebonne Basin Barrier Shoreline Restoration Study Area.**

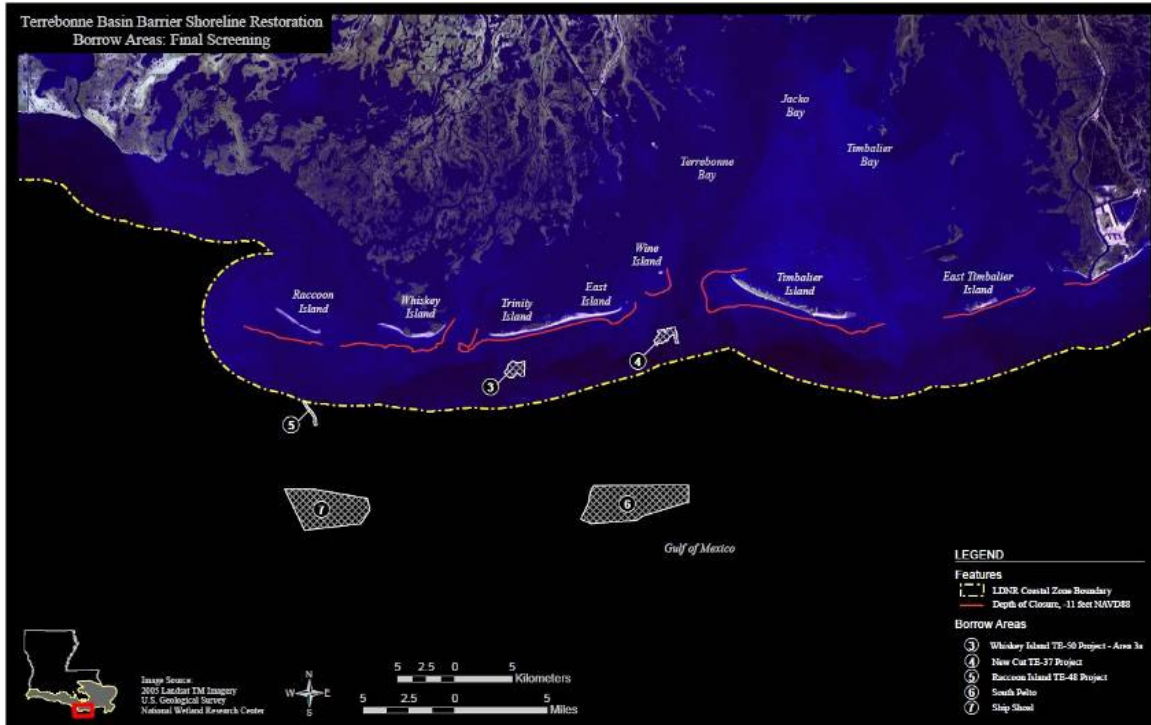


Figure 2. Proposed Borrow Areas.

## 1.2 Authority and Purpose

Title VII of the Water Resources Development Act (WRDA) 2007 authorizes the Louisiana Coastal Area (LCA) ecosystem restoration program. Included within that authority are requirements for comprehensive coastal restoration planning, program governance, a Science and Technology Program, a program for the beneficial use of dredged material, feasibility studies for restoration plans, project modification investigations, and restoration project construction, in addition to other program elements. This authorization was recommended by the Chief of Engineer's Report, dated January 31, 2005.

Under the 2007 WRDA Section 7006, the LCA program has authority for feasibility-level reports of six near-term critical restoration features. The excerpt below from WRDA outlines the project authority for this report for the Terrebonne Basin Barrier Shoreline Restoration project:

**SEC. 7003. LOUISIANA COASTAL AREA.**

(a) *IN GENERAL.*—The Secretary may carry out a program for ecosystem restoration, Louisiana Coastal Area, Louisiana, substantially in accordance with the report of the Chief of Engineers, dated January 31, 2005.

**SEC. 7006. CONSTRUCTION.**

(3) *PROJECTS SUBJECT TO REPORTS.—*

(A) *FEASIBILITY REPORTS.—Not later than December 31, 2008, the Secretary shall submit to Congress feasibility reports on the following projects referred to in the restoration plan:*

(i) *Multipurpose Operation of Houma Navigation Lock at a total cost of \$18,100,000.*

(ii) ***Terrebonne Basin Barrier Shoreline Restoration at a total cost of \$124,600,000.***

(iii) *Small Diversion at Convent/Blind River at a total cost of \$88,000,000.*

(iv) *Amite River Diversion Canal Modification at a total cost of \$5,600,000.*

(v) *Medium Diversion at White's Ditch at a total cost of \$86,100,000.*

(vi) *Convey Atchafalaya River Water to Northern Terrebonne Marshes at a total cost of \$221,200,000.*

(B) *CONSTRUCTION.—The Secretary may carry out the projects under subparagraph (A) substantially in accordance with the plans and subject to the conditions, recommended in a final report of the Chief of Engineers if a favorable report of the Chief is completed by not later than December 31, 2010.*

(4) *CONSTRUCTION.—No appropriations shall be made to construct any project under this subsection if the report under paragraph (2) or paragraph (3), as the case may be, has not been approved by resolutions adopted by the Committee.*

This report is an integrated feasibility study and environmental impact statement (EIS) conducted for the Terrebonne Basin Barrier Shoreline Restoration project. This report fulfills the reporting requirement to Congress of Section 7006(e)(3) which directs the Secretary of the Army to submit feasibility reports on the six projects included in that section by December 31, 2008 and authorizes implementation of the projects provided a favorable Chief of Engineers' Report is completed no later than December 31, 2010.

The National Ecosystem Restoration Plan (NER Plan) includes the restoration of Raccoon Island to its minimal geomorphologic form and ecologic function along with twenty-five (25) years of advanced fill (Plan E) and construction of a terminal groin. This plan also includes restoration of Whiskey and Trinity Islands to their minimal geomorphologic form and ecologic function along with five (5) years of advanced fill (Plan C) and restoration of Timbalier Island to its minimal geomorphologic form and ecologic function along with twenty-five (25) years of advanced fill (Plan E). Approximately 5,840 acres would be restored for the NER Plan.

### **1.3 General Description of Excavated or Dredged and Fill Material**

**General Characteristics of Material.** The materials proposed for placement on Raccoon, Whiskey, Trinity, and Timbalier Islands consist of sands, silts, and clays materials.

## **Quantity and Source of Dredged Material.**

The NER plan will require a total of 55,787,481 cy of dredged material for initial construction and 23,639,786 cubic yards for periodic renourishment. Table 1 provides detailed information on the cut and fill quantities for the NER. Table 2 contains total volumes that will be dredged from each of the borrow areas during initial construction and renourishment. Figure The following sections provide additional information on the source and quantity of material that will be dredged for each component of NER Plan.

### *Whiskey Island Plan C*

Whiskey Island Plan C has been proposed as the first component of construction. During construction, approximately 8.3 mcy of sandy material would be placed along the southern beach shoreline and dune of Whiskey Island. Approximately 0.6 mcy of marsh material would be placed within the marsh template of the site.

The island will also require two renourishment intervals in order to maintain its geomorphologic form and ecologic function throughout the 50-year period of analysis. The first renourishment event will occur 20 years after construction (i.e. 2032) and will include the addition of approximately 8.3 mcy of sandy material to the dune and supratidal beach components of the island. The second renourishment interval will occur 40 years after construction (i.e. 2052) and will include the addition of approximately 6.4 mcy of sandy material to the dune and supratidal beach. No additional marsh material will be added.

The material used for the initial construction of Whiskey Island Plan C will be dredged from the Ship Shoal Borrow Area and Whiskey Island Restoration Borrow Area 3. The material used for the renourishment events at TY20 and TY40 will also be dredged from the Ship Shoal Borrow Area.

### *Raccoon Island Plan E with Terminal Groin*

Fill quantities for the dune/beach and marsh components of Raccoon Plan E are 5.4 million and 4.6 mcy, respectively. The plan will utilize beach/dune material from Ship Shoal and marsh material from the Raccoon Island TE-48 borrow area. However, the borrow area does not have enough material to construct the marsh in its entirety. Therefore, approximately 2.8 mcy of sand will be dredged from Ship Shoal to provide a base layer for the marsh. The marsh material from the Raccoon Island TE-48 borrow area will be deposited on the sand material to provide an adequate foundation for the marsh.

For the dune area, the material will be pumped from the dredge to the beach. The material will then be worked on the beach by bulldozers and front-end loaders. For the marsh area, the material will be pumped from the offshore borrow site. Containment dikes will be constructed around the perimeter. Sediment for the containment dikes will be dredged from existing material inside the marsh creation area. These operations will be completed in a manner that will minimize turbidity of the water at the dredge site and the discharge site.

### *Trinity Island Plan C*

Trinity Plan C will utilize beach/dune material from Ship Shoal and marsh material from the Whiskey 3A borrow area. Fill quantities for the dune/beach and marsh components of Trinity Plan C are 3.8 million and 3.8 mcy, respectively. For the dune area, the material will be pumped from the dredge to the beach. The material will then be worked on the beach by bulldozers and front-end loaders. For the marsh area, the material will be pumped from the offshore borrow site. Containment dikes will be constructed around the perimeter. Sediment for the containment dikes will be dredged from existing material inside the marsh creation area. These operations will be completed in a manner that will minimize turbidity of the water at the dredge site and the discharge site.

### *Timbalier Plan E*

Fill quantities for the dune/beach and marsh components of Timbalier Plan E are 10.7 million and 9.1 mcy, respectively. Timbalier Plan E will utilize beach/dune material from South Pelto and marsh material from Whiskey 3A (marsh material). However, the marsh borrow areas do not have adequate material to construct the marsh in its entirety. Therefore, approximately 8.6 mcy of sand will be dredged from South Pelto, Whiskey 3A (sandy material), and New Cut to provide a base layer for the marsh. The marsh material from Whiskey 3A will be deposited on the sand material to provide an adequate foundation for the marsh.

For the dune area, the material will be pumped from the dredge to the beach. The material will then be worked on the beach by bulldozers and front-end loaders. For the marsh area, the material will be pumped from the offshore borrow site. Containment dikes will be constructed around the perimeter. Sediment for the containment dikes will be dredged from existing material inside the marsh creation area. These operations will be completed in a manner that will minimize turbidity of the water at the dredge site and the discharge site.

**Table 1. Cut and Fill Quantities for Alternative 5 (NER).**

Island	Fill Template	Fill Volume (cy)	Source	Source Fill Volume (cy)	Cut-to-Fill	Cut Volume (cy)	Depth of Cut	Acreage (acres)
<b><i>Initial Construction</i></b>								
Raccoon Plan E	Beach/Dune	5,381,956	Ship Shoal	5,381,956	1.13	6,081,610	12	315
	Marsh	4,609,709	Ship Shoal	2,763,555	1.13	3,122,817	12	162
			Raccoon	1,846,154	1.3	2,400,000	18	83
Whiskey Plan C	Beach/Dune	8,330,215	Ship Shoal	8,330,215	1.13	9,413,143	12	487
	Marsh	579,724	Whiskey (marsh)	579,724	1.6	927,558	12	48
Trinity Plan C	Beach/Dune	3,813,885	Ship Shoal	3,813,885	1.13	4,309,690	12	223
	Marsh	3,772,925	Whiskey (marsh)	3,772,925	1.6	6,036,680	12	312
Timbalier Plan E	Beach/Dune	10,702,818	South Pelto	10,702,818	1.13	12,094,184	13	577
	Marsh	9,073,317	South Pelto	3,083,736	1.13	3,484,622	13	167
			Whiskey (beach)	3,630,769	1.3	4,720,000	8	366
			Whiskey (marsh)	435,735	1.6	697,176	12	37
			New Cut	1,923,077	1.3	2,500,000	18	87
<b><i>Renourishment</i></b>								
Raccoon Plan E	Plan B @ TY30 – Beach/Dune	1,946,212	Ship Shoal	1,946,212	1.13	2,199,220	12	114
Whiskey Plan C	Plan C @ TY20 – Beach/Dune	8,330,215	Ship Shoal	8,330,215	1.13	9,413,143	12	487
	Plan B @ TY40 – Beach/Dune	6,359,650	Ship Shoal	6,359,650	1.13	7,186,405	12	372
Trinity	Plan C @TY25 – Beach/Dune	3,813,885	Ship Shoal	3,813,885	1.13	4,309,690	12	223
Timbalier Plan E	Plan B @ TY30 – Beach/Dune	470,203	South Pelto	470,203	1.13	531,329	13	26



**Table 2. Borrow Area Utilization for Alternative 5 (NER).**

<b>Borrow Area</b>	<b>Acreage</b>	<b>Volume (cy)</b>
<i><b>Initial Construction</b></i>		
South Pelto	744	15,578,806
Ship Shoal	1,187	22,927,260
Whiskey (12' depth)	31	Not applicable
Whiskey (20' depth)	366	12,381,414
New Cut	87	2,500,000
Raccoon Island	83	2,400,000
<i><b>Renourishment</b></i>		
South Pelto	26	531,329
Ship Shoal	1196	23,108,457

#### **1.4 Description of Proposed Discharge Sites**

**Location and Size.** Initial construction would cover a total of 3,283 acres of water bottoms and existing fragmented barrier habitats on Raccoon, Whiskey, Trinity, and Timbalier Islands. Renourishment would directly cover 71 acres on Raccoon, 474 acres at TY 20 and 349 acres at TY40 on Whiskey Island; 537 acres on Trinity Island at TY 25; and 202 acres on Timbalier Island at TY30.

**Type of Site.** The disposal sites for the beach and marsh creation projects are comprised of shallow open-water and fragmented barrier habitats. All disposal areas are saline and tidally influenced. Earthen retention dikes would be constructed as needed to span gaps of open water between sections of barrier habitats or natural ridges within the marsh and beach creation sites. Material excavated for construction of floatation and access channels would be placed in shallow open-water between the shoreline and dikes or adjacent to the excavation channel.

**Type of Habitat.** The discharge sites consist of typical coastal barrier island habitats including: shallow intertidal flats, emergent saline marsh, and beach/dune habitat. These areas provide estuarine habitat that supports marine life of the Gulf of Mexico. Salinity within the disposal area is high and a variety of marine fauna utilize the area. These estuarine habitats also function as critical nursery areas for various species of finfish and shellfish including; brown, white, and pink shrimp; blue crab; oyster; menhaden; black and red drum; spotted sea trout; sheepshead; striped mullet; and croaker.

**Timing and Duration of Discharge.** The dredge and fill activities for the NER are expected to last about 2,480 days. The excavation/dredging activities would occur simultaneously with placement of previously dredged material to disposal areas.

**Description of Disposal Method.** Excavation and construction of retention features within the marsh creation sites would be performed with a marsh buggy equipped with a bucket, or similar equipment. Dredged material would be excavated from the borrow sites by a hydraulic cutterhead dredge and discharged from a pipeline into the marsh creation disposal areas. If practical, other mechanical or hydraulic dredges would be utilized for placement of material into the disposal areas. A mechanical dredge, such as a barge-mounted bucket dredge, would be used to excavate and place the floatation channel material in the shallow open-water disposal areas. A barge-mounted drag-line with a bucket, or similar equipment, would be used to construct the shoreline protection dikes.

## **2.0 Factual Determinations**

### **2.1 Physical Substrate Determinations**

**Comparison of Existing Substrate and Fill.** Sediments at the *Terrebonne Basin Barrier Island Restoration Project – NER Plan* project area and the proposed borrow sites are composed of similar alluvial silts, clays, fine and coarse sands formed by the deltaic process. However, sediments at the marsh creation disposal areas likely contain greater amounts of organic material originating from the surrounding marsh. Due to similar physical qualities of substrates at borrow and marsh creation sites, it is anticipated that plants from the surrounding marsh would colonize the newly deposited material. Earthen retention dikes would be constructed from material borrowed from within or adjacent to the disposal areas, and would not differ from surrounding sediments in the disposal area.

**Changes to Disposal Area Elevation.** Shallow open-water disposal areas of the *Terrebonne Basin Barrier Island Restoration Project – NER Plan* would be filled to an initial elevation of approximately +4.2 feet NAVD88 for beach; +6.4 feet NAVD88 for Dune, and +2.4 feet NAVD88 for marsh. Elevations between +0.5 and +1.5 feet NAVD88 are expected within the disposal areas following dewatering and compaction, and would be suitable for marsh development. Earthen retention dikes would be constructed in open water areas around the perimeter of the disposal areas to elevations of about +6.0 feet NAVD88. The retention features would degrade naturally over time to match marsh or open-water elevation.

**Migration of Fill.** Construction methods may vary but it is anticipated that sand placement along the shoreline will be controlled by advancing a temporary sand dike several hundred feet parallel to shore ahead of the discharge terminus. This aids in reducing initial fill losses offshore and helps control temporary turbidity that may result from the fill placement operations. Typically water drainage and discharges will be directed offshore into the Gulf of Mexico or into existing marsh areas to nourish these habitats.

Placement of the material for the backbarrier marsh would be confined to the limits of the diked area and project footprint.

**Duration and Extent of Substrate Change.** Substrates at the disposal and borrow sites are of similar physical quality, and plant colonization at the marsh creation sites would increase organic content of the newly deposited sediments. The marsh creation areas would be protected from erosion by containment dikes along the northern edge of the backbarrier marsh fill area. However, the material is expected to subside over time, and the disposal areas would convert back to shallow open-water without periodic maintenance. Earthen retention features are expected to degrade naturally over time after project completion.

The discharge of floatation and access channel material at the *Terrebonne Basin Barrier Island Restoration Project – Whiskey (Plan C)* project into shallow open-water is not expected to substantially alter disposal area substrates. Substrates at the excavation and disposal sites are of similar quality. Dredged material placed between the shoreline and dikes is expected to consolidate and migrate into low-lying areas within or adjacent to the disposal areas. Total impacted acres are to be determined by the P.E.D at a later date.

**Changes to Environmental Quality and Value.** Initial construction of the NER would remove a total of 55,787,481 cy of borrow material from a total of 2,498 acres of water bottoms in the offshore borrow areas. Renourishment would remove a total of 23,639,786 cy from a total of 1,222 acres of water bottoms in offshore borrow areas. Initial construction would cover a total of 3,283 acres of water bottoms and existing fragmented barrier habitats. Renourishment would directly cover 71 acres on Raccoon, 474 acres at TY 20 and 349 acres at TY40 on Whiskey Island; 537 acres on Trinity Island at TY 25; and 202 acres on Timbalier Island at TY30.

The NER Plan would initially restore a total of 5,840 acres on Raccoon, Whiskey, Trinity, and Timbalier Islands. This would include initial restoration of a total of 472 acres of dune, 4,320 acres of supratidal and 1,048 acres of intertidal vegetated habitats used by fish and wildlife for shelter, nesting, feeding, roosting, cover, nursery, and other life requirements; increased vegetation growth and productivity; and reduced inter- and intra-specific species competition between resident and non-resident fish and wildlife species for limited coastal vegetation. A complete environmental impact assessment can be found in Section 5 of the Integrated Feasibility Study and Final Environmental Impact Statement.

**Actions to Minimize Impacts.** Project construction will require placement of beach and marsh fill within the Study Area. These activities could potentially adversely impact cultural resources and threatened and endangered species living within the Project Area. Cultural resource surveys will be conducted within the Project Area prior to construction activities in areas where they have not been conducted already. If during dredging, cultural resources are inadvertently discovered, construction activities will cease and the USACE shall immediately secure the jobsite. The USACE will immediately notify the

State Historic Preservation Office, Indian Tribes, and other consulting parties as appropriate.

The project could potentially impact threatened and endangered species as well as species of special interest. To avoid/minimize impacts, construction-related activities will be coordinated with the USFWS, NMFS, and LDWF. During the PED process, both the mechanics/ methodologies and phasing of fill placement will be analyzed and modified with the goal to eliminate or minimize adverse impacts to the species inhabiting the Project Area. Detailed information regarding protection of threatened and endangered species and species of special interest is found in the Section 3.7.7.1 of the main report.

### **2.1.1 Water Circulation, Fluctuation, and Salinity Determination**

Normal water fluctuations in the area consist of daily, seasonal, and annual tidal and flood fluctuations in water level and salinity gradients. Water circulation, stratification, and chemistry as they relate to the discharge/placement of excavated or previously dredged material are will not be significantly affected by the proposed action.

**Alteration of Current Patterns and Water Circulation.** Currents and water circulation within the disposal areas are influenced primarily by tidal and wind driven forces. The combined force of wind and tide regulate current direction and velocity along the shoreline, through narrow bayous, at bayou openings, and within open water areas. Discharge of dredged material and construction of earthen retention features for the barrier island restoration project would convert open water areas to low elevation land inundated only during high tides. Currents or water circulation within these disposal areas would be minimal and only possible during periodic high tides. Earthen retention features would be constructed across areas of open water, and would restrict water from moving into the disposal area or along routes that are currently open to circulation. However, tidal access would be restored after retention features degrade.

Discharge of floatation channel material between the dikes and shoreline at the shoreline protection projects would reduce the overall volume and depth of water within the disposal area, although it is impossible to determine the extent of this reduction. The reduction of water depth, including the creation of sub-aerial mounds, would further alter currents and water circulation between the dikes and shoreline. Impacts to water circulation and depth would be temporary, and conditions similar to pre-construction levels would return as the dredged material naturally disperses between the shoreline and dike.

**Interference with Water Level Fluctuation.** Water level within the marsh creation and shoreline protection disposal areas is primarily influenced by tidal fluctuation. While the placement of dredged material and stone at the project sites would decrease overall water depths within the disposal areas, there would be no interference with water level fluctuation associated with the tides.

**Salinity Gradient Alteration.** Marsh creation and shoreline protection features or disposal of floatation/access channel material would not result in any obstruction of flow from these intersections or other minor bayous. Therefore, alteration of salinity gradients is not expected.

**Cumulative Effects on Water Quality:**

**Salinity.** No cumulative effects are expected.

**Clarity.** No effects are expected.

**Color.** No effects are expected.

**Water Chemistry and Dissolved Gases.** No effects are expected.

**Temperature.** No effects are expected.

**Nutrients.** Slight increases in nutrient concentrations may occur; however, these would rapidly disperse. These described increases would have no significant effect to the water column.

**Changes to Environmental Quality and Value.** The direct impacts of implementing the NER Plan would primarily result from the discharge of 67,184,714 cy of dredged material and associated effluent waters during construction. Proposed restoration features would not result in either long-term or short-term water quality impacts to the adjacent aquatic ecosystem. Potential impacts of dredged material effluent discharges would include increased turbidity and decreased oxygen concentrations, are expected to be short-lived and would likely result in temporary and minor impacts to water quality, if any.

**Actions Taken to Minimize Impacts.** Containment of dredged material by earthen retention dikes and natural features within the marsh creation disposal areas would minimize turbid plumes in adjacent waters. Gaps in the dikes at channel openings would allow water to circulate between the bays, shallow open-water fronting the shoreline, and interior marshes.

**2.1.2 Suspended Material/Turbidity Determination**

**Alteration of Suspended Particulate Type and Concentration.** Particulates suspended at the dredging locations and within the disposal areas during project construction, or by natural forces after project construction, are not expected to differ in type from particulates currently within the project area.

**Particulate Plumes Associated with Discharge.** Temporary and local particulate plumes may occur during construction activities but will quickly dissipate after construction is complete.

**Changes to Environmental Quality and Value.** Particulate plumes resulting from any construction activity are not expected to persist after project completion. Particulates suspended within disposal areas during project construction, or by natural forces after construction, are not expected to differ in type from particulates currently within the project area.

**Actions to Minimize Impacts.** Water column turbidity alterations will be temporary in nature, taking place during excavation/dredging activity, and are expected to return to normal once these activities are completed. Minimal impacts would occur if construction and excavation were timed with low water stages.

### **2.1.3 Contaminant Determinations**

A Phase I Environmental Site Assessment was completed for the project Study Area and indicated no findings of any HTRW impacts. It is not expected, based on these findings, that any contaminants will go into suspension during the construction of this project.

## **2.2 Aquatic Ecosystem and Organisms Determinations**

**Effects on Plankton.** Direct impacts to plankton resources of implementing the NER Plan would be localized and short-term adverse impacts, including mortality of some plankton populations, due to construction activities of terminal groin at Raccoon Island, dredging activities at borrow sites as well as placement of borrow for barrier island restoration. During initial construction and re-nourishment a total of 1,1048 acres and 1,601 acres, respectively, of water bottoms and fragmented barrier habitat would be converted to beach, dune and marsh barrier habitats.

During construction, there would be a localized and short-term decrease in available dissolved oxygen; an increase in turbidity, temperature and biological oxygen demand (BOD). Following construction and dredging operations, the area would return to ambient conditions and be re-colonized by plankton populations.

**Effects on Benthos.** Initial construction would directly impact a total of 2,498 acres of borrow site water bottoms and benthic organisms utilizing these areas including: 744 acres at the South Pelto-6; 1,187 acres at Ship Shoal-7, 31 acres at Whiskey 3A (12 ft depth); 366 acres at Whiskey 3A (20 ft depth); 87 acres at New Cut BA-4, and 83 acres at Raccoon Island BA-5. Renourishment would directly impact a total of 1,222 acres of borrow site water bottoms and benthic organisms utilizing these areas including 1,196 acres at Ship Shoal - 7 and 26 acres at South Pelto - 6.

A total of 3,283 acres of existing water bottoms would be converted to beach, dune and marsh barrier habitats during initial construction. Renourishment would impact 1,633 acres of water bottoms and associated benthic organisms.

Dredging and placement of borrow material, as well as placement of rock over 2 acres for construction of the terminal groin on Raccoon Island, could destroy any slow-moving or

sessile benthic organisms found within the borrow areas, within the barrier island restoration/creation areas, or within the footprint of the terminal groin at Raccoon Island. However, more mobile benthic species would likely be displaced to more suitable habitats.

**Effects on Nekton.** The direct impacts to fisheries resources of implementing the NER Plan would be localized and short-term adverse impacts due to construction activities of the terminal groin at Raccoon Island, dredging activities at borrow sites and access canals, as well as placement of borrow for barrier island restoration. Initial construction would directly impact a total of 2,498 acres of borrow site water bottoms including 744 acres at the South Pelto-6; 1,187 acres at Ship Shoal-7, 31 acres at Whiskey 3A (12 ft depth); 366 acres at Whiskey 3A (20 ft depth); 87 acres at New Cut BA-4, and 83 acres at Raccoon Island BA-5. Renourishment would directly impact a total of 1,222 acres of borrow site water bottoms including 1,196 acres at Ship Shoal - 7 and 26 acres at South Pelto – 6.

A total of 3,283 acres of existing water bottoms would be converted to barrier island transitional habitats. Dredging and placement of borrow material could destroy any slow-moving or sessile fisheries organisms found within the borrow areas and within the barrier island restoration/creation areas. Sessile or slow moving fisheries resources would also likely suffer some mortality or injury during placement of rocks at the terminal groin at Raccoon Island. Construction activities would also temporarily increase turbidity, temperatures and biological oxygen demand (BOD); and decrease dissolved oxygen. However, following construction, displaced fisheries resources would likely return to the Study Area.

**Effects on the Aquatic Food Web.** All aquatic organisms, in all of their life stages, could potentially be impacted temporarily during construction activities and placement of excavated material that would cause increased turbidity and change in water circulation patterns. Excavation during periods of reproduction/spawning will be minimized or avoided. Impact to or reduction of detrital feeding species or lower trophic level species (immobile or sedentary bottom feeders) will be minimized as much as possible to preserve the food chain populations and nutrient export capability of the ecosystem. While no adverse cumulative effects on the aquatic organisms are expected to result from this project, it is expected that some effects will improve and/or benefit aquatic life within the ecosystem.

**Effects on Threatened and Endangered Species.** Species that have been found within the study area that is either considered threatened or endangered include Gulf sturgeon, green sea turtle, hawksbill sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, loggerhead sea turtle, brown pelican, and the West Indian manatee. Details regarding the protection of threatened and endangered species are included in Section 3.7.7.1 of the main report and in the USACE Biological Assessment (Appendix A of main report)

**Effects on Other Wildlife.** Direct impacts to wildlife and habitat resources of implementing NER Plan would primarily result from initial construction and renourishment construction activities related to placement of borrow material on existing

fragmented dune, supratidal, intertidal (gulfside and bayside) and shallow open water habitats that would make these habitats temporarily unavailable and could disrupt or displace wildlife utilizing these habitats. The NER Plan would initially restore a total of 5,840 acres on Raccoon, Whiskey, Trinity, and Timbalier Islands including a total of 472 acres of dune, 4,320 acres of supratidal and 1,048 acres of intertidal wildlife habitats for use by various wildlife species.

Placement of borrow material would unavoidably bury existing barrier shoreline, dune, marsh, and shallow water bottom wildlife habitat resources. Following placement, consolidation of borrow material would take about one year.

Construction of the terminal groin on Raccoon Island would result in 2 acres of these existing shallow water bottoms to be permanently unavailable for use by wildlife.

Potential impacts to migratory bird and colonial nesting birds are described in Section 5.7.1.2 of the main report and in the USACE Biological Assessment (Appendix A of main report).

**Actions to Minimize Impacts.** Due to the duration of the construction events, avoiding critical nesting periods altogether is not feasible under the current schedule and funding constraints. The USACE will develop a Nesting Prevention Plan that will include a combination of proactive measures, coordination, monitoring, and avoidance that will be utilized to avoid/reduce impacts to these species. Throughout PED, consultation will continue with the LDWF, USFWS, and NMFS on detailed contract specifications to avoid and minimize potential impacts to the brown pelican and colonial nesting waterbirds.

## **2.3 Special Aquatic Sites**

### **2.3.1 Effect on Sanctuaries and Refuges**

The project Study Area is within the Terrebonne Barrier Island Refuge. The purpose, along with objectives and goals of this project, is to improve the existing degrading barrier island conditions within the refuge.

### **2.3.2 Effect on Wetlands**

The NER Plan would affect wetlands during the construction activities related to placement of borrow material on existing dune, supratidal, and intertidal habitats. The proposed action would initially restore a total of 5,840 acres on Raccoon, Whiskey, Trinity, and Timbalier Islands. This would include initial restoration of a total of 472 acres of dune, 4,320 acres of supratidal and 1,048 acres of intertidal habitat. Of the 5,840 acres restored, 3,283 acres would be created and 2,557 acres of existing beach, dune, or intertidal habitats would be nourished with dredged material.



### **2.3.3 Effect on Mud Flats**

A portion of the 1,315 acres of intertidal habitat that will exist at the beginning of project construction are mud flats and will be covered with dredged material. These mud flats will be planted with marsh vegetation and will provide 1,550 acres of intertidal habitat by TY5.

### **2.3.4 Effect on Vegetated Shallows**

A portion of the 1,315 acres of intertidal habitat that will exist at the beginning of project construction is shallow backbarrier marsh habitat and will be covered with dredged material. These areas will be planted with marsh vegetation and will provide 1,550 acres of intertidal habitat by TY5.

### **2.3.5 Effect on Coral Reefs**

Not applicable to this project.

## **2.4 Human Use Characteristics**

### **2.4.1 Effect on Municipal and Private Water Supplies**

No municipal or private water supplies exist within the project area.

### **2.4.2 Effect on Recreational and Commercial Fisheries**

Direct impacts to fisheries resources of implementing the NER Plan would be localized and short-term adverse impacts due to construction activities of the terminal groin at Raccoon Island, dredging activities at borrow sites and access canals, as well as placement of borrow for barrier island restoration.

### **2.4.3 Effect on Water-related Recreation**

The immediate direct recreational resources impact from implementation of the NER Plan would be temporary closure of each island's Study Area during construction. In addition, there will be a temporary decrease in the quality of recreational opportunities as the wetland restoration sites are allowed to settle, vegetation is restored, and tidal circulation is reestablished naturally. The recreational benefits and opportunities will rebound as the restored marshes become established. As formulated, the plan involves filling several canals on both Trinity and Timbalier Islands. These canals were excavated and have been maintained to provide access to oil or gas wells and for houseboat mooring. The filling of these canals will have a negative impact on that form of recreation.

### **2.4.4 Aesthetic Effects**

Aesthetics of the barrier island habitat and aquatic ecosystems apply to the perception of beauty and quality of life enjoyed by the general public and property owners. It is expected that all project components will be in keeping with general characteristics of the area that will likely enhance areas of the aquatic ecosystem.

#### **2.4.5 Effect on Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves**

Whiskey Island and Raccoon Island are part of the Terrebonne Barrier Island Refuge (TBIR) which is managed by the Louisiana Department of Wildlife and Fisheries. The purpose, along with objectives and goals of this project, is to improve degrading barrier island conditions which will have a long-term positive effect on the TBIR.

### **3.0 Findings of Compliance or Non Compliance with the Restrictions on Discharge**

- 1) No significant adaptations of the guidelines were made relative to this evaluation.
- 2) No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.
- 3) The discharges of fill materials will not cause or contribute to, after consideration of disposal site dilution and dispersion, violation of any applicable State water quality standards for waters. The discharge operations will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
- 4) The placement of fill materials in the Project A will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973. Deposition of fill material in the gulfside intertidal areas will adversely impact piping plover foraging areas. In order to minimize impacts to this species, the sequencing of island construction will allow these birds to temporarily relocate to suitable habitat within the boundary of the Study.
- 5) The placement of fill materials will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

#### 4.0 Evaluation Responsibility

Evaluation Prepared By:

Joseph Leblanc, Office of Coastal Protection and Restoration Authority, Plan Development Section, P.O. Box 44027, Capital Station, Baton Rouge, LA 70804-4027

Aaron S. Bass, Ph.D. Coastal Scientist & Senior Project Manager, SJB Group, 6120 Perkins Road, Suite 200 Baton Rouge, LA 70808

Evaluation Reviewed By:

William P. Klein, Jr., Ed.D. U.S. Army Corps of Engineers, New Orleans District, P.O. Box 60267, New Orleans, LA 70118

The proposed plan for the project, which incorporates sites for dredging and excavation and the placement of fill, complies with the requirements of guidelines and includes appropriate and practicable methods to minimize adverse effects to the aquatic ecosystem.

Date: Sept 27, 2010

Joan M Exnicios

Joan M. Exnicios, Chief  
Environmental Planning and Compliance Branch

**APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT  
(33 CFR 325)**

**OMB APPROVAL NO. 0710-0003  
EXPIRES: 31 August 2012**

Public reporting burden for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

**PRIVACY ACT STATEMENT**

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This Information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

**(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)**

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
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**(ITEMS BELOW TO BE FILLED BY APPLICANT)**

<p>5. APPLICANT'S NAME: First - Middle - Last- Company - U.S. Army Corps of Engineers, New Orleans District E-mail Address - William.P.Klein.Jr@usace.army.mil</p>	<p>8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required) First - Middle - Last- Company - NA E-mail Address - NA</p>
<p>6. APPLICANT'S ADDRESS: City - New Orleans State - Louisiana Zip -70160-0267 Country - USA</p>	<p>9. AGENT'S ADDRESS City - NA State - NA Zip - NA Country - NA</p>
<p>7. APPLICANT'S PHONE NOS. W/AREA CODE. a. Residence - NA b. Business - (504)862-2540 c. Fax - NA</p>	<p>10. AGENT'S PHONE NOS. W/AREA CODE a. Residence - NA b. Business - NA c. Fax - NA</p>

**STATEMENT OF AUTHORIZATION**

11. I hereby authorize, \_\_\_\_\_ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

\_\_\_\_\_  
APPLICANT'S SIGNATURE

\_\_\_\_\_  
DATE

**NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY**

<p>12. PROJECT NAME OR TITLE (see instructions) Louisiana Coastal Area - Terrebonne Basin Barrier Shoreline Restoration Project</p>																
<p>13. NAME OF WATERBODY, IF KNOWN (if applicable), Gulf of Mexico</p>	<p>14. PROJECT STREET ADDRESS (if applicable) Address - NA  City - NA State - NA Zip - NA</p>															
<p>15. LOCATION OF PROJECT:</p> <table border="1"> <thead> <tr> <th></th> <th>Raccoon</th> <th>Whiskey</th> <th>Trinity</th> <th>Timbalier</th> </tr> </thead> <tbody> <tr> <td>Latitude N</td> <td>29.0536</td> <td>29.0460</td> <td>29.0525</td> <td>29.0753</td> </tr> <tr> <td>Longitude W</td> <td>90.9305</td> <td>90.8312</td> <td>90.7311</td> <td>90.4962</td> </tr> </tbody> </table>			Raccoon	Whiskey	Trinity	Timbalier	Latitude N	29.0536	29.0460	29.0525	29.0753	Longitude W	90.9305	90.8312	90.7311	90.4962
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Latitude N	29.0536	29.0460	29.0525	29.0753												
Longitude W	90.9305	90.8312	90.7311	90.4962												

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

The Project, located in LCA Subprovince 3, provides for the restoration of the Timbalier and Isles Dernieres barrier island chains located in Terrebonne Parish and Lafourche Parish, Louisiana. The Isles Dernieres Reach represents a barrier island arc approximately 22 miles long in Terrebonne Parish that extends from Caillou Bay east to Cat Island Pass. Raccoon Island, Whiskey Island, Trinity Island, East Island, and Wine Island (the primary islands that comprise the Isles Dernieres barrier island chain) are backed by Bay Blanc, Bay Round, Caillou Bay, and Terrebonne Bay, and bordered by the Gulf of Mexico on the seaward side (Attachment 1). The Timbalier Reach is comprised of Timbalier Island and East Timbalier Island. The two islands are on the western edge of the Lafourche barrier shoreline and are located about 60 miles southwest of New Orleans, Louisiana (Attachment 1). This barrier island shoreline is approximately 20 miles long and backed by Terrebonne and Timbalier Bay to the north and delimited by Raccoon Pass to the east and Cat Island Pass to the west.

17. DIRECTIONS TO THE SITE:

Please see Section 16.

18. Nature of Activity (Description of project, include all features)

The project includes the restoration of Raccoon Island to its minimal geomorphologic form and ecologic function along with twenty-five (25) years of background erosion / land loss and construction of a terminal groin. This plan also includes restoration of Whiskey and Trinity Islands to their minimal geomorphologic form and ecologic function along with five (5) years of background erosion / land loss and restoration of Timbalier Island to its minimal geomorphologic form and ecologic function along with twenty-five (25) years of background erosion / land loss. Immediately after construction, the project will add 3,283 acres of habitat (dune, intertidal, and supratidal) to the existing island footprints of Raccoon, Whiskey, Trinity, and Timbalier Islands, increasing the total size of the islands to 5,840 acres. This includes approximately 472 acres of dune, 4,320 acres of supratidal habitat, and 1,048 acres of intertidal habitat. A detailed description of the components for each island and the related construction activities is provided in Attachment 2. These components are summarized in the following table:

Table 1: Project Components\*

Island	Proposed Dune Height (ft NAVD88)	Proposed Marsh Height (ft NAVD88)	Proposed Dune Crown Width (ft)	Proposed Dune Slope (H:V)	Proposed Beach Slope (H:V)	Existing Island Footprint (acres)	Proposed Island Footprint (acres)	Net Increase in Island Footprint (acres)	Proposed Fill Quantity: Beach/Dune (mcy)	Proposed Fill Quantity: Marsh (mcy)	Proposed Length of Sand Fencing Used (ft)
Raccoon	+7.7	+3.7	100	30:1	60:1	235	789	554	5.2	5.1	11,912
Whiskey	+6.4	+2.4	100	30:1	60:1	803	1,272	469	8.3	0.6	18,075
Trinity	+6.4	+2.5	100	30:1	60:1	564	1,149	585	3.1	4.0	22,467
Timbalier	+7.1	+3.2	100	30:1	60:1	955	2,630	1,675	10.7	9.1	35,425

\*Please note that this information was developed for a feasibility level report and will be revised during Pre-construction, Engineering, and Design (PED).

Each of the islands in the project will require at least one renourishment event in order to maintain their geomorphologic form and ecologic function throughout the 50-year period of analysis. Trinity Island will be renourished at TY25 (2037) while Raccoon and Timbalier will be renourished at TY30 (2042). Whiskey Island will require two renourishment events; one at TY20 (2032) and one at TY40 (2052). **Separate 404 permits will be submitted for the renourishment events.**

**Beach and Dune Construction**

The contractor will use a hydraulic cutterhead dredge to excavate sand from the available sand borrow areas. The sand will then be pumped through a series of booster pumps to the beach/dune fill template via a submerged sediment pipeline.

During construction the contractor will be directed to maintain dedicated equipment loading/unloading areas, staging areas, and access corridors to minimize the impacts to the island. Existing mangrove habitats and prior restoration project areas shall be avoided by construction equipment and construction-related activities.

Once on the beach, the sediment pipeline will run parallel to the shoreline. Front-end loaders that are equipped with grapple arms will be utilized in the placement and relocation of the sediment pipeline. For segments of the fill template that have sufficient width, a Y-valve will be utilized to enable placement of multiple sediment pipelines along the template. The bifurcation of the discharge pipeline will facilitate lower discharge velocities and increased sediment retention within the fill template. In order to minimize the impact on piping plover (a threatened and endangered species that inhabits the island), the beach will be constructed in sections to allow the birds to move to areas that are not currently under construction.

The sand will be worked on the beach by bulldozers to meet the specified template grades, slopes and widths. Construction methods may vary but it is anticipated that sand placement along the shoreline will be controlled by advancing a temporary sand dike several hundred feet parallel to shore ahead of the discharge terminus. This aids in reducing initial fill losses offshore and helps control temporary turbidity that may result from the fill placement operations. Typically water drainage and discharges will be directed offshore into the Gulf of Mexico or into existing marsh areas to nourish these habitats.

If construction is completed during the summer, fall, or winter months, the dune and supratidal areas would be temporarily stabilized through aerial dispersion of grass seed. During the first spring following construction, the dune and supratidal areas would be planted with a more permanent combination of plants. Vegetation would be manually planted on 8-foot centers and would provide 100% coverage of the dune and supratidal areas. An additional 15% of the dune and supratidal swale areas will be planted with woody species in TY2 (2014). The vegetation will be manually planted on 8-foot centers.

**Back-Barrier Marsh Construction**

As with the beach fill, it is anticipated that the contractor will use a hydraulic cutterhead dredge and booster pump(s) to excavate sediment from the available offshore marsh borrow area(s) and directly transport it via a submerged sediment pipeline to the marsh platform. Sediment used to construct the marsh containment dikes will be dredged from existing material inside the marsh creation area rather than from offshore borrow areas.

These operations will be done in a manner that will minimize turbidity. Discharge and dewatering from the marsh fill shall typically be directed towards the Gulf of Mexico including orienting discharge pipes such that the hydraulic flow moves in a gulfward direction and locating dewatering structures on the gulf side of the Project area. The contractor may employ other methods such as building interior containment dikes and creating a drainage gradient towards the gulf. If excess turbidity occurs, the contractor will be directed to change the operating procedure to reduce the degree of turbidity.

Herbaceous planting of the marsh template will be conducted in two phases. The first phase will occur in the second year following construction (i.e. TY3 - 2015) and will consist of covering 50% of the platform. The remaining 50% of the platform will be planted the following year. The vegetation will be manually planted on 8-foot centers.

19. Project Purpose (Describe the reason or purpose of the project, see Instructions)

Natural processes and human actions, such as the construction of oil field canals and the containment of waterways, have threatened the long-term viability of the project area. These processes and activities have caused significant adverse impacts to the Terrebonne Basin barrier island shoreline, resulting in extensive barrier island habitat loss and ecosystem degradation. The purpose of this project is to expand the footprints of four barrier islands (i.e. Raccoon, Whiskey, Trinity, and Timbalier Islands) to restore their geomorphic form and ecologic function. This will effectively reduce land-loss rates within the project area to below historic land-loss rates (1880 through 2005). The project will also restore and improve various barrier island habitats that provide essential habitats for fish, migratory birds, and other terrestrial and aquatic species, mimicking, as closely as possible, conditions which would occur naturally in the area for the 50 year period of analysis. Furthermore, restoration of the four islands will increase sediment input to supplement long-shore sediment transport processes along the gulf shoreline by mechanically introducing compatible sediment, and increasing the ability of the restored area to continue to function and provide habitat for the 50 year period of analysis with minimal continuing intervention.

**USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

20. Reason(s) for Discharge

The restoration of Raccoon, Whiskey, Trinity, and Timbalier Islands will require a considerable amount of fill material (e.g. marsh material for marsh creation and sand material for beach/dune creation). This material will be dredged from a number of off-shore borrow areas located gulfward of the islands including Whiskey Island 3, New Cut, Raccoon, South Pelto, and Ship Shoal (see Attachment 3). As previously stated, the contractor will use a hydraulic cutterhead dredge to excavate fill from the available borrow areas. The fill will then be pumped through a series of booster pumps to the beach/dune fill template via a submerged sediment pipeline. If no action is taken, the barrier islands will continue to be subjected to the prevailing erosional processes that will eventually result in a direct loss of the barrier islands to open water. This will reduce essential fish habitat, destroy critical habitat for threatened and endangered species (i.e. the piping plover) and species of special interest (i.e. the brown pelican), impact fisheries resources, and diminish the storm-surge protection benefits of the barrier island system.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

The impacts of the Deepwater Horizon oil spill on the proposed borrow areas are uncertain at this time (August 2010). However, prior to any dredging activities, the borrow material will be tested to insure that it is free of contaminants. Fill types and quantities for each of the four islands are presented in the following sections and summarized in Table 2.

**Raccoon**

Fill quantities for the dune/beach and marsh components of Raccoon Plan E are 5.4 million and 4.6 million cubic yards, respectively. The plan will utilize beach/dune material from Ship Shoal and marsh material from the Raccoon Island TE-48 borrow area. However, the borrow area does not have enough material to construct the marsh in its entirety. Therefore, approximately 2.8 million cubic yards of sand will be dredged from Ship Shoal to provide a base layer for the marsh. The marsh material from the Raccoon Island TE-48 borrow area will be deposited on the sand material to provide an adequate foundation for the marsh.

**Whiskey**

The plan will utilize beach/dune material from the Ship Shoal borrow area and marsh material from Whiskey 3a borrow area. Fill quantities for the initial construction of the dune/beach and marsh components of Whiskey Plan C are 8.3 million and 0.6 million cubic yards, respectively.

**Trinity**

Trinity Plan C will utilize beach/dune material from Ship Shoal and marsh material from the Whiskey 3A borrow area. Fill quantities for the dune/beach and marsh components of Trinity Plan C are 3.8 million and 3.8 million cubic yards, respectively.

**Timbalier**

Fill quantities for the dune/beach and marsh components of Timbalier Plan E are 10.7 million and 9.1 million cubic yards, respectively. Timbalier Plan E will utilize beach/dune material from South Pelto and marsh material from Whiskey 3A (marsh material). However, the marsh borrow areas do not have adequate material to construct the marsh in its entirety. Therefore, approximately 8.6 million cubic yards of sand will be dredged from South Pelto, Whiskey 3A (sandy material), and New Cut to provide a base layer for the marsh. The marsh material from Whiskey 3A will be deposited on the sand material to provide an adequate foundation for the marsh.

**Table 2: Fill Type and Quantities**

Island	Type of Material	Fill Volume (cy)	Source	Source Fill Volume (cy)	Cut-to-Fill Ratio	Cut Volume (cy)	Depth of Cut (ft)	Acreage (acres)
Raccoon	Beach/Dune	5,381,956	Ship Shoal	5,381,956	1.13	6,081,610	12	315
	Marsh	4,609,709	Ship Shoal	2,763,555	1.13	3,122,817	12	162
			Raccoon	1,846,154	1.3	2,400,000	18	83
Whiskey	Beach/Dune	8,330,215	Ship Shoal	8,330,215	1.13	9,413,143	12	487
	Marsh	579,724	Whiskey 3A (marsh)	579,724	1.6	927,558	12	48
Trinity	Beach/Dune	3,813,885	Ship Shoal	3,813,885	1.13	4,309,690	12	223
	Marsh	3,772,925	Whiskey 3A (marsh)	3,772,925	1.6	6,036,680	12	312
Timbalier	Beach/Dune	10,702,818	South Pelto	10,702,818	1.13	12,094,184	13	577
	Marsh	9,073,317	South Pelto	3,083,736	1.13	3,484,622	13	167
			Whiskey 3A (beach)	3,630,769	1.3	4,720,000	8	366
			Whiskey 3A (marsh)	435,735	1.6	697,176	12	37
			New Cut	1,923,077	1.3	2,500,000	18	87

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions) Acres Or Liner Feet

There are existing pockets of back-barrier marsh on each of the islands that will be covered with fill material during construction. Although construction of the project will result in temporary impacts to these marshes, the creation of larger back-barrier marshes is expected to offset these impacts in the long term. Table 3 summarizes the anticipated area of marsh that will be covered and the amount of new marsh created.

One of the primary objectives of the project is to increase the island footprints. This will require the placement of fill material in the Gulf of Mexico. Table 3 identifies the acreage of island fill that will be placed in the open water adjacent to the existing island footprints.

**Table 3: Fill Type and Quantities**

Island	Area of Marsh Covered at TY1 (acres)	Area of Marsh Created at TY1 (acres)	Net Marsh Created at TY1 (acres)*	Area of Open Water Filled at TY1 (acres)**
Raccoon	5	318	313	554
Whiskey	105	110	5	469
Trinity	343	521	178	585
Timbalier	791	1063	272	1675
Total	1244	2012	768	3283

\*Net Marsh Created equals the area of marsh created at TY1 minus the area of marsh covered at TY1

\*\*Represents the acreage of the Gulf of Mexico that will be filled during construction

23. Description of Avoidance, Minimization, and Compensation (see instructions)

During the plan formulation, the proposed island plans for Raccoon and Whiskey Islands were shifted gulfward to avoid approximately 58 and 286 acres of existing mangroves on the islands, respectively. This was done in order to minimize the ecologic impact during construction. Since these two islands are considered to be valuable wildlife habitats (Isles Dernieres Barrier Islands Wildlife Refuge) and the LDWF is reestablishing a pelican rookery on Whiskey Island, maintaining adequate areas of healthy beach, dune, and marsh is particularly important.

The project was also designed to avoid existing restoration projects on the islands. For example, Whiskey Plan C was designed to complement TE-50, which is an existing CWPPRA project that was constructed in 2009. TE-50 created approximately 316 acres of intertidal back-barrier marsh between the two existing mangrove stands. Restoration of the beach and dune gulfward of TE-50 will help to protect the existing CWPPRA investment.

Raccoon Plan E was designed to complement two separate CWPPRA projects, TE-29 and TE-48. The TE-29 project, which was completed in July 1997, included the construction of eight segmented breakwaters along the eastern end of the island. The TE-48 project consists of two phases. Phase A, which included the construction of eight additional segmented breakwaters and a terminal groin, was completed in September of 2005. The terminal groin, which was constructed on the eastern end of the island, was intended to prevent longshore currents from scouring accumulated sediment behind the breakwater field. Phase B, which is currently in the pre-construction phase, will include the construction of a 53-acre marsh along the backside of the island. The resilience of Raccoon Island Plan E is partially due to the existing breakwaters from both CWPPRA projects. The plan will help protected the marsh that will be constructed as part of TE-48.

The mangrove stands and CWPPRA projects on Raccoon and Whiskey Island can be avoided without undermining the project because they are the only areas of sufficient elevation to complement the design template and to contribute to the geomorphologic form and ecologic function of the islands. Avoidance of other pockets of existing habitat could potentially undermine the project by providing "weak spots" in the template. These areas could be more susceptible to breaching and could accelerate erosion. Therefore, the remaining habitat on Raccoon and Whiskey Island will be covered with fill material during construction of the template (i.e. at TY1). Existing habitat on Trinity and Timbalier Islands can not be avoided without undermining the project. Therefore, the entire footprints of the islands will be covered with fill material, but will be restored through the vegetative planting efforts immediately following construction.

No compensatory mitigation is required for this project. As an ecosystem restoration project, the alternatives were designed to avoid environmental impacts. Any incidental temporary impacts that might be incurred during construction will be more than offset by the net habitat value created by the project.

24. Is Any Portion of the Work Already Complete? Yes \_\_\_ No X IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

The four islands in the project area are completely surrounded by the Gulf of Mexico. The following sections describe the landownership of the actual islands.

**Raccoon Island**

Raccoon Island is owned by the State of Louisiana and is under the jurisdiction of the Louisiana Department of Wildlife & Fisheries for Isles Dernieres Barrier Island Refuge, therefore, easements are not needed for this island, only a Grant of Particular Use.

**Whiskey Island**

Whiskey Island is owned by the State of Louisiana and is under the jurisdiction of the Louisiana Department of Wildlife & Fisheries for Isles Dernieres Barrier Island Refuge; therefore, easements are not needed for this island, only a Grant of Particular Use.

**Trinity Island**

The majority of the island is owned by the State of Louisiana, however, a small portion of the island, approximately 30 acres, is privately owned by what appears to be one landowner. This property owner will be identified during PED. A Standard Perpetual Beach Nourishment Easement would be acquired over these 30 acres of private property.

**Timbalier Island**

The majority of the island is owned by the State of Louisiana, however, one end of the island has some private ownership which is estimated to be approximately 80 acres. The ownership of this land is heavily disputed; however, preliminary data indicates that each of the 11 estimated tracts contain multiple owners. These property owners will be identified during PED. A Standard Perpetual Beach Nourishment Easement would be acquired over these 80 acres of private property.



26. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
LDEQ	Water Quality Certification	TBD	TBD		

\*Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

\_\_\_\_\_  
SIGNATURE OF APPLICANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE OF AGENT

\_\_\_\_\_  
DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

BOBBY JINDAL  
GOVERNOR



PEGGY M. HATCH  
SECRETARY

State of Louisiana  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
ENVIRONMENTAL SERVICES

SEP 20 2010

U.S. Army Corps of Engineers- New Orleans District  
P.O. Box 60267  
New Orleans, LA 70160-0267

Attention: Sandra Stiles

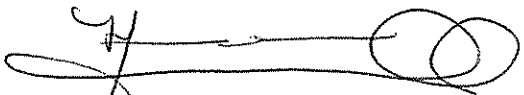
RE: Water Quality Certification (WQC 100824-03/AI 171484/CER 20100003)  
Louisiana Coastal Area- Terrebonne Basin Shoreline Restoration  
Terrebonne Parish

Dear Ms. Stiles:

The Louisiana Department of Environmental Quality (the Department) has reviewed your application to restore the shorelines of the Timbalier and Isles Dernier barrier islands.

Based on the information provided in the application, the Department made a determination that the requirements for a Water Quality Certification have been met and concludes that the placement of the fill material will not violate water quality standards of Louisiana as provided for in LAC 33:IX.Chapter 11. Therefore, the Department hereby issues a Water Quality Certification to the U.S. Army Corps of Engineers- New Orleans District.

Sincerely,



Melvin C. Mitchell, Sr.  
Administrator  
Water Permits Division

MCM/jjp