WEST BELLE PASS BARRIER HEADLAND RESTORATION
CWPPRA PROJECT Fed No. TE-52

ENVIRONMENTAL ASSESSMENT
Lafourche Parish, Louisiana

U.S. Department of Commerce

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ACRONYMS

AAHU	Average annual habitat unit
ATM	Applied Technology & Management
CAA	Clean Air Act
CEI	Coastal Environments, Inc.
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CPE	Coastal Planning & Engineering, Inc.
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection and Restoration Act
CZMA	Coastal Zone Management Act
DEM	Digital elevation model
DOI	U.S. Department of Interior
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
GEC	Gulf Engineers and Consultants
GMFMC	Gulf of Mexico Fisheries Management Council
LCA	Louisiana Coastal Area
LCWCRTF	Louisiana Coastal Wetlands Conservation and Restoration Task Force
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
LDWF	Louisiana Department of Wildlife and Fisheries
LOOP	Louisiana Offshore Oil Port
m	Meter
MMS	Minerals Management Service, U.S. Department of Interior
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NAO	NOAA Administrative Order
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration, U.S. Department of Commerce
NRCS	Natural Resources Conservation Service, U.S. Department of Agriculture

ACRONYMS (Continued)

NRHP	National Register of Historic Places
OCPR	Office of Coastal Protection and Restoration
SAV	Submerged aquatic vegetation
SBEACH	Storm-Induced Beach Change Model
SHPO	State Historic Preservation Office
TAR	Tidewater Atlantic Research
TY	Target year
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey, U.S. Department of Interior
WCRA	Wetlands Conservation and Restoration Authority
WIS	Wave Information Studies
WVA	Wetland Values Assessment

EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared to assess impacts related to the proposed implementation of the West Belle Pass Barrier Headland Restoration Project (TE-52) in Lafourche Parish, Louisiana. The purpose of this proposed project is to support the coastal restoration objectives of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) through reestablishment of the West Belle Pass Barrier Headland by rebuilding a large portion of the beach, dune, and back-barrier marsh that once existed. Approximately 8,500 feet of beach and dune would be rebuilt using about 1 million cubic yards of dredged material, and about 227 acres of marsh habitat would be rebuilt using nearly 2 million cubic yards of dredged material. Native vegetation would be planted after construction to help stabilize the rebuilt marsh and dune habitat. This proposed project was selected by the CWPPRA Task Force through a publicly vetted process to proceed to engineering and design on February 15, 2007. Other federal agencies that make up the CWPPRA Task Force include the U.S. Army Corps of Engineers (USACE); the U.S. Fish and Wildlife Service (USFWS), Department of the Interior; the Natural Resources Conservation Service (NRCS), Department of Agriculture; and the U.S. Environmental Protection Agency (EPA). As the federal sponsor for the West Belle Pass Headland Restoration Project, the National Oceanic and Atmospheric Administration (NOAA) is responsible for project oversight in partnership with the State of Louisiana Office of Coastal Protection and Restoration (OCPR). NOAA and OCPR wish to proceed to the construction phase of this proposed project, and, through the standard operating procedures of CWPPRA, an EA is required at the 95 percent design phase.

This EA complies with requirements set forth under the National Environmental Policy Act (NEPA) of 1969, as implemented by the regulations of the Council on Environmental Quality (CEQ) (Title 40 *Code of Federal Regulations* [CFR] Parts 1500 through 1508 [CEQ 1992]) and NOAA Administrative Order (NAO) 216-6 (NOAA 1999), which describes NOAA's policies, requirements, and procedures for complying with NEPA and the regulations for implementation. The CWPPRA program was evaluated in a programmatic Environmental Impact Statement (EIS) for the Louisiana Coastal Wetlands Restoration Plan prepared by the CWPPRA Task Force and the Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] (1993). This EA tiers to and incorporates applicable parts of that EIS and evaluates the site-specific impacts on the human environment associated with the proposed West Belle Pass Headland Restoration Project and alternatives. General information on the need for this type of project, the affected environment, and the environmental consequences was presented in the Final Programmatic EIS prepared by the USACE as part of the Louisiana Coastal Area (LCA) Ecosystem Restoration Study (USACE 2004). Information on existing conditions in the borrow areas and potential impacts of sand mining came from NEPA compliance documents prepared by the Department of Interior (DOI) Minerals Management Service (MMS) (DOI MMS 2002, 2003). This EA does not duplicate those discussions, but relies on and incorporates by reference, relevant descriptions and analysis.

The West Belle Pass Headland Restoration Project had to be included on the CWPPRA annual Priority Project List to be eligible for funding for formal engineering and design and subsequent implementation. This project selection process takes several months to complete, involves the public, and narrows the field of potential projects down to approximately four a year that are approved to enter the formal engineering and design process (Phase 1). As a result of this process, the field of available alternatives under consideration for a project is restricted to those options that would provide the same wetland benefits for the relative cost per acre and that take place within the general proposed project area.

The proposed project area encompasses 411 acres (166 hectares) dominated by shallow open water, salt marsh, and barrier islands with beach and dune habitats. Most of this barrier island segment is erosional. Shoreline changes were documented by analyzing historical data, reviewing digitized topographic maps, analyzing aerial photographs taken in July 2008, and conducting beach surveys in 2008 (Coastal Planning and Engineering, Inc. [CPE] 2009). The goal of this proposed project is to create habitat along a barrier island complex.

Through the CWPPRA process, it was determined that repair and restoration of existing barrier island features is the appropriate approach to restoration. Alternatives available to achieve this goal focus on repairing breaches and tidal inlets in the shoreline, reinforcing the existing shoreline with sand, and using dredged sediments to build up important back barrier marsh habitat. Alternatives that involved more intensive construction or placement of hard structures versus restoration and repair of existing features, were considered but eliminated from further analysis.

All three proposed alternatives involve moving sand from two offshore borrow areas into the proposed project area. Differences among alternatives include (1) variance in dune width and slope, (2) inclusion of a terminal groin or breakwater, and (3) size and elevation of the marsh platform. The dune crest elevation for all design alternatives is +6.0 feet North American Vertical Datum 88 (NAVD). The landward contour of all design alternatives is similar, except where a terminal end structure was used the contour was more rectangular due to the position of the structure. The same borrow areas are incorporated into all design alternatives. The proposed project would confine fill material within containment dikes. Containment dikes would be gapped or degraded after appropriate dewatering and consolidation of fill material. Areas of newly created island, dune, and marsh would be planted with vegetation. Sand fencing to reduce wind-induced loss and maintain target island topography is included in all alternative designs.

Similar components of the three alternatives include the following features: (1) marsh creation and nourishment behind the island, with associated containment; (2) beach nourishment and dune construction on the Gulf of Mexico side of the island; (3) sand fencing; and (4) vegetative planting. The three alternatives for the proposed project call for between 3.0 and 3.4 million cubic yards of material to be placed within the proposed project area. Two sources of fill material have been identified for island restoration and marsh creation. First, a sand borrow area containing material suitable for building the beach portion of the island has been delineated about 9 miles west of the proposed project area. Second, a marsh borrow area that contains relatively fine-grained material suitable for marsh creation is located approximately 2.8 miles south of the project area.

Construction of the preferred alternative (Alternative 1) would include 1,180,000 cubic yards of beach fill and 1,903,000 cubic yards of marsh fill. A marsh constructed at +3.0 feet NAVD would persist at elevations between mean high water and mean low water for approximately 20 years (typical project lifespan). The preferred alternative would result in a net benefit of 203 average annual habitat units (AAHU).

This EA provides the supporting analysis to determine whether or not significant long-term adverse direct, indirect, or cumulative environmental impacts are anticipated from implementing the alternatives. Short-term impacts related to construction are not significant and considered reversible. This conclusion is based on a comprehensive review of relevant literature, site-specific data, quantitative model results, and project-specific engineering reports related to biological, physical, and cultural resources. The natural resource benefits anticipated from implementing the preferred alternative would include maintenance and enhancement of dune, swale, and intertidal habitat within the proposed project area. The increase in both quality and acreage of fisheries habitat is expected to have long-term beneficial impacts on the local economy, as more people visit the area to take advantage of recreational and commercial fishing opportunities. In addition, the proposed project would result in increased protection for infrastructure on and behind the barrier headlands to be restored.

1.0 INTRODUCTION

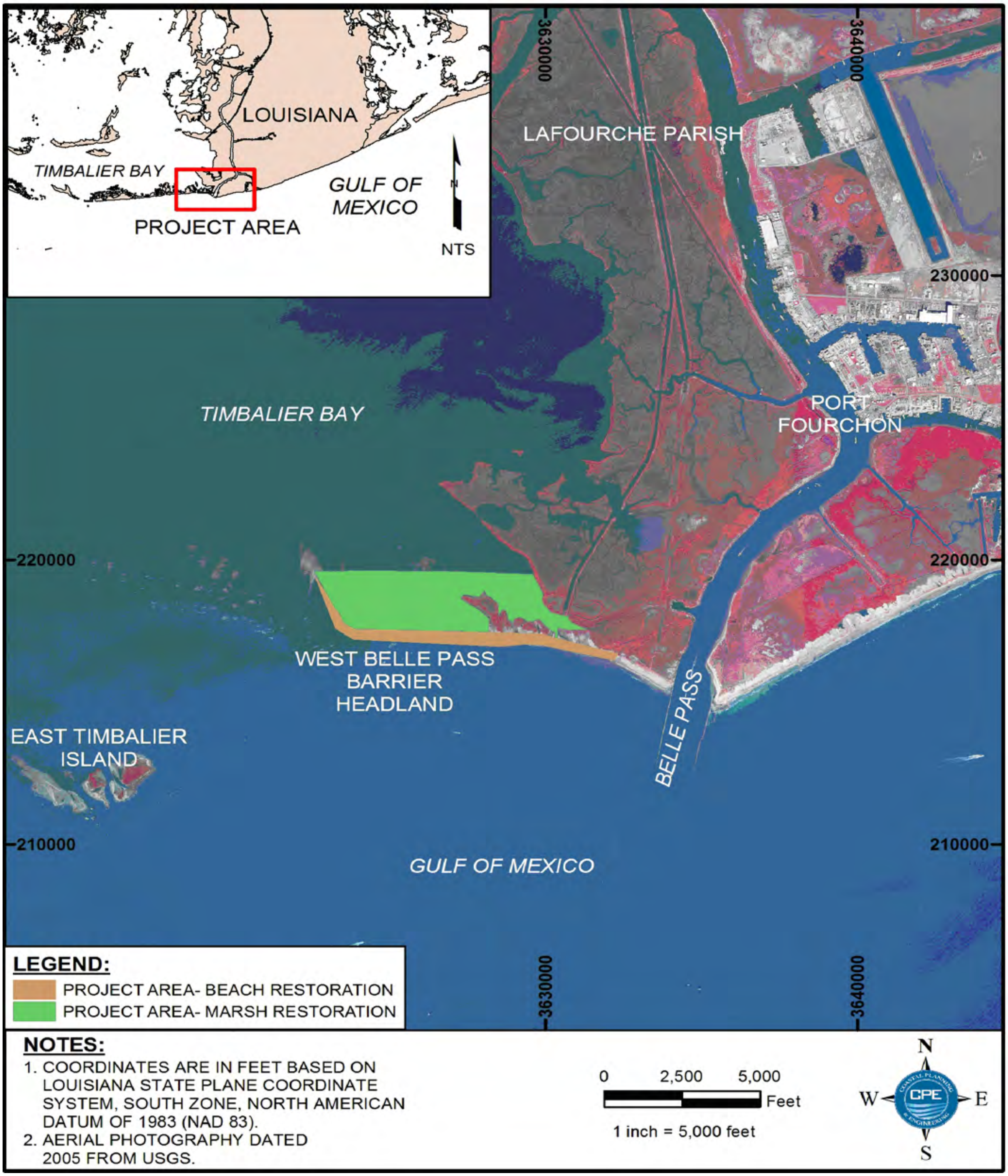
This Environmental Assessment (EA) was prepared to assess the intensity of direct, indirect, and cumulative impacts related to proposed implementation of the West Belle Pass Barrier Headland Restoration (TE-52) in Lafourche Parish, Louisiana (see Figure 1). This proposed project was selected by the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Task Force through a publicly vetted process to proceed to engineering and design on February 15, 2007. Other federal agencies that make up the CWPPRA Task Force include the U.S. Army Corps of Engineers (USACE); the U.S. Fish and Wildlife Service (USFWS), Department of the Interior; the Natural Resources Conservation Service (NRCS), Department of Agriculture; and the U.S. Environmental Protection Agency (EPA). As the federal sponsor for the West Belle Pass Barrier Headland Restoration Project, the National Oceanic and Atmospheric Administration (NOAA) is responsible for project oversight in partnership with the State of Louisiana Office of Coastal Protection and Restoration (OCPR). NOAA and OCPR wish to proceed to the construction phase of this proposed project, and through the standard operating procedures of CWPPRA, an EA is required at the 95 percent design phase. The objective of Project TE-52 is to protect and create habitat on and behind the West Belle Pass Barrier Headland in an area of rapidly retreating shoreline.

This EA complies with requirements set forth under the National Environmental Policy Act (NEPA) of 1969, as implemented by the regulations of the Council on Environmental Quality (CEQ) for implementation of NEPA (Title 40 *Code of Federal Regulations* [CFR] Parts 1500 through 1508 [CEQ 1992]) and NOAA Administrative Order (NAO) 216-6 (NOAA 1999), which describes NOAA's policies, requirements, and procedures for complying with NEPA and the regulations for implementation. This EA tiers to and where appropriate incorporates portions of an Environmental Impact Statement (EIS) for the Louisiana Coastal Wetlands Restoration Plan prepared by the CWPPRA Task Force and the Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] (1993). General information on the need for this type of project, the affected environment, and the environmental consequences was presented in the Final Programmatic EIS prepared by the USACE as part of the Louisiana Coastal Area (LCA) Ecosystem Restoration Study (USACE 2004). Information on existing conditions in the borrow areas and potential impacts of sand mining came from NEPA compliance documents prepared by the Department of Interior (DOI) Minerals Management Service (MMS) (DOI MMS 2002, 2003). This EA does not duplicate those discussions, but relies on and incorporates by reference, relevant descriptions and analysis.

1.1 PROJECT LOCATION

The proposed West Belle Pass Barrier Headland Restoration project is located along the Chenier Caminada headland west of Belle Pass, at the southeastern edge of Timbalier Bay in Lafourche Parish, Louisiana (see Figure 1). The proposed project area encompasses 411 acres (166 hectares) dominated by shallow open water, salt marsh, and barrier headland with beach and dune habitats. The limits of the specific project area start approximately 2,800 feet from Belle Pass and extend approximately 8,500 feet west. The eastern project limits are based on the western limit of USACE's beneficial disposal area for material dredged from Belle Pass.

The proposed project area is west of Port Fourchon, Louisiana, in the barrier island-shoreline system of east Timbalier Bay. The area is included in the Timbalier Island Shorelines Mapping Unit that extends from the Belle Pass jetties to Timbalier Island in Region 3 of the Coast 2050 Restoration Plan (LCWCRTF and Wetlands Conservation and Restoration Authority [WCRA] 1998, 1999). The proposed project area, which is about 2 miles long, is bounded on the north by Timbalier Bay and associated wetlands. The west jetty of the Bayou Lafourche Waterway forms the eastern boundary of the project. The Gulf of Mexico is to the south. A shallow open water connection between the Gulf of Mexico and Timbalier Bay (Raccoon Pass) separates the proposed project area from its nearest neighbor to the west, East Timbalier Island.



West Belle Pass Barrier Headland Restoration
Draft Environmental Assessment

Figure 1
Location of West Belle Pass
Barrier Headland Restoration Project

TETRA TECH EM INC.

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The Timbalier Island Shorelines Mapping Unit consists of a narrow strip along Louisiana's Gulf of Mexico coastline that includes the project barrier headland, East Timbalier Island, and Timbalier Island (LCWCRTF and WCRA 1999). Historically, the West Belle Pass Barrier Headland, which is a relict of the Lafourche Delta, protected the marsh platform behind it. However, erosional forces and indirect effects of the jetties have resulted in substantial shoreline recession in the past several decades. Current shoreline retreat is estimated at about 55 feet per year (Finkl and others 2008). Salt marsh is currently the dominant habitat in the area (LCWCRTF and WCRA 1999).

1.2 CWPPRA PROJECT SELECTION PROCESS

This project is authorized under the CWPPRA of 1990 (16 United States Code [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)). The CWPPRA Task Force approved the West Belle Pass Barrier Headland Restoration Project in 2007 as part of the 16th Priority Project List. The LCWCRTF chooses projects for this annual list by conducting a careful technical and public evaluation of numerous candidate projects.

Before it can be selected as a priority project, a CWPPRA project is subjected to layers of public, academic, and interagency review to ensure that the most cost-effective projects move forward for design and ultimate construction. The project selection process begins around February of each year, when a series of Regional Planning Teams convene across the coast to solicit project nominees from the public, state, and federal agencies, as well as members of industry and academia. The meetings are publicized via public notices, and all members of the public are invited to attend. Every nominee project contains conceptual project features, approximate construction costs, and anticipated benefits to wetland resources. The nominees are screened and pared down to 20 nominee projects at a public voting meeting. Each federal agency represented in the CWPPRA program, the state, and each coastal parish is able to cast one vote for the projects that, in their opinion, best meet the goals of the program.

These projects are then evaluated by interagency and academic working groups to assess whether the conceptual project features, costs, and associated wetland benefits are feasible and appropriate to addressing land loss in that area. The 20 nominee projects are then voted on by the program's federal and state agencies to obtain a list of the 10 top-ranking projects to continue through the process. These "candidate" projects undergo several months of further design and interagency evaluation to determine whether the proposed project features are feasible, the proposed benefits are likely, and the project costs fall within the funding constraints of the program. Certain project features are typically discounted during this preliminary design phase based on concerns about inferior performance or unreasonable costs. In January of each year, the candidate projects are publicly presented and voted on by the program agencies to be funded for Phase 1 analysis, which includes the activities necessary to complete engineering and design, permitting, land rights, and environmental compliance before the project moves to construction.

1.3 ENVIRONMENTAL SETTING

The Lafourche Delta Complex is formed by five major distributaries and their associated delta lobes; Bayou Lafourche is the principal distributary (Coastal Environments, Inc. [CEI] 2008). Like all of the seven delta complexes that make up the Mississippi Delta, the Lafourche delta plain is characterized by a main river channel with radiating distributaries held in place by natural levees. The channel known as Belle Pass forms below a bifurcation in Bayou Lafourche. In fact, Belle Pass was called the West Fork of Bayou Lafourche on early maps (CEI 2008, Figure 4-6).

In the early 1900s, natural flow from the Mississippi River into Bayou Lafourche was purposefully reduced to near zero, resulting in inadvertent conversion of freshwater marsh to brackish or saline marsh.

Salinity of these marshes now sometimes approaches full sea water. Vegetation at the project site includes marshhay cordgrass (*Spartina patens*), smooth cordgrass (*S. alterniflora*), grasses (*Panicum* spp.) and saltgrass (*Distichlis spicata*). Black mangrove (*Avicennia germinans*) at the project site is at the northern extent of its range and is periodically damaged or killed by hard freezes. This species has proliferated since the last hard freeze in 1990 and is now common in the intertidal zone of the project area.

1.3.1 Hydrology / Geomorphology

The Terrebonne Basin drainage area is approximately 1,455 square miles (3,783 square kilometers) in size. Much of the northern and western portions of the basin are fresh. The Timbalier Islands and Isles Dernieres provide some protection to interior areas by reducing marine influences, such as wave action and saltwater intrusion (see Figure 1). The more saline wetland communities in the eastern portion of the Terrebonne Basin are hydrologically isolated from freshwater inputs to the west (USACE 2004).

Generally, erosion and deterioration of the shoreline and back-bay wetlands result from increased eustatic sea-level rise, diminished sediment supply, repeated storm events, construction of canals and navigation channels, and high rates of subsidence (Kulp and Penland 2001, Boesch and others 1994). The low marshes in the project area (near sea level) are frequently inundated with several feet of gulf water during hurricanes and tropical storms. Most of the erosion on the barrier headland is thought to be storm-related. The process of shoreline erosion of the headland results in the net loss of material from the area, mainly caused by lateral and offshore sediment transport. Longshore transport losses between 1996 and 2008 were estimated at 50,900 cubic yards per year (CPE 2009). The sediment budget developed for this project estimated that 23,100 cubic yards/year of sediment lost from the headland is deposited as overwash, and 25,800 cubic yards/year of sediment is lost to the Gulf of Mexico. Consequently, the headland is currently eroding more than it is undergoing landward retreat, which requires a significant back-barrier platform to support continued landward migration. This reduction in headland width is conducive to the formation of breaches and tidal inlets that can expedite headland deterioration.

1.3.2 Wetland Loss

Interior saline marshes of the Timbalier Islands Shoreline mapping unit experience a high subsidence rate (2.1 to 3.5 feet per century) and also suffer from storms and cold front passages. A healthy coastal marsh provides rearing habitat for shellfish and finfish; furnishes habitat for waterfowl, wading birds, small mammals, and numerous amphibians and reptiles; protects interior lands from storm surges; helps maintain water quality; and provides other services. Louisiana's coastal wetlands are essential to sustain renewable fisheries resources integral to the local, state, and national economies. Of the 1.3 billion pounds of fisheries landings reported for the Gulf Coast in 2007, more than 71 percent were caught in Louisiana (NOAA 2009b). Barrier island wetlands, flats, and subtidal habitat provide unique nursery, foraging, and spawning habitat for numerous marine and estuarine species of commercial and recreational importance.

Many species prefer back-barrier beaches (Thompson 1988) and intra-island ponds and tidal creeks (Williams 1998). Island fragmentation results in loss of habitat, as more area is exposed to storm surges and erosion. As the islands break up, both habitat and infrastructure behind the islands become increasingly vulnerable to damage from high energy Gulf waves (Kindinger and others 2001).
Barrier islands and headlands function to control the hydrology of the estuaries behind them, and act as buffers to storm surge. The combined effects of subsidence, erosion, eustatic sea-level rise, and other man-made impacts have compromised these functions and left the marshes vulnerable to physical and chemical degradation. Just as the skin protects the internal organs from infectious agents, the geomorphic structure of the barrier island headland system protects the inner marsh habitats from the degenerative

processes of storms and saltwater intrusion. Although the barrier islands themselves represent a small percentage of the acreage of land loss documented in coastal Louisiana, their degradation leaves thousands of acres of marsh without protection, which significantly accelerates overall land loss.

The West Belle Pass Barrier Headland extends approximately 8,500 feet west of Belle Pass. Shoreline retreat of the headland averages about 55 feet/year, and the physical integrity of the headland has been compromised (Finkl and others 2008). The eastern half of the headland remains intact and has benefitted from the beneficial disposal of spoil dredged from Belle Pass since 2001, while the western half of the headland is generally low with extensive overwash features. The large breach near the western extent of the project area is relatively shallow (less than -7 feet, North American Vertical Datum [NAVD]) and extends approximately 1,500 feet west to a relic headland feature in the form of an island. The breach was expanded during Hurricanes Katrina and Rita in 2005. The Gulf of Mexico is now in direct exchange with Timbalier Bay across about 25 percent of what used to be the barrier headland. Longshore sediment transport is interrupted by the jetties at Port Fourchon, which intercept west-drifting sediment that would otherwise be delivered to the project area.

1.3.3 Restoration

Relative sea-level rise and frequent intense coastal storm surge have degraded the barrier headland to such an extent that the marshes behind it are essentially unprotected. The attempt to ameliorate this situation by the purposeful placement of spoils (dredged during navigational channel maintenance) on the west side of the jetties has not had the intended effect. The placement of dredge spoils has produced only minimal effects on maintaining the shoreline; the beneficial effect of the added material is seen only on the eastern side and wanes quickly as distance toward the west of the jetties increases (Finkl and others 2008). Shoreline change from 1996 to 2008 measured 48 feet per year, even with beneficial disposal. Sediment budget estimates show that without the disposal of dredge spoils, shoreline retreat would have been 53 feet per year (CPE 2009).

All engineering alternatives for this project anticipate placing much greater volumes of sediment on the barrier headland than what is currently provided by dredge spoils. Two borrow areas have been tentatively identified for this purpose (Section 2.3).

1.4 PURPOSE AND NEED

1.4.1 Purpose

The purpose of this proposed project is to support the coastal restoration objectives of CWPPRA through reestablishment of the West Belle Pass Barrier Headland by rebuilding a large portion of the beach, dune, and back-barrier marsh that once existed. This project would be accomplished through partnering with OCPR to implement proposed actions or alternatives within the proposed project area. Approximately 8,500 feet of beach and dune would be rebuilt using about 1 million cubic yards of dredged material, and about 230 acres of marsh habitat would be rebuilt using nearly 2 million cubic yards of dredged material. Native vegetation would be planted after construction to help stabilize the rebuilt marsh and dune habitat.

The goals of this specific proposed project are to repair breaches and tidal inlets in the shoreline, reinforce the existing shoreline with sand, and re-establish back-barrier intertidal marshes. Specific targets include the following:

- Nourish and rebuild the shoreline with sand
- Establish marsh and dune vegetation

- Create a back-barrier marsh platform with unrestricted tidal exchange
- Fill existing and developing tidal inlets
- Restore and create dune and marsh to increase headland longevity and maintain shoreline integrity to prevent breaches during the 20-year proposed project life
- Reduce current shoreline erosion rates along adjacent, interior shorelines.

1.4.2 Need for Action

The need for the proposed action is directly related to slowing or halting the rapidly degrading environmental conditions at the proposed project site and maintaining the structural integrity and value of the headland as habitat and buffer for the critical socioeconomic resources of Port Fourchon.

Shoreline retreat rates immediately west of Belle Pass have been estimated at 55 feet per year, with a long-term rate (1887 to 1992) of 82 feet per year (Williams and others 1992). In some areas of the Fourchon mapping unit, gulf erosion rates are as high as 100 feet per year (Applied Technology & Management [ATM] 2006).

The barrier islands on the southeastern margin of Timbalier Bay have decreased in size to the extent that they are susceptible to breaching during storms. In fact, a 1,500-foot breach has already developed in the West Belle Pass Barrier Headland. Average storm return frequency is 8.3 years along the Barataria-Terrebonne shoreline, and each storm can remove up to 100 feet (30.5 meters) of shoreline. As the barrier shoreline degrades, the infrastructure and interior marshes of Lafourche Parish become more vulnerable to erosion. Hurricanes Katrina and Rita removed almost all the subaerial headland west of Belle Pass. Removal of this storm buffer further threatens the southwestern perimeter of Port Fourchon and surrounding areas.

Interior saline marshes of the Timbalier Islands Shoreline mapping unit experience a high subsidence rate (2.1 to 3.5 feet per century) and also suffer from storms and cold front passages. There is a need to restore healthy coastal marsh that provides rearing habitat for shellfish and finfish; furnishes habitat for waterfowl, wading birds, small mammals, and numerous amphibians and reptiles; protects interior lands from storm surges; helps maintain water quality; and provides other services. Louisiana’s coastal wetlands are essential to sustain renewable fisheries resources integral to the local, state, and national economies.

2.0 PROPOSED ACTION AND ALTERNATIVES

The no action alternative and three construction alternatives were considered in some detail. All of the construction alternatives involve moving sand from two offshore borrow areas onto the proposed project area. The alternatives vary in dune width and slope, the inclusion of a terminal structure or breakwater, and the size and elevation of the marsh platform. All three alternatives will undergo maintenance of the sand fences and vegetative plantings during the 20-year project lifespan, as warranted and as funds are available. The same borrow areas are proposed for all design alternatives. This section briefly describes the alternatives and summarizes factors that were considered in selecting a preferred alternative.. Figures 2 through 4 illustrate important design features of the three alternatives.

2.1 ALTERNATIVES CONSIDERED BUT ELIMINATED

As described in Section 1.2, CWPPRA projects go through a rigorous review and selection process. When a proposed project is approved to proceed to formal engineering and design (Phase 1) by the CWPPRA Task Force, evaluation of project performance often includes the use of sophisticated modeling to determine what project features are likely to be the most cost effective. By this point, project features are well developed but undergo some refinement based on results of field investigations and quantitative modeling, where applicable. Comprehensive engineering and design efforts focus on project alternatives that are considered technically feasible and cost effective. Project features are typically vetted to landowners and the public before the project moves into Phase 1, so that untenable alternatives are eliminated from the evaluation process prior to investment of significant resources. The alternatives that were considered but eliminated were hard shoreline protection features and any construction item that had not been commonly used or well tested throughout the coast for gulf shoreline stabilization.

For the West Belle Pass Barrier Headland Restoration Project, the continuous or segmented installation of hard shoreline armoring was considered but eliminated during the candidate phase. Placing rock, sunken barges, sea walls, or comparable materials along the shoreface of the West Belle Pass Barrier Headland may help reduce shoreline erosion; however, such features may become less protective as the barrier headland moves away from the built structure through natural migration over time. Additionally, hard shoreline armoring is known to impede longshore sediment drift, which could exacerbate headland losses at West Belle or adjacent islands by interrupting sediment migration onto the existing headland. Furthermore, the goals of this proposed project are to reestablish lost habitat as well as restore the headland for its natural protection services. Armoring the shoreline may create an intact headland, but would not replace lost habitat. Because NOAA favors a “living shorelines” approach to barrier headland restoration, the use of hard shoreline stabilization features is generally discouraged. Likewise, proposed project features that satisfy the objectives of protecting infrastructure but do not meet the habitat restoration objectives are likely to be eliminated early in the process. For the foregoing reasons NOAA determined that these alternatives did not meet the purpose and need for action and thus were not considered “reasonable” alternatives.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

The no-action alternative and three design alternatives were considered in detail in this EA. Design alternatives were developed based on results of the Storm-Induced Beach Change Model (SBEACH), the GENESIS Shoreline model, and the Delft3D Model to evaluate long-term and storm performance (Thomson and others 2009). The two-dimensional SBEACH model simulates cross-shore transport of sediment caused primarily by breaking waves and changing water levels. Water level changes are calculated from input wave, storm surge, and tide data. The GENESIS model predicts the longshore transport rate and shoreline position given various input parameters, including incident wave height, direction, and grain size (ATM 2006). The Delft3D model includes waves, currents, sediment transport, erosion, and sedimentation. Significant design features of the three alternatives are shown in Table 1.

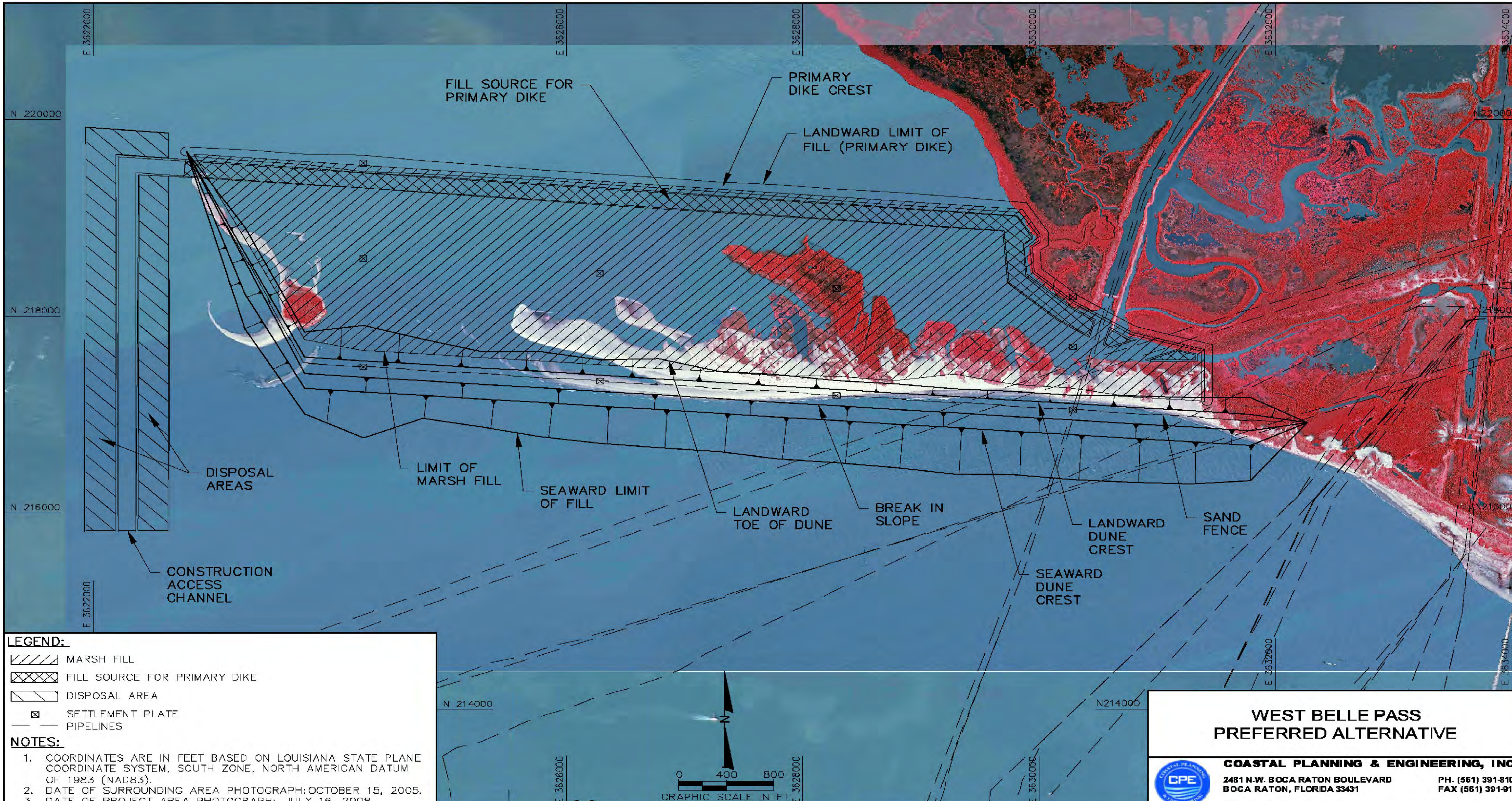

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Figure 2
Plan View of Alternative 1
(Preferred)

TETRA TECH EM INC.

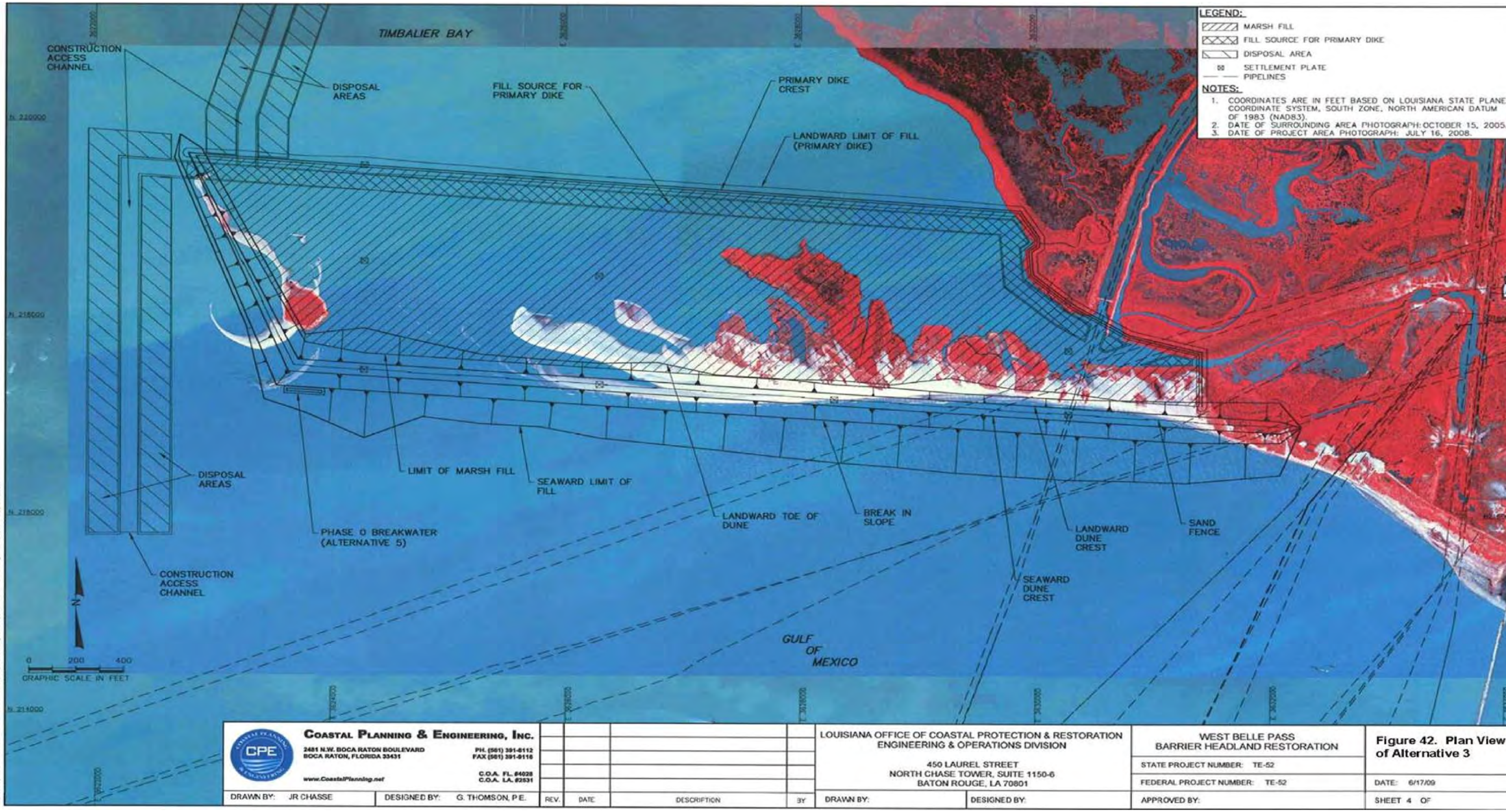

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Figure 3
Plan View of Alternative 2

TETRA TECH EM INC.

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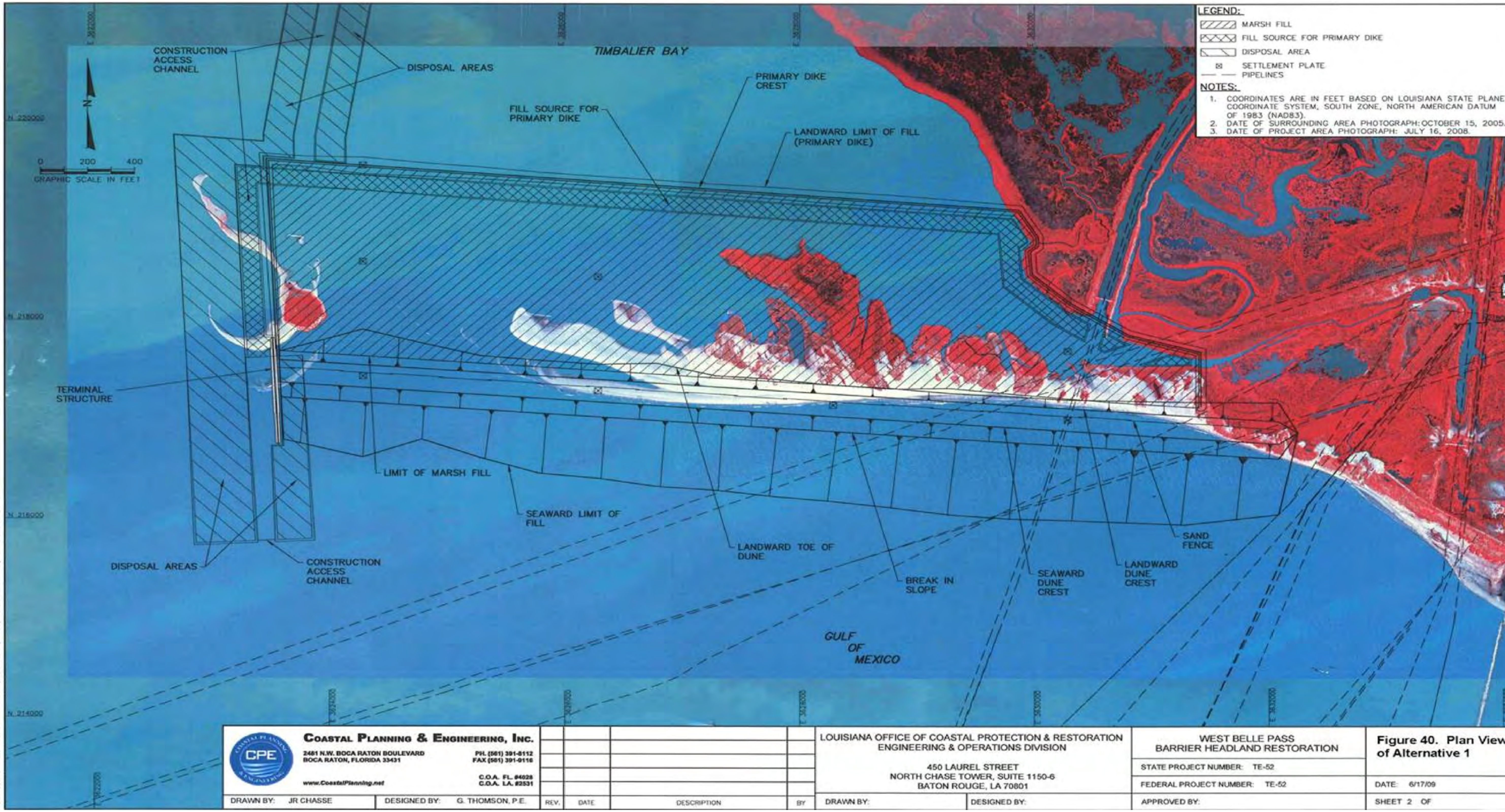

West Belle Pass Barrier Headland Restoration
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Figure 4
Plan View of Alternative 3

TETRA TECH EM INC.

TABLE 1

DESIGN FEATURES OF PROJECT ALTERNATIVES

Alternative	*Beach and Dune Features*							
	Total Dune Width (feet)	Advanced Fill Longevity (years)	Fill Volume (cubic yards)	Offshore Slope (below +1.0 feet NAVD)	Fill Length (feet)	Spatial Range of Fill (Stations)	Extra Taper (feet)	Total Project Length (feet)
1	169	20	1180000	1V:60H	8500	53-138	700	9200
2	169	20	1180000	1V:60H	8500	53-138	700	9200
3	225	20[1]	1553000	1V:90H	8500	53-138	0	8500

[1] Alternative 3 also includes 20 years of design fill.

Alternative	*Marsh Features*							
	Construction Elevation (feet NAVD)	Year 1 Elevation (feet NAVD)	Marsh Width (range from west to east, in feet)	Marsh Width (mean, in feet)	Fill Volume (cubic yards)	Terminal Structure	Net Benefits (AAHU, all habitats combined)[2]	Net Benefits (acres, all habitats combined)
1	+3.0	+1.4	1910-1840	1880	1903000	No	203	305
2	+2.5	+0.9	1910-1840	1880	1656000	Yes	190	222
3	+3.0	+1.4	1910-1840	1880	1868000	Yes	215	346

[2] Compare with 99 average annual habitat units (AAHU) and 79 acres for the no-action alternative

All three alternatives have the following features in common:

Landward Dune Crest	Bayward Slope of Dune	Dune Crest Elevation (feet NAVD)	Offshore Slope (above +1.0 foot NAVD)	Compaction of Marsh Fill in Year 1 (feet NAVD)
At mean high water shoreline (straight-lined)	1V:30H	+6.0	1V:30H	1.6

2.2.1 The No Action Alternative

CEQ guidance on NEPA refers to the no-action alternative as the continuation of baseline conditions without implementation of the proposed action. Evaluation of the no-action alternative is required by CEQ regulations. Under the no-action alternative, NOAA NMFS would not implement restoration activities for the West Belle Pass barrier headland.

This headland experiences some of the highest shoreline retreat rates in the nation, measuring more than 100 feet per year in some locations. As the gulf encroaches upon the shoreline, sand is removed and the headland erodes. What was once a continuous shoreline spanning several miles has been reduced to less than half its original length. Furthermore, Hurricanes Katrina and Rita in 2005 removed most of the emergent headland and dunes west of the pass. This headland helps provide protection to interior marshes and the Port Fourchon area; however, its continued degradation threatens the fragile bay habitat and infrastructure it once protected. With no action, supratidal habitat will disappear from the proposed project area by 2015 (CPE 2009)**.**

2.2.2 Alternative 1 (Preferred Alternative)

Alternative 1 is a hybrid choice that attempts to limit costs while retaining a beach state in 20 years that is similar to today's condition, although with a backing marsh (Figure 2; Table 1). This alternative involves 20 years of advanced fill, which is the portion of the beach cross-section that is expected to erode within 20 years. Advanced fill is placed during construction such that the design cross-section is protected for a predetermined period of time. In this alternative, there is no design fill. The dune crest is 169 feet wide at +6.0 feet NAVD and has side slopes of 1V:30H down to +1-foot NAVD and 1V:60H below +1.0-foot NAVD. The backing marsh is approximately 1,880 feet wide with a constructed elevation of +3.0 feet NAVD. This alternative does not include a terminal structure.

2.2.3 Alternative 2

Alternative 2 is identical to Alternative 1 in most design features. The key differences are that Alternative 2 includes a single, 300-foot parallel breakwater as a terminal end structure and has a slightly lower marsh construction elevation (+2.5 feet) than Alternative 1 (Figure 3; Table 1). The dune crest is 169 feet wide at +6.0 feet NAVD. The construction slopes are similar to Alternative 1. The marsh has a similar platform to Alternative 1, but is 0.5 foot lower in elevation.

The breakwater was analyzed to evaluate whether such a structure could help trap sediments from moving outside of the project area and thus conserve placed beach fill. The analytical and Delft3D modeling showed that the terminal structure yielded only marginal benefits. The terminal structure was determined not to be cost-effective at a cost to build the terminal structure of $1.1 million and an expected increase of only a few additional AAHUs than the same design without the structure.

Furthermore, installation of breakwaters along the entire length of the project was considered. Given that the project is in an area with a sediment deficit, beach fill would still be required to prevent breaching and meet the project's goals. Assuming that 10 breakwaters would be required to span the length of the project area, the added cost to the project would be approximately $10 million. Although precise estimates of the volume of sediment that would be collected behind the breakwaters are not available, an extrapolation of the single breakwater model indicates that meaningful benefits could be realized during the first years of the project. Over time, however, the shoreline would be expected to continue its northern migration, leaving the breakwaters behind. As the distance between the shoreline and the breakwaters increased, wave regeneration on the shoreline would likely increase. Ultimately, the breakwaters would be in open water, where they would potentially pose a navigation hazard. Moreover, maintenance would be required over the 20-year project life to keep the breakwaters in functional condition. Given these concerns and costs, continuous breakwaters were eliminated from the project design. Instead, design alternatives that included increased marsh elevations were considered more cost effective and better suited to meeting the project's goals.

2.2.4 Alternative 3

Alternative 3 follows a standard coastal engineering design of a design fill and advanced fill (Figure 4; Table 1). The design fill meets the project goals at the end of the 20-year project life. CWPPRA projects require a one-time construction event; thus, the advanced fill is designed for 20 years of losses.

The dune crest is 225 feet wide with a +6.0-feet NAVD elevation and side slopes of 1V:30H down to +1-foot NAVD and 1V:90H below +1.0-foot NAVD. The backing marsh is approximately 1,880 feet wide with a constructed elevation of +3.0 feet NAVD. Alternative 3 also includes a 1,060-foot-long terminal groin. Although the terminal groin itself was determined to be cost effective because it would retain sand in the system, Alternative 3 has an overall cost of $43.6 million, which is $8.4 million more than Alternative 2

2.3 OFFSHORE BORROW AREAS

Potential sand and mixed-sediment borrow sources have been identified for various beach and marsh restoration projects along the Gulf coast of Louisiana. Although many of these deposits appear promising, they are located too far east of the project to be feasible. Other potential sand deposits proved to be too thin or too shallow to support excavation. Potential borrow areas were evaluated by reviewing existing geotechnical and geophysical data collected in the vicinity of the project area. Field surveys were then conducted to delineate the extent of suitable borrow material (CPE 2008). Areas that would pose navigational hazards or contain known cultural resources were avoided.

Two borrow areas are proposed as sources of materials for this project that would be used regardless of which alternative is selected. Selection of a borrow site is dependent upon both proximity to the project site and suitable sediment content to meet the project goals. A proposed marsh borrow area is located approximately 2.8 miles south of the project area (Figure 5). This borrow area contains approximately 4.0 million cubic yards of marsh fill material. This borrow area has also been separated into a primary and secondary borrow area based on the quality of fill. In this instance, the delineation is based on the stiffness of the fill material; with the primary borrow area containing softer clays to minimize costs (Table 2). The marsh borrow area did not contain adequate sand for the beach construction, so a second area had to be selected.

The proposed beach fill borrow area is located within Little Pass Timbalier (Figure 5). The center of the borrow area is approximately 9 miles west of the project area. The borrow area contains 4.7 million cubic yards of sand. The borrow area has been broken into a primary and secondary based on depth of cut. There is sufficient sand to construct the project using only the primary borrow area (2.9 million cubic yards). The sand has a composite grain size of 0.12 millimeters (mm) and a silt content of 11 percent within the primary borrow area (Table 2).

TABLE 2

CHARACTERISTICS OF THE BORROW AREAS

Borrow Area	Area (acres)	Distance from Project Area	Water Depth (feet mean low water)	Grain size (millimeter)	Volume of Material (million cubic yards)
Beach	695.7	9 miles west	10-22	0.12	4.7
Marsh	353.4	2.8 miles south	28-33	very fine clay	4.0

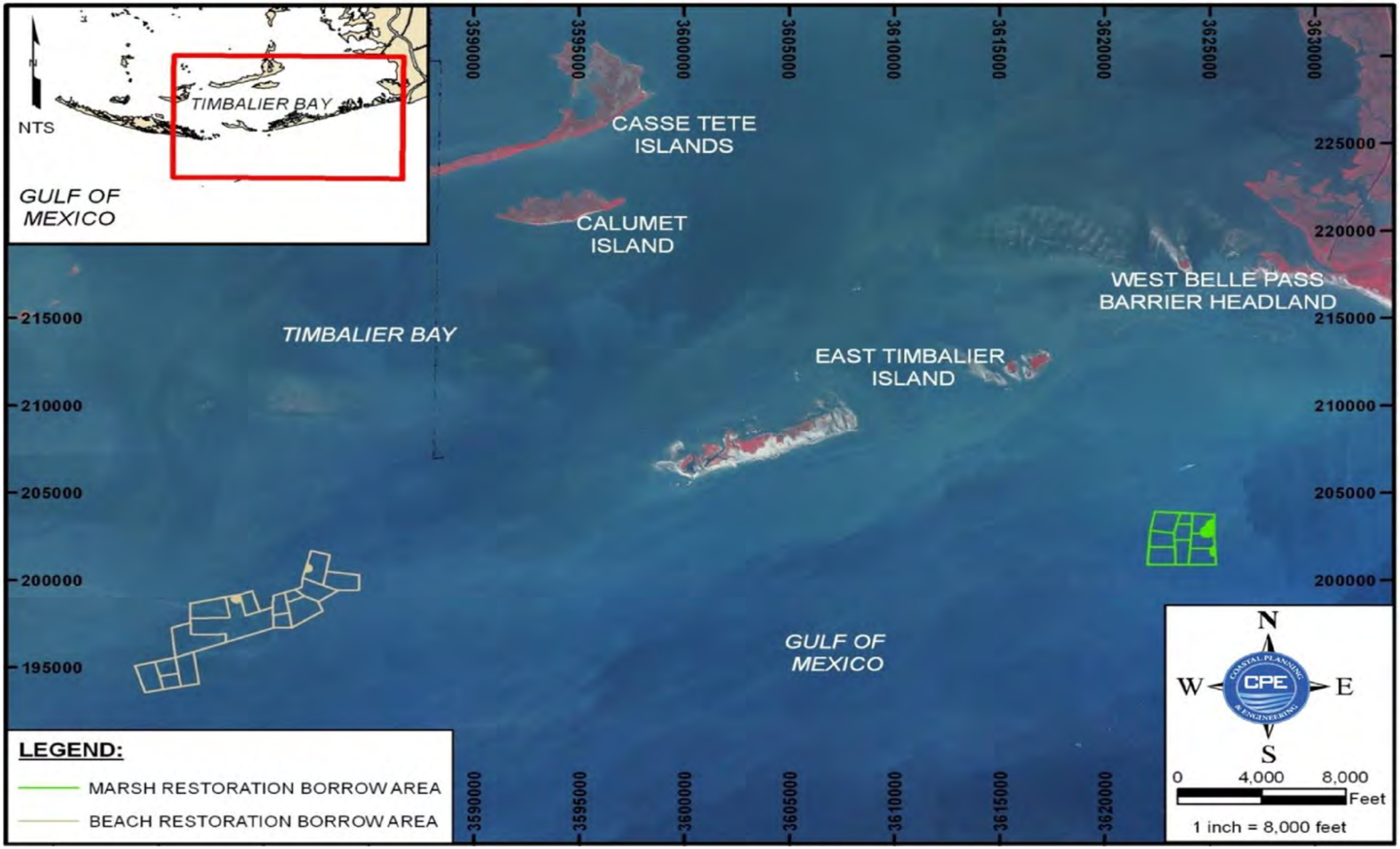

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Figure 5
Borrow Area Location Map

TETRA TECH EM INC.

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3.0 AFFECTED ENVIRONMENT

The proposed project area is within the 8,615-acre Timbalier Barrier Shorelines Mapping Unit, which includes the barrier islands at the southern extent of Lafourche and eastern Terrebonne Parishes. This mapping unit includes the proposed project headland as well as barrier islands to the west, as well as Timbalier Island. In 1949, this barrier island chain was about half salt marsh and half beach. By 1968, salt marsh had become dominant. These islands have been slowly migrating to the northwest as storms and overwash events erode the beach and deposit sands into the back-barrier marshes. As the islands have migrated, they have decreased in width, height, and area (LCWCRTF and WCRA 1999). Continued erosion has reduced the volume of sediment available to support landward migration, which has resulted in the formation of tidal inlets and shoreline breaches.

The proposed project area was visited by the Wetland Value Assessment (WVA) team in May 2006. Information from the site visit, as well as any references cited in the WVA, was considered in writing this EA. Other sources of data on the existing conditions near the proposed project area include the Coast 2050 Region 3 Supplemental Information – Appendix E (LCWCRTF and WCRA 1999), the USACE Final Programmatic Environmental Impact Statement for the Louisiana Coastal Area Ecosystem Restoration Study (USACE 2004), and several NEPA documents prepared for similar projects in neighboring areas (NOAA 2007 [BA-35], CEI 2008, NOAA 2004 [BA-38])

3.1 PHYSICAL ENVIRONMENT

Some time about 1,000 years ago, Bayou Lafourche divided into the two distributaries that would eventually become Belle Pass and Pass Fourchon. Historical maps of the late seventeenth and early eighteenth centuries depicted both Belle Pass and Pass Fourchon as prograding distributaries. By the late eighteenth century, however, the flow within Bayou Lafourche was too small to sustain delta growth, and the existing delta had begun to erode. Then, in 1904, the remaining discharge from the Mississippi River that flowed down Bayou Lafourche at Donaldsonville was purposefully cut off. From this time until the first jetties were built at Belle Pass in 1935, the erosion rates along the transgressive shorelines were at their highest — about 115 to 150 feet (35 to 45 meter [m]) per year (Penland and others 1986, as cited in CEI 2008).

3.1.1 Geology, Soils, and Topography

Changes in land elevation vary spatially along coastal Louisiana. Wetland habitats sink and convert to open water in areas where subsidence is high and riverine influence is minor or virtually non-existent, such as in areas of western Barataria Basin and eastern Terrebonne Basin.

The proposed project area consists of Felicity loamy fine sand (frequently flooded) along the gulf shoreline, and Scatlake muck and Bellpass muck along the back-barrier marsh.

Waves that affect the project area are generated primarily by local winds, though significant wave events may occur as a result of distant storms. Wave statistics generated for the project area used the 1980 to 1999 hindcast at Wave Information Studies (WIS) Station 129 (USACE 2008), the 2000 to 2007 Wavewatch III regional model data for the Western North Atlantic (NOAA 2008), and the 2008 Wavewatch III global model data (NOAA 2008). Project area wave statistics describe the wave conditions at WIS Station 129, which is located approximately 12.6 miles southeast of the project site in approximately 70 feet of water (CPE 2009).

The average wave height at WIS Station 129 is 3.1 feet with a corresponding period of 4.5 seconds and direction of 145° (southeast). Approximately 71 percent of the waves propagate from the onshore direction band between 93° and 273°. Within this band, the average height is 3.2 feet with a corresponding period of 4.8 seconds and direction of 153° (south-southeast). The largest storm waves occur between August and October during hurricane season. With the exception of tropical storms, the highest waves under typical conditions occur between November and April, with the lowest waves occurring in July and August. The wave direction varies from 113° (east-southeast) in October to 180° (south) in July. Within the onshore direction band, the wave direction varies from 133° (southeast) in October to 175° (south) in July. The largest and longest waves under normal conditions come from the south-southeasterly direction band. Wave heights are estimated based on combined WIS and Wavewatch III data. Offshore wave heights for the 5, 10, and 20 year conditions range from 21.4 to 28.9 feet, with a corresponding period of 12.7 to 15.0 seconds and a direction near 150° (CPE 2008).

A fetch limited wave analysis was used to estimate wave activity along the back-bay shoreline during average conditions and frequent storms. An average depth of –6 feet NAVD was used for Timbalier Bay based on NOAA Digital Elevation Model (DEM) bathymetric data and profile data collected by John Chance Land Surveyors in August 2008. Under average conditions, back-bay wave heights range from 0.3 to 1.0 feet with corresponding periods ranging from 1.0 to 2.3 seconds. The average back-bay wave height is approximately 0.6 feet with a corresponding period of 1.5 seconds.

As the average wave energy in the back-bay area is small, wave-induced erosion is attributed to storm events. A wave hindcast was performed for annual to 5-year return period storm events. A water level equal to the storm stage was used for the fetch limited waves during the 3-, 4-, and 5-year return period storm conditions. During the more frequent storms, the water level was assumed to be equal to Mean Higher High Water. The wind was assumed to blow from the northwest (315°), as this direction is the longest fetch. Under the annual to 5-year storm conditions, wave heights range from 3.5 to 4.7 feet with corresponding periods of 3.4 to 3.7 seconds (CPE 2009).

3.1.2 Climate and Weather

The subtropical climate of coastal Louisiana is characterized by long hot summers and short mild winters, with high humidity year round. Over the past 40 years, air temperature ranged from 14 to 102 °F; average winter and summer temperatures are 55.3 and 82.4 °F (12.9 to 28 °C). In a typical year, more than 60 inches (1.5 m) of rain falls, mostly in the spring and summer. In the fall and winter, winds tend to be from the north-northeast; in spring and summer, winds are generally from the south-southeast.

The weather patterns controlling precipitation in the Barataria-Terrebonne Basin include Frontal Overrunning, Gulf Return, Frontal Gulf Return, and Gulf Tropical Disturbances (responsible for most of the precipitation). Freshwater inputs from rain are greatest in the late winter and spring and least in the fall (Gulf Engineers and Consultants [GEC] 2001).

3.1.3 Air Quality

The proposed project area lies in the Southern Louisiana-Southeast Texas Interstate Air Quality Control Region (GEC 2001). Lafourche Parish meets all national ambient air quality standards, according to the Louisiana Department of Environmental Quality (LDEQ) Office of Environmental Assessment, which monitors air quality at a station south of Thibodeaux (the nearest station to the proposed project area). No significant point sources of air-borne pollutants occur in the vicinity of the proposed project area, and air quality is generally good. The most prominent source of airborne pollutants in the area is the exhaust from boats. Offshore breezes mix and freshen the air, and frequent precipitation prevents accumulation of particulates.

3.1.4 Surface Water Resources

No fresh water (groundwater) is found in the subsurface of Barataria-Terrebonne Basin, and no specific groundwater information is available for the proposed project areas (GEC 2001).

Tidal influences and precipitation are the primary factors that affect surface water in the proposed project area. Riverine inputs are minimal, and the freshwater aquifer present in much of Louisiana is not found in the basin.

Tides in the Barataria-Terrebonne Basin are diurnal, with the tidal range decreasing with increasing distance from the coast. Depth and volume of water in the basin are affected by tides, winds, and precipitation. In the northern Gulf of Mexico, tidal range is relatively small, about 1 foot (0.3 m) in the Gulf and 0.1 foot (0.03m) in the upper basin (LCWCRTF 1993). The approximate tidal range at Port Fourchon, about 3.4 miles from the project area, is 1.06 feet (CPE 2009). Daily water-level fluctuations in the basin are strongly influenced by storm tides.

Salinity varies seasonally and decreases landward from the coast (GEC 2001). Salinity in coastal areas is highest from October through November and lowest in February and March. Designated uses of the coastal bays of the Barataria-Terrebonne Basin and nearshore waters of the Gulf of Mexico include recreation (such as swimming, fishing, and boating), as well as support of commercially and ecologically valuable biological systems (GEC 2001). According to the LCA restoration study, the mean salinity is greater than 10 parts per thousand behind the proposed project headland. Salinity in Timbalier Bay tapers off to near zero toward the western part of the basin (USACE 2004, Figure 3-19).

The Louisiana Department of Health and Hospitals (LDHH) coordinates with LDEQ, the Louisiana Department of Wildlife and Fisheries, and the Louisiana Department of Agriculture and Forestry to issue water body advisories aimed at protecting the public's health. Fish and shellfish consumption advisories employ a risk-based method to advise the public to limit or avoid the intake of certain species of fish and shellfish that contain unsafe contaminant levels in their tissues. The Gulf of Mexico waters off of all coastal parishes are under a fish consumption advisory related to mercury contamination (LDHH 2009).

According to LDEQ's "2006 Water Quality Integrated Report," Timbalier Bay (Subsegment LA120803_00) fully supported all designated uses, including primary and secondary contact recreation, fish and wildlife propagation, and oyster propagation (LDEQ 2006).

3.2 BIOLOGICAL ENVIRONMENT

The biodiversity of coastal Louisiana is nationally significant. Coastal Louisiana contains an estimated 40 percent of the vegetated estuarine wetlands in the contiguous United States. The combined Barataria-Terrebonne estuaries support more than 350 species of birds, of which 185 species are annual returning migrants. In total, approximately 735 species of birds, finfish, shellfish, reptiles, amphibians, and mammals spend all or part of their life cycle in the estuaries (USACE 2004).

3.2.1 Vegetative Communities

To complete the wetland values assessment, acreages within the proposed project area were estimated by applying AutoCad to October 2005 imagery provided by the U.S. Geological Survey (USGS) National Wetlands Research Center. The proposed project area is predominantly composed of intertidal and subtidal saline marsh, with some supratidal and subtidal headland habitat.

Based on USGS habitat mapping and the May 2006 site visit by the CWPPRA Environmental Working Group, it was agreed that the baseline percent cover of woody species is approximately 50 percent. The majority of the woody vegetation is black mangrove located in the intertidal range of the proposed project area.

No submerged aquatic vegetation (SAV) was observed in the proposed project area during the May 2006 site visit, nor was any SAV identified in the USGS habitat analysis. The proposed project area is likely too saline and the water too rough to support the growth of SAV.

Other vegetation in the proposed project area includes marshhay cordgrass, panicum, saltgrass, and black mangrove. The proposed project area contains the following acreages of supratidal, intertidal, and subtidal areas (Table 3).

TABLE 3

SUPRATIDAL, INTERTIDAL, AND SUBTIDAL AREAS

Year	Habitat (acres)				Total
	Dune	Supratidal	Intertidal	Subtidal	
2008	0	12	122	277	411

3.2.2 Aquatic Habitats

The proposed project area includes beach, intertidal, open-water, and benthic habitats. Each is described briefly below.

3.2.2.1 Beach and Intertidal Habitats

Beach habitat occurs as unvegetated areas adjacent to open water that are subject to direct wave action at some time during the daily tidal cycle or during average storm surges, and therefore do not typically support vegetation. Beaches consist of sand, shell, organic matter, rock, or a mixture of sediment types. 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 that supports emergent vegetation such as smooth cordgrass and black mangrove.

3.2.2.2 Open-Water Habitats

Open-water habitat in the proposed project area includes the Gulf of Mexico to the south and Timbalier Bay to the north, as well as a large shallow breach in the headland that allows gulf waters to mingle directly with Timbalier Bay. The proposed borrow area is also in open water habitat. 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 composed of diatoms; (2) secondary producers—zooplankton; and (3) consumers—larger marine species, including fish, reptiles, cephalopods, crustaceans, and marine mammals. 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, gastropods, bivalves, and fish larvae and eggs). Planktonic primary producers drift with currents, whereas zooplankton move by swimming (DOI MMS 2002).

According to DOI MMS (2002), floating *Sargassum* in the Gulf can support more than 100 animal species. Hydroids and copepods dominate the assemblage, which also includes fish, crabs, gastropods, polychaetes, bryozoans, anemones, and sea spiders. Most of these species depend on the S*argassum* algae. During their early years of life, sea turtles drift with the *Sargassum* and feed off living organisms associated with the seaweed.

Although open water is essential fish habitat (EFH) to several managed species (see Section 3.2.4), the trend toward increasing the amount of open water habitat generally is considered a problem to be addressed by the project. Abundant open water habitat is available in the Gulf of Mexico. An increase in open water habitat comes at the expense of submerged vegetation and emergent marsh habitat, which are much less common and more vulnerable to disturbance. Potential impacts to aquatic habitats are discussed in Section 3.2.5.

3.2.3 Benthic Habitats

The description of benthic resources at the proposed borrow areas primarily derives from a recent EIS prepared for the Gulf of Mexico Outer Continental Shelf Oil and Gas Lease Sales and is incorporated by reference (DOI MMS 2002). The most typical bottom substrate in the Central Gulf of Mexico is soft muddy bottom where polychaetes are the dominant benthic organism. Benthic habitats near the borrow area sites support bacteria, algae, and seagrasses; abundances are controlled by scarcity of suitable substrates and limited light penetration. When turbidity is low, coralline red algae and other benthic algae grow in water depths to at least 180 m (DOI MMS 2002). Offshore seagrasses are uncommon in the Central Gulf but are more common in the estuaries behind barrier islands. Dominant groups of benthic fauna are: (1) infauna (animals that live in the substrate, such as burrowing worms, crustaceans, and mollusks); and (2) epifauna (animals closely associated with the substrate, such as crustaceans, echinoderms, mollusks, hydroids, sponges, and soft and hard corals). The benthic community supports higher levels of the food chain, such as shrimp and demersal fish. Substrate quality strongly influences the distribution of benthic fauna. For example, infaunal organisms increase in number as sediment particle size increases (DOI MMS 2002). Other variables affecting the distribution of benthic organisms include water depth, distance from shore, illumination, food availability, currents, tides, and wave shock (DOI MMS 2002).

The prevalence of opportunistic species on the Louisiana shelf is an indication that the region is regularly disturbed, stressed, and a highly unpredictable environment (Baker and others 1981, as cited in EPA 2003). The variable benthic environment causes the inner shelf macroinfaunal community to be dynamic and unstable and to remain at immature levels of development (EPA 2003).

3.2.4 Essential Fish Habitat and Associated Managed Species

The proposed project is located in an area containing EFH as designated by the Gulf of Mexico Fisheries Management Council (GMFMC) for species that are federally managed under the Magnuson-Stevens Fishery Conservation and Management Act, P.L. 104-297; 16 U.S.C. 1801 et seq. (Magnuson-Stevens Act). EFH is defined as areas in the estuaries where species are considered “common,” “abundant,” and “highly abundant.” Detailed information on federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the GMFMC. In the Barataria and Terrebonne estuaries, the estuarine-dependent assemblage, including white and brown shrimp and red drum, has shown decreasing trends over the last 10 to 20 years (LCWCRTF and WCRA 1999). Table 4 lists the EFH, federally managed species, and their life stages expected to occur in the proposed project area, including the borrow areas.

Brown shrimp and white shrimp are estuarine-dependent species. Habitats within the Timbalier Bay and nearshore Gulf of Mexico are considered EFH for certain life stages of these species. In addition, these species migrate through tidal passes during their planktonic life stage. These species also depend on the marine environment for survival and reproduction. Brown and white shrimp are associated with offshore zones characterized by different types of sediment, all considered essential habitat for shrimp. As well, shrimp play an important role as prey species for other federally managed fish and crustaceans (GMFMC 1998). Estuaries and marine habitats of the gulf in the study area are designated as EHF for red drum (GMFMC 2005).

Brown shrimp: Brown shrimp are likely present in both the marsh and borrow areas of the proposed project. The brown shrimp fishery represents 57 percent of the Gulf of Mexico shrimp landings (NOAA 1993, as cited in Patillo and others 1997). Brown shrimp are consumed by many finfish predators and, therefore, large juvenile stocks are considered important for supporting other fish species. The brown shrimp is estuarine-dependent, which means that it requires estuarine habitat to complete its life cycle. The eggs of brown shrimp are demersal and occur offshore, in habitats typical of the proposed 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, cited in GMFMC 1998). The juvenile stages are common year round in Timbalier Bay and are highly abundant from April through July (Patillo and others 1997). The abundance of juveniles is highest in marsh-edge habitat and near submerged vegetation. They also use tidal creeks, inner marsh, and shallow open water. Muddy bottoms are preferred in unvegetated areas. Juveniles and subadults are found in estuarine channels, shallow marsh areas, and estuarine bays. They prefer vegetated habitats. Subadults recruit to coastal waters and at the adult stage move to offshore spawning grounds. Adults are associated with silt, muddy sand, and sandy substrates. Subadults and adults are likely to be found in preferred proposed 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 to 91 m]). In deeper water (210 to 361 feet [64 to 110 m]), spawning appears to occur throughout the year (Patillo and others 1997; GMFMC 1998).

White Shrimp: White shrimp are likely present in both the marsh and borrow areas of the preferred project areas. White shrimp make up 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 and others 1997). White shrimp are estuarine-dependent. Within Timbalier Bay, adults are never abundant, but are common during the fall months; juveniles are common year round but are abundant only from July to November; and larvae are common during the summer. 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 through 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, with densities highest along the marsh edge and among submerged aquatic vegetation. However, 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. Based on 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 drops in salinity (Patillo and others 1997; GMFMC 1998). Spawning occurs from spring to late fall, peaking in 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).

TABLE 4

ESSENTIAL FISH HABITAT (EFH) FOR MANAGED SPECIES IN THE WEST BELLE PASS BARRIER HEADLAND PROPOSED PROJECT AREA, INCLUDING BORROW AREAS

Common Name	Latin Name	Life Stage	System	EFH
Brown shrimp (Estuarine-dependent)	*Farfante penaeus aztecus*	eggs	Marine (M)	<110 meters (m), demersal
		larvae	M	<100 m, planktonic
		postlarvae/juvenile	Estuarine (E)	marsh edge, SAV, tidal creeks, inner marsh
		subadults	E	mud bottoms, marsh edge
		adults	M	<110 m silt sand, muddy sand
White shrimp (Estuarine-dependent)	*Litopenaeus setiferus*	eggs	M	<40 m, demersal
		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
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
Lane snapper	*Lutjanus synagris*	eggs	M	pelagic
King mackerel	*Scomberomorus cavalla*	juvenile	M	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/E	inlet, estuaries, coastal waters <25 m
		adult	M	<25 m deep
Blacknose shark	*Carcharhinus acronotus*	adult	M	25 to 100 m isobath

Source: GMFMC 2005

Red Drum: The red drum is likely present in both marsh and borrow areas of the proposed project. The commercial harvest of red drum caused significant declines in numbers that resulted in restriction of the harvest in Louisiana and a moratorium on harvest in federal waters. Juveniles are common in Timbalier Bay throughout the year, and adults are largely absent. 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 the borrow areas. Spawning habitats include seagrass, muddy, 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 offers 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 over mud to sand bottoms. Older juveniles move into primary bays and open-water habitats. Estuarine wetlands are important to larvae, juveniles, and subadults, while 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 in 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 miles (25 kilometers) from shore; they prefer mud to sand or oyster-reef bottoms with little or no seagrass (Patillo and others 1997; GMFMC 1998), as well as artificial reef habitats such as oil and gas platforms. Based on the habitat preferences of adults, they are likely to occur in the borrow areas.

Lane Snapper: The lane snapper may be present in the preferred borrow areas of the proposed 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.

King Mackerel: The king mackerel may be present in the preferred borrow areas of the proposed 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 to 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 and others 1990, as cited in GMFMC 1998). Although juveniles are not estuarine-dependent, they prey on 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 by the nutrient-rich Mississippi River plume (DeVries and others 1990; Grimes and others 1990, both cited in GMFMC 1998).

Cobia: The cobia may be present in the preferred borrow areas. 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 and others 1964, as cited in GMFMC 1998).

Bonnethead Shark: The bonnethead shark may be present in the preferred borrow areas, often in schools in inshore waters less than 82 feet (25 m) deep. Spawning occurs spring through fall (Hoese and Moore 1998).

Blacknose Shark: The blacknose shark is a small coastal requiem shark that occurs in parts of the Gulf of Mexico during summer and fall (NOAA 2009d). It may be a somewhat infrequent visitor to the shallow waters of the north-central Gulf of Mexico. EFH has been designated for Louisiana waters in the 25 to 100 m isobath for the adult life stage of this shark. Neither neonates nor juveniles are likely to occur near the project site.

3.2.5 Fisheries Resources

The Timbalier Islands Shoreline Mapping Unit is host to a large variety of fish and invertebrate species. Of all the fisheries species reported, only the numbers of Spanish mackerel are believed to be increasing. Spotted seatrout, red drum, black drum, southern flounder, Gulf menhaden, blue crabs, American oysters, and brown and white shrimp are all decreasing in abundance. These trends are expected to remain the same in the future (LCWCRTF and WCRA 1999).

Three of Louisiana's commercial fishing ports — Empire-Venice, Intracoastal City, and Cameron — are in the top seven landings ports for the United States based on poundage in 2007 (NOAA 2009c). Empire-Venice, the nearest large commercial fishing port to the proposed project site, ranked third in the nation for quantity of commercial fisheries landings and fourth in the nation for value of landings in 2007 (NOAA 2009c).

The Barataria-Terrebonne estuaries support a variety of invertebrate and fish species of ecological, commercial, and recreational value. 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. 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. Highly abundant or abundant harvested species include brown shrimp, white shrimp, sand sea trout, black drum, southern flounder, blue crab, gulf menhaden, and bay anchovy (Patillo and others 1997). Important forage species in the area include hardhead catfish, sheepshead minnow, gulf killifish, spot, pinfish, Atlantic croaker, silversides, sheepshead, silver perch, and striped mullet (Patillo and others 1997).

Other species that occur in the proposed project area during some portion of their life history include the ecologically important grass shrimp (Patillo and others 1997). Many other non-game species of finfish and shellfish are important links in the food chain of commercially and recreationally harvested species. Some species shown in Table 4 are prey for some federally managed species such as red drum, mackerels, snappers, and groupers. The NMFS also manages highly migratory species such as billfish and sharks. In addition, wetlands in the proposed project area produce nutrients and detritus that contribute to the overall productivity of Timbalier marshes as important components of the aquatic food web.

The role of barrier islands in protecting important fisheries habitat within the back-barrier region is well documented. Perhaps less appreciated is the value of habitat of the barrier islands. That is, barrier islands and headlands provide a unique and ecologically important transitional area from the marine to estuarine environments. Microhabitats within islands and headlands include the surf zone, intra-island tidal creeks and ponds, and back-barrier sand flats (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) (Ross 1983, as cited in Williams 1998). 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, Louisiana, showed tremendous seasonal variability, likely a result of changes in water level, temperature, and tidal action. More importantly, barrier islands and headlands provide specific habitats used by unique nekton assemblages that differ distinctly from mainland habitats (Williams 1998).

Fisheries resources in the borrow areas are difficult to describe and quantify because seismic and sub-bottom data geomorphologically define the borrow areas. The two proposed borrow areas differ in distance from shore and water depth (Table 2**)**; though buried sand and fine sediment resources in these locations are of particular value to the proposed restoration project, they are not necessarily relevant to fisheries resources that occupy the overlying water column, nor to benthic species associated with surficial sediments in the area. Section 3.2.3 describes typical benthic resources of the continental shelf in the Gulf of Mexico.

3.2.6 Wildlife Resources

The populations of the brown pelican, seabirds, and other avifauna have remained steady over the last 10 to 20 years in the Timbalier Islands Shorelines Mapping Unit, while furbearer populations have declined. By 2050, numbers of brown pelican, seabirds, and most other avifauna are expected to remain steady, while furbearer populations are expected to continue to decline (LCWCRTF and WCRA 1999).

Over the last 10 to 20 years, dabbling ducks, wading birds, shorebirds, seabirds, furbearers, and alligators have experienced decreasing populations in eastern Terrebonne Basin as a result of marsh loss and a conversion to saltier marsh types. Across this subprovince, the greatest loss of coastal wetlands has occurred in the fresh and intermediate marshes of the Terrebonne Basin. Fresh and intermediate marshes and swamps in the Terrebonne Basin represent a major fall staging and wintering area for migratory waterfowl (USACE 2004).

Also over the past 10 to 20 years, duck populations in the Barataria and Terrebonne basins have declined as a result of marsh loss and conversion to saltier marsh types. Louisiana’s coastal zone supports 19 percent of the United States’ winter population for 14 species of ducks and geese. The North American Waterfowl Management Plan identified coastal Louisiana as one of the most important regions for the maintenance of continental waterfowl populations in North America (USACE 2004).

3.2.6.1 Coastal Birds

Birds that use the proposed project area can be divided functionally into swimmers, sea birds, waders, shore birds, birds of prey, and passerine birds. Ducks are part of the swimmer functional group. Although most ducks prefer freshwater marshes and rarely use saline marshes, the marshes near the proposed 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 and others 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 and others 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 could occur in the proposed project area include the 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 the 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).

Seabirds are most common along the barrier islands and inland bays of the Barataria-Terrebonne estuaries (Conner and Day 1987). Three seabird colonies have been identified on the headland east of Belle Pass (GEC 2001). Seabird colony surveys did not include the proposed project headland, however. A survey published in 1984 noted that colonies of black skimmers (*Rynchops niger*) and least terns (*Sterna albifrons*) were present (Keller and others 1984, as cited in Gosselink 1984).

Several wading birds occur in saline habitats and thus could occur in the proposed 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 the 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 proposed project area include black-bellied plover (*Pluvialis squatorola*), semipalmated 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 (A*ctitis 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*), dundlin (*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 are thus likely to be present in the proposed project area include the 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 are thus likely to occur in the proposed project area include the 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 proposed 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 they depart 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).

3.2.6.2 Mammals and Reptiles

No wildlife surveys have been conducted in the proposed project area. However, some fur-bearing species may be present based on the types of habitat present in the proposed project area. The swamp rabbit (*Sylvilagus aquaticus*) is the only species of mammal harvested as game from the saline marshes typical of the proposed project area (GEC 2001). Fur-bearing mammals that may also occur in the proposed project area include muskrat (*Ondatra zibethicus*), nutria (*Myocaster coypus*), mink (*Neovison vison*) raccoon (*Procyon lotor*), and otter (*Lutra canadensis*). Trapping is not common in the area (GEC 2001). Non-game mammals that may occur in or near the proposed project area include red fox (*Vulpes vulpes*), nine-banded armadillo (*Dasypus novemcinctus)*, and marsh rice rat (*Oryzomys palustris*) (GEC 2001).

Reptiles and amphibians that could occur within the proposed project area include treefrogs, bullfrogs, salamanders, newts, diamondback terrapin (*Malaclemys terrapin*), six-lined racerunner (*Cnemidophorus sexlineatus*), mole skink (*Eumeces egregious*), and island glass lizard (*Ophisaurus compressus*) (GEC 2001). However, the high salinities in the proposed project area likely limit the diversity of amphibians and reptiles that occur there.

3.2.6.3 Marine Mammals

The bottlenose dolphin (*Tursiops truncatus*) occurs throughout the estuaries and bays of the Gulf of Mexico and is expected to occur at the project site and borrow areas. NMFS has identified a bottlenose dolphin community in the Terrebonne/Timbalier Bay area. A "community" includes resident dolphins that regularly share large portions of their ranges, exhibit similar distinct genetic profiles, and interact with each other to a much greater extent than with dolphins in adjacent waters. The degree to which individual dolphins in the project area are migratory is not known. Throughout the Gulf of Mexico, there is some evidence that dolphins move into more northerly bay systems in summer, and into more southerly systems in winter.

3.2.7 Threatened and Endangered Species

Several vertebrate species listed as federally threatened or endangered occur at least occasionally in Lafourche Parish, although none are known to breed in the immediate vicinity of the proposed project areas (Louisiana Department of Wildlife and Fisheries [LDWF] Natural Heritage Program 2009). The Latin name, legal status, and likelihood of occurrence in the proposed project area are listed for each threatened or endangered species (Table 5).

TABLE 5

THREATENED AND ENDANGERED SPECIES OF LAFOURCHE PARISH AND NEARSHORE GULF OF MEXICO WATERS

Common Name	Latin Name	Federal Legal Status
West Indian manatee	*Trichechus manatus*	E
Brown pelican	*Pelecanus occidentalis*	E
Piping plover	*Charadrius melodus*	T/E
Bald eagle	*Haliaeetus leucocephalus*	Delisted*
Loggerhead sea turtle	*Caretta caretta*	T
Green sea turtle	*Chelonia mydas*	T
Kemp’s Ridley sea turtle	*Lepidochelys kempii*	E
Hawksbill sea turtle	*Eretmochelys imbricate*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T
Pallid sturgeon	*Scaphirhynchus albus*	E

Notes:

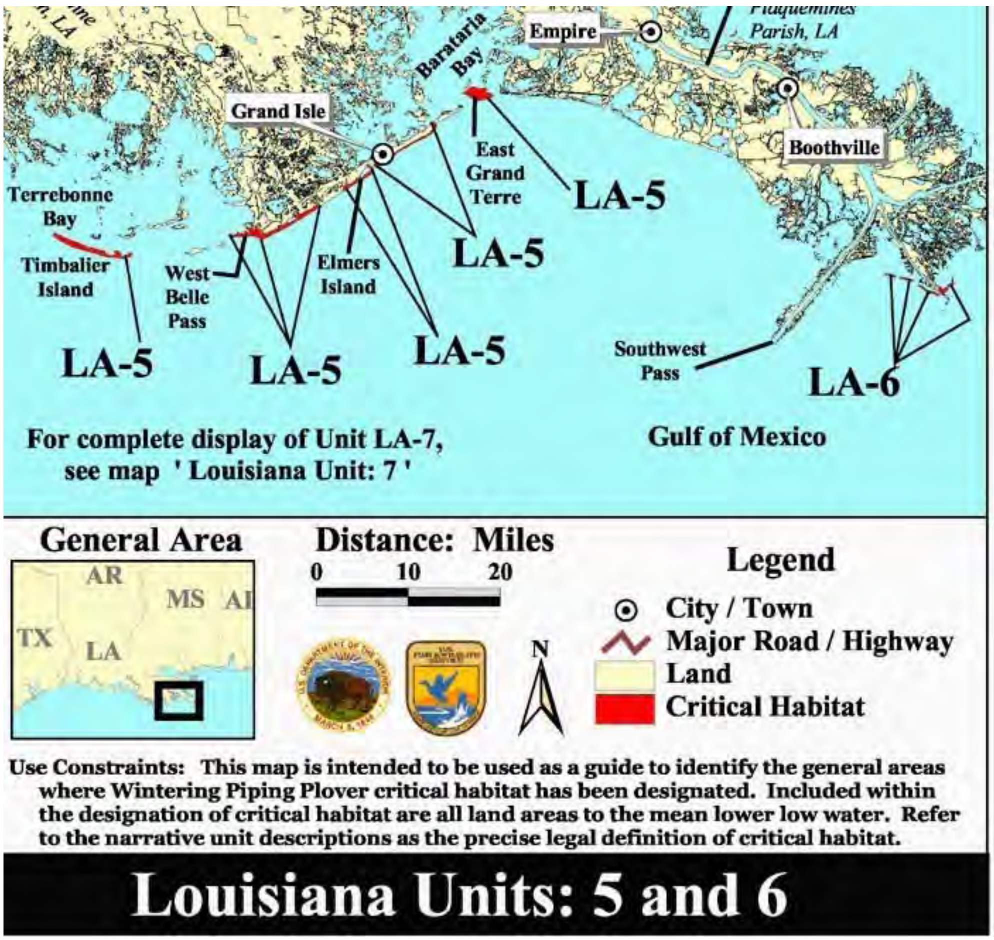
E = Endangered
T = Threatened
* = State Endangered

In response to a request for information on threatened and endangered species in the proposed project area, USFWS supplied a summary of concerns about proposed projects in this area as they relate to threatened and endangered species. The project would be located within Unit LA-5 of designated critical habitat for the threatened piping plover. Designated critical habitat for that area is specifically defined as “. . . all of Belle Pass West [the “peninsula” extending west/northwest approximately 4.8 km (3.0 mi) from the west side of Belle Pass] where primary constituent elements occur to mean low low water. . .” (Federal Register Vol. 66, No. 132, P 36127). The designated critical habitat identifies specific areas that are essential to the conservation of the piping plover. The primary constituent elements for piping plover wintering habitat are those components of the habitat 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 or mud flats (or both) 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 (USFWS 2009).

The threatened piping plover, as well as its designated critical habitat, occurs within a portion of the proposed project area. Piping plovers winter in Louisiana and may be present for 8 to 10 months annually. Piping plovers feed extensively on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no or very sparse emergent vegetation; they also use these habitats for roosting. The threatened piping plover occurs in coastal Louisiana, including the proposed project area. They arrive from the breeding grounds as early as late July and remain until late March or April. In most areas, wintering piping plovers depend on a mosaic of sites distributed throughout the landscape because the suitability of a particular site for foraging or roosting depends on local weather and tidal conditions. Plovers move among sites as environmental conditions change, and studies have indicated that they generally remain within a 2-mile area. Although the exact locations of use shift annually and seasonally as environmental conditions change, the piping plover is expected to occur at or near the proposed project area. The extent of critical habitat for the piping plover in and near the project area is shown on Figure 6 (USFWS 2009).

FIGURE 6

GENERAL LOCATIONS OF THE DESIGNATED CRITICAL HABITAT FOR THE WINTERING PIPING PLOVER



The endangered brown pelican nests on several barrier islands in the vicinity and is known to change nesting sites as habitat changes; however, no known nesting colonies occur within 2,000 feet of the project area. The pelican feeds along the Louisiana coast in shallow estuarine waters, using sand spits and offshore sand bars as rest and roost areas. The pelican may use the proposed project area now for foraging and roosting and is likely to use the restored proposed project area in the same way at some time in the future.

The bald eagle, which has been delisted at the federal level but remains endangered within Louisiana, nests in Louisiana from October to mid-May. Nests are usually built in bald cypress trees near fresh to intermediate marshes or open water, but are also known from mature trees of other species. No bald eagle nests are known within the project area, likely because of the lack of suitable nesting habitat.

Five species of sea turtles occur in the Gulf of Mexico off the Louisiana coast. All are considered either threatened or endangered. The loggerhead and the green turtle are somewhat common in nearshore waters. Nesting and hatching dates for the loggerhead in the northern gulf are from May to November (USFWS 2009). The Kemp's Ridley is an uncommon visitor, and the hawksbill turtle and the leatherback are rarely encountered in Louisiana (Dundee and Rossman 1989). Kemp's Ridley juveniles and sub-adults occupy shallow, coastal regions and are often associated with crab-laden, sandy, or muddy water bottoms. If present, small Kemp's Ridley turtles are generally found in inshore areas of the Louisiana coast from May to October. Adult Kemp's Ridley may be abundant near the mouth of the Mississippi River in spring and summer. Adults and juveniles move to offshore waters during the winter. Kemp's Ridley have been observed in Sabine and Calcasieu Lakes and use nearshore waters, ocean sides of jetties, small boat passageways through jetties, and dredged and non-dredged channels (USFWS 2009).

The threatened gulf sturgeon is an anadromous fish that occurs in rivers, streams, and estuarine waters of the gulf coast between the Atchafalaya River and Suwanee River, Florida. In the late 19th and early 20th century, the gulf sturgeon supported an important commercial fishery, providing eggs for caviar, flesh for smoked fish, and swim bladders for isinglass. Gulf sturgeon numbers declined because of overfishing during most of the 20th century. Gulf sturgeon adults would most likely occur in the estuarine and marine waters of the proposed project area from November to March when they are not spawning (USFWS 2009). There is no critical habitat for gulf sturgeon in the proposed project area.

The endangered pallid sturgeon is found in both the Mississippi and Atchafalaya Rivers (USFWS 2009). Since this species requires riverine habitat, it is unlikely to occur in the waters of the project site.

The West Indian manatee is the only mammal listed as threatened or endangered that may be present in the proposed project area (USFWS 2009). Manatees have occasionally been sighted in coastal marshes along the Louisiana Gulf Coast. The West Indian manatee is known to occur on the Louisiana coast, and manatees typically frequent protected inshore waters such as bays and coastal streams.

3.3 CULTURAL RESOURCES

3.3.1 Historic, Prehistoric, and Native American Resources

Terrestrial and offshore cultural resource investigations were conducted in the project area in 1994 and 2009. Results of the surveys are summarized below.

3.3.1.1 Terrestrial Cultural Resources

The proposed project area is within the area surveyed by USACE in 1993 for the West Belle Pass Barrier Headland Restoration Project (Weinstein 1994). The USACE project area was surveyed on foot to the extent practicable and by boat with bankline probing where there was no access to land. Terrestrial investigations were conducted on the beach fronting the Gulf of Mexico where spoil from previous dredging had been deposited.

Two archaeological sites, 16LF7 and 16LF82, were recorded as part of the survey. However, neither of these sites was determined to be eligible for the National Register of Historic Places (NRHP) because they lacked intact deposits and research potential (Weinstein 1994). No additional terrestrial cultural resources surveys were conducted for the current proposed project.

3.3.1.2 Marine Cultural Resources

Submerged cultural resource and geotechnical surveys of two proposed offshore borrow sites were conducted in March 2009, by Tidewater Atlantic Research, Inc. (TAR). Magnetic and acoustic remote-sensing were conducted using a cesium magnetometer, sidescan sonar, and sub-bottom profiler. Bathymetric data were generated using a survey-grade precision depth recorder. Differential global positioning and computer survey software provided accurate navigation and data collection (TAR 2009).

In the proposed beach fill borrow area, 97 individual magnetic and one acoustic target were identified by remote sensing. Again, most anomalies were consistent with a modern source. Two clusters (WBPE-1 and WBPE-2), composed of four individual magnetic targets, exhibit signature characteristics consistent with shipwreck material or other potentially significant submerged cultural resources. No acoustic signatures were associated with these two anomaly clusters, however. TAR recommended that dredging occur outside a 400-foot diameter buffer around cluster WBPE-1 and a 300-foot diameter buffer around cluster WBPE-2 to avoid disturbance of the potentially important area.

In the proposed marsh borrow area (Figure 5), 131 magnetic anomalies and three acoustic signatures were identified (TAR 2009). Most of the anomalies were interpreted as either well heads, pipelines, or modern debris, such as fish and crab traps, pipes, small-diameter rods, cable, wire rope, chain, or small boat anchors. However, one target cluster (WBPA-5), composed of two magnetic anomalies identified on two lanes, is located directly on a wreck symbol on NOAA Chart No. 11346. An acoustic signature associated with this target showed a strand of cable approximately 50 feet in length, which may be associated with rigging from a historic ship.

3.3.2 Socioeconomics (Income and Environmental Justice)

The population of Lafourche Parish is approximately 93,083, according to a July 2008 estimate from the Louisiana State Treasurer's Office (Lafourche Parish Government 2009). Lafourche Parish is home to a Native American population (2.3 percent) and African-American population (12.6 percent). A few Asian-Americans also reside in the parish (0.7 percent). In total, nearly 15 percent of the parish population is minority. Furthermore, 14.7 percent of the residents of Lafourche Parish are below the U.S. Census Bureau's definition of poverty, and 19.7 percent of the children in the parish live below the poverty level (Hemmerling and Colten 2003).

Major industries in Lafourche Parish include oil and gas production, sugar refining, shipbuilding, and commercial fishing (Lafourche Parish Government 2009). Marine fisheries make up 86 percent of the total gross value of fish and wildlife production in the parish (Hemmerling and Colten 2003). According to the 2000 census, the median full-time annual income of Lafourche Parish residents was $34,600 for males and $19,484 for females (U.S. Census Bureau 2000).

Port Fourchon, about 8 miles east of the proposed project area, is the economic hub of Lafourche Parish. In 2006, about $63.4 billion worth of oil and natural gas was tied to Port Fourchon via the Louisiana Offshore Oil Port (LOOP) and the offshore platforms the port helps to service (Loren C. Scott and Associates 2008). Hundreds of offshore drilling rigs in the Gulf of Mexico send oil and gas to the mainland through Port Fourchon. Port Fourchon had operating revenue of $11.7 million in 2005. The port currently services half of the drilling rigs operating in the Gulf of Mexico and is projected to service 47 percent of future deepwater plans. The recently developed deepwater extension of the Lower Tertiary trend is expected to spur the growth of Port Fourchon. The Lower Tertiary trend, holding up to 15 billion barrels of oil and natural gas liquids, could boost the U.S. oil and gas reserves as much as 50 percent (Greater Lafourche Port Commission 2006).

Though located on a relatively small piece of land, Port Fourchon plays a vital role in both the U.S. and local economies. More than 250 private firms operate at Port Fourchon, including drilling, production, and aviation companies (Greater Lafourche Port Commission 2006). An economic analysis of the role of Port Fourchon in the local economy (the Houma Metropolitan Statistical Area [MSA]) illustrates the web of related businesses that depend on the port, including restaurants that provide food and catering to offshore workers, shipbuilders that fabricate drill ships and oil well service vessels, air and water transportation firms, and petroleum extraction companies (Loren C. Scott and Associates 2008). Many people who provide social services, such as education and health care, are also indirectly linked to the port. The economic analysis summarized the importance of the port to the Houma area (the largest population center near the proposed project area) as follows:

- $1,501 million in business sales in the MSA are tied to the port
- $351.4 million in household earnings of MSA residents can be traced back to the port
- 8,169 jobs in the Houma MSA depend on the presence of the port
- $12,053,899 (at least) in port-related sales taxes was collected by local governments in the Houma MSA.

3.3.3 Land Use

Lafourche is a parish of marshes, sandy ridges, bodies of water, and natural levees. Lafourche Parish (French for "the fork") was named after Bayou Lafourche, which forms a fork where it flows out of the Mississippi River in Ascension Parish and runs the length of the parish into the Gulf of Mexico. Lafourche Parish is almost 100 miles long and never more than 15 miles wide, covering an area of approximately 1,085 square miles (Hemmerling and Colten 2003). Bayou Lafourche is known as the "Longest Street in the World" because of its 77 continuous miles of homes spaced closely together along the bayou.

Human settlement is aligned with the natural levees and beach ridges characterized by elongated settlement patterns, ranging from 50 acres to just under 10,000 acres, strung out along Bayou Lafourche. As the population has increased, the once-isolated towns have spread and become an almost continuous linear settlement with few firm boundaries between communities. Settled areas outside the linear communities that were once linked to agriculture, fishing, and trapping are now important to the petroleum industry or serve as recreation centers, such as fishing or hunting camps (Hemmerling and Colten 2003).

3.3.4 Infrastructure

Substantial oil and natural gas activity occurs in Terrebonne and Timbalier Bays behind the islands, and on the islands themselves in the immediate proposed project area. Both East Timbalier and Timbalier Islands have been impaired by oil and natural gas access canals that were dredged on the islands. These canals serve as potential weak spots, or focal points, for breaches to form during severe storm and overwash events. The Timbalier Island Shorelines Mapping Unit contains 258 oil or natural gas wells and 11.6 miles of pipelines, but no roads or railroads (LCWCRTF and WCRA 1999).

Three incorporated towns — Thibodaux, Lockport, and Golden Meadow — are located in Lafourche Parish. Thibodaux is the parish seat and the largest town. It has the only university in the parish. Smaller communities in the parish include the unincorporated towns of Raceland, Larose, Cut Off, and Galliano (Hemmerling and Colten 2003).

U.S. Highway 90 crosses Lafourche Parish from east to west. Louisiana Highways 1 and 308 provide access to the north and south of the parish. Water transport from the interior of the parish to the Gulf of Mexico is via Bayou Lafourche, which is intersected by the Intracoastal Waterway, which runs east-west. Shipping traffic is greatest in the portion of Bayou Lafourche between the Gulf of Mexico and the Intracoastal Waterway in Larose.

At the mouth of Bayou Lafourche is Port Fourchon, a deep-draft port that supports major onshore staging for outer continental shelf oil and gas exploration and development in the Central and Western Gulf of Mexico and the landfall for the LOOP, which handles 13 to 15 percent of the nation's foreign oil and is connected to 50 percent of the U.S. refining capacity (Greater Lafourche Port Commission 2006). In Galliano, the South Lafourche Leonard Miller, Jr. Airport serves the southern portion of the parish and the port.

More than 95 percent of the tonnage handled at the port is oil and gas related, transported by container, bulk, breakbulk, and other methods. Approximately 30 percent of the cargo is transported on inland barge to and from the port; the rest arrives and leaves by truck. Offshore transport is by supply vessel or helicopter (Greater Lafourche Port Commission 2006). In 2006, 675 million barrels of crude oil were transported via pipelines through the port.

3.3.5 Noise

The proposed project area is remote with no industry other than oil production and fisheries. Ambient noise in the area results from oil and gas production, boats, and wildlife.

4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA evaluates the anticipated environmental impacts to the human environment that would result from implementation of the proposed project. It includes an analysis of the direct, indirect, and cumulative impacts of project alternatives, including the preferred alternative and the no-action alternative. The three alternatives evaluated in this EA differ primarily in the elevation, slope, and width of various features of the beach, dune, and marsh, and the use of hard structures to help retain sediment. All of the alternatives are designed to meet the purpose and need for action, guided by regionally accepted criteria because the CWPPRA process screens out extreme designs early in the process.

This review is consistent with CEQ regulations and NOAA Administrative Order 216-6, as guided by the NOAA NEPA Handbook (NOAA 2009a). Sources of analysis developed for this specific project that were used to consider environmental impacts throughout proposed project development are the WVA and engineering design analyses (ATM 2006, CPE 2009). Other factors subjectively considered during the selection process included, but were not limited to, the following:

- Wetland benefit — creation, enhancement, or protection
- Cost effectiveness
- Longevity and sustainability
- Risk and uncertainty
- Consistency with Coast 2050 Plan
- Public support
- Synergy with other restoration efforts.

Wetland benefits are assessed through the WVA process. The WVA is a quantitative, habitat-based assessment model developed to estimate anticipated environmental benefits for restoration project proposals submitted for funding consideration under CWPPRA. The assessment compares conditions over a 20-year period to determine the net difference in "future without project" and "future with project" scenarios. Initial and future conditions are set based on historical land loss, aerial imagery, and on-site visits to the proposed project area. Expected benefits are based on previously implemented projects that are similar in scope, construction plans, models, experience of the assessment team, or a combination of these elements. The Engineering and Environmental Work Groups, consisting of biological and engineering representatives from each participating CWPPRA agency, visited the area in May 2006.

A qualitative assessment was conducted for direct and indirect short-term (occurring during construction) and long-term (occurring during project life) impacts. The actual construction duration cannot be known in advance, as duration is affected by final design, weather, mechanical performance, and other factors that cannot be completely controlled. The range of estimates provided in the 30% Design Report (CPE 2009) provided the basis for designations of short- and long-term impacts. In the following sections, impacts that occur only during the construction phase are considered short term, temporary, and reversible. An example of a short-term impact is increased turbidity during dredging. Long-term impacts are those that persist well-beyond the construction phase, and are considered semi-permanent and irreversible within the 20-year lifespan of the project. An example of a long-term impact is the increase in dune elevation to +6.0 feet NAVD. The estimated duration of each component of construction is given in the appropriate sections below.

In addition to the temporal component of each impact, the magnitude or severity of the impact is described in qualitative terms. Alternatives were designated as having *no impact*, *no significant impact*, or *significant impact*. The impacts that were found *not significant* were further defined by the terms *minor and moderate*. Minor impacts are those that may be measurable, but not result in adverse effects.

An example of a minor impact is construction causing birds to temporarily avoid a local area. If the birds have access to similar areas, and are not prevented from foraging altogether in the area, it is not significant that they were dislocated a few meters down the beach. In human terms, “minor” is equivalent to “inconvenient but not harmful.” *Moderate* impacts may have a population-level effect, and thus warrant some mitigation or revision of the project component causing the impact. An example of a moderate impact is the loss of beach habitat during the construction phase. Although the loss is spatially extensive, it is temporary, and the restoration will more than compensate for the temporary disruption of beach habitat to all of the affected fish and wildlife species.

In contrast, *significant* impacts warrant preparation of a full environmental impact statement (EIS). Significant impacts may result from “taking”, which is actions resulting in the death of an endangered species, or interfering with reproduction of a local population of fish or wildlife if, for example, it causes an irreversible negative effect. In that case, the alternative would either be rejected, amended to include mitigative actions that reduce the impacts to acceptable levels, or evaluated in an EIS.

The qualitative assessment of an impact’s context and intensity is based on a review of the available and relevant reference material and on professional judgment, which includes consideration of the permanence of an impact or the potential for natural attenuation of an impact, the uniqueness of the resource, the abundance or scarcity of the resource, and the potential that mitigation measures can offset the anticipated impact. A quantitative assessment is included when sufficient data are available to conduct such an analysis.

Adverse environmental consequences of the no-action alternative contrast with the benefits of the preferred alternative. With no action, continued loss of headland, supratidal, and intertidal habitats likely would occur, along with associated declines in fish and wildlife resources. However, the preferred alternative can offset adverse impacts to these habitats.

Table 6 summarizes general construction plans for the proposed project. Table 7 presents a comparison of environmental impacts associated with the no-action, preferred, and other alternatives. Table 8 presents the mitigation measures of the preferred alternative.

TABLE 6

OVERVIEW OF CONSTRUCTION PLANS FOR PREFERRED ALTERNATIVE

Project Component	Proposed Project Start Date	Duration of Proposed Project	Total Dredge Time	Onshore Construction Time	Onshore Construction Equipment Deployed	Depth of Dredging Cut	Quantity of Material Placed (cubic yards)
Beach	2011	TBD	63 days	TBD	Bulldozers	-17.5 to -22.0 feet	1,180,000
Marsh	2011	TBD	41 days	TBD	Marsh buggies	-41.0 to -50.0 feet	1,903,000

Notes:

Depth of Dredging Cut is the maximum depth below existing grade for plan.
Quantity of Material Placed is up to 50 percent of the material dredged, based on a 2:1 cut:fill ratio. .
Net Acres Benefited based on WVA projections at 20 years post-construction.
AAHU = Average annual habitat unit
TBD = To be determined

TABLE 7

COMPARISON OF ENVIRONMENTAL IMPACTS OF PREFERRED ACTION AND ALTERNATIVES

Resource	No Action	Alternative 1 (Preferred Alternative)	Alternative 2	Alternative 3
Geology, Topography, and Physical Oceanographic Processes	Without action, the remaining supratidal acreage will disappear by 2015. The existing breach is expected to widen. Under the no-action alternative, material from the borrow areas is likely to be used for other restoration projects in the area.	Emplaced materials would result in long-term, direct, beneficial impacts in the proposed project area by protecting marshes from storm surge, reducing erosion rates, and increasing seaward position at the 20-year mark. Island construction would result in coverage of existing marsh and shallow water habitat. Short-term, direct, moderate, adverse effects would occur in the proposed borrow areas associated with suspension of sediments and disturbance to natural sediment sorting and layering within the borrow areas.	Immediate impacts are the same as Alternative 1. However, this alternative is more likely to breach than the preferred alternative. Temporary impacts to existing beach and marsh are the same as for Alternative 1. Borrow area impacts are the same as for Alternative 1.	Beneficial impacts are the same as for Alternative 1, but breaching is not expected. Temporary impacts to existing beach and marsh are the same as for Alternative 1. Borrow area impacts are the same as for Alternative 1.
Air Quality	No impacts	Construction and dredging would result in adverse, direct, short-term, minor impacts from exhaust diesel fumes and fugitive dust generated by dredging equipment, earthmoving equipment, tugs, and barges.	Same as Alternative 1	Same as Alternative 1
Surface Water and Water Column Resources	No direct impact. The cumulative impact of loss of the barrier headland would be to allow increased exchange of gulf waters with Timbalier Bay, leading to increased salinity, loss of intermediate marsh vegetation, and increased vulnerability to storm surge.	Dredging and emplacement would result in adverse, direct, short-term, minor impacts to surface water quality associated with (1) increased turbidity in the water column at the dredge site (dredge plume) and at the construction location; (2) exhumation of buried trash and debris; and (3) discharges from the dredge vessel. Long-term beneficial impact to surface water quality would result from increased wetland acreage.	Adverse impacts would be the same as Alternative 1. Beneficial impacts would be similar to Alternative 1, but to a lesser degree.	Adverse impacts would be generally the same as for Alternative 1, but slightly more material would be dredged. Beneficial impacts would be similar to Alternative 1, but to a greater degree, as breaching is less likely.

TABLE 7 (Continued)

COMPARISON OF ENVIRONMENTAL IMPACTS OF PREFERRED ACTION AND ALTERNATIVES

Resource	No Action	Alternative 1 (Preferred Alternative)	Alternative 2	Alternative 3
Wetlands	Continued erosion and overwash are expected to occur, resulting in losses to wetland resources. All supratidal habitats are expected to be lost by 2015. About half of the existing intertidal habitat (56 acres) will be lost within 20 years.	Emplacement would result in adverse, direct, short-term, minor impacts to wetlands. Emplacement would increase wetland acreage and provide long-term benefits to fish and wildlife resources in the wetlands.	Adverse impacts would be the same as Alternative 1. Beneficial impacts would be similar to Alternative 1.	Temporary adverse impacts would be the same as for Alternative 1. Beneficial impacts would be similar to Alternative 1.
Vegetation	All supratidal habitats are expected to be lost by 2015. Intertidal habitat will be reduced by half within the next 20 years.	The proposed action would result in short-term, adverse, direct, minor, and long-term, direct moderate, beneficial impacts to vegetation. Long-term improvement in vegetation and available habitat would result.	Adverse impacts would be the same as Alternative 1. Long-term beneficial impacts would be similar to Alternative 1, although breaching is more likely.	Adverse impacts would be the same as Alternative 1. Long-term beneficial impacts would be slightly greater than Alternative 1.
Aquatic Biota, Fisheries, and Essential Fish Habitat	Intertidal habitat will be lost, and open water habitat will increase. Animals that rely on marsh vegetation and marsh edge habitat will decline.	Construction and dredging would result in localized, adverse, direct, short-term, minor impacts to fisheries and EFH. Slow-moving or sessile organisms in the borrow areas may be killed during dredging. Sessile organisms in the emplacement areas may be buried or injured. Short-term increases in turbidity may temporarily reduce habitat quality in the borrow areas and the emplacement areas. The proposed project would have long-term, moderate, direct and indirect beneficial impacts to EFH for the immediate project area through protection, restoration, and creation of marsh. The proposed project would provide long-term benefits, such as enhanced habitat, surf zone stability, increased food and shelter resources, improved water quality; and greater access to interior island locations during storm or high-water events.	Adverse impacts would be the same as Alternative 1. Positive impacts would be similar to, but less lasting than, Alternative 1 because breaching is more likely.	Adverse impacts would be the same as Alternative 1. Positive impacts would be similar to, but more lasting than, Alternative 1 because breaching is less likely.

TABLE 7 (Continued)

COMPARISON OF ENVIRONMENTAL IMPACTS OF PREFERRED ACTION AND ALTERNATIVES

Resource	No Action	Alternative 1 (Preferred Alternative)	Alternative 2	Alternative 3
Terrestrial Wildlife	All dune and supratidal habitats are expected to be lost by 2015.	Construction and dredging would result in localized, adverse, direct, short-term, minor impacts to beach habitat through covering of existing beach. Emplacement would result in adverse, direct, short-term, minor impacts to terrestrial wildlife. The preferred alternative would increase the longevity of supratidal habitat, resulting in a net benefit to terrestrial wildlife.	The adverse impacts would be the same as Alternative 1. Positive impacts would be less than Alternative 1 because the headland is more likely to breach.	Impacts would be similar to those for Alternative 1. Alternative 3 is less likely to breach within the 20-year project lifespan.
Threatened, Endangered, and Sensitive Species	Loss of beach and dune habitat will adversely affect the piping plover and brown pelican. Critical habitat for the piping plover is expected to diminish during the next 20 years.	Construction would temporarily affect critical habitat for the piping plover by depositing new material in intertidal and supratidal areas, which would render those areas unsuitable for foraging until benthic prey species recolonize the project area. Excavation could result in localized, adverse, direct, short-term, minor impacts to sea turtles in the borrow areas, which could be disturbed by the dredge. On-shore construction will take place during the fall and spring, when sea turtles are off shore. The proposed action would result in positive, indirect, long-term, moderate impacts to threatened and endangered species by maintaining the barrier headland system.	Adverse impacts would be the same as Alternative 1. Beneficial impacts would be less than Alternative 1, but offer less protection of supratidal habitat over time.	Impacts would be similar to those for Alternative 1. However, Alternative 3 would offer longer-term integrity of the restored headland.
Cultural and Historic Resources	No impact.	No impact. Dredging will not occur within a protective buffer zone around underwater cultural resources.	Same as Alternative 1	Same as Alternative 1

TABLE 7 (Continued)

COMPARISON OF ENVIRONMENTAL IMPACTS OF PREFERRED ACTION AND ALTERNATIVES

Resource	No Action	Alternative 1 (Preferred Alternative)	Alternative 2	Alternative 3
Land Use/Recreation	Fisheries-related activities would decline, as marsh-dependent fish and shellfish species relocate.	Construction would result in adverse, direct, short-term, minor impacts to land use, including minor, localized disruption of fishing. Long-term, direct, moderate beneficial impacts to recreation, including improved fisheries nursery habitat	Adverse impacts would be the same as for Alternative 1. Beneficial impacts would be less than Alternative 1, but for a shorter duration.	Positive impacts would be the same as for Alternative 1. Beneficial impacts would be the same as for Alternative 1, but for a longer duration.
Infrastructure	Infrastructure would become more vulnerable to storm damage.	Long-term, beneficial impacts would be expected for oil and gas leases and infrastructure, as pipelines would be better protected from problems associated with erosion. Short-term, substantial, adverse impacts are possible in the event that a pipeline is damaged during dredging	Similar to Alternative 1, but less protective over the long term.	Similar to Alternative 1, but more protective over the long term.
Socioeconomics	Loss of habitat that supports fisheries may lead to reduced income. Increased damage to the build environment from storms has an economic impact.	No adverse impacts to socioeconomics are expected. The preferred project will result in long-term, moderate, beneficial impacts to socioeconomics by improving fisheries, recreational opportunities, commercial fishing outfits, and pipelines.	No adverse impacts would occur. Positive impacts would be similar to Alternative 1, but of shorter duration.	No adverse impacts would occur. Positive impacts would be similar to Alternative 1, but of longer duration.

TABLE 8

SUMMARY OF AVOIDANCE, MINIMIZATION AND MITIGATION MEASURES OF PREFERRED ACTION

Resource	Potential Avoidance, Minimization and Mitigation Measures
Geology, Topography, and Physical Oceanographic Processes	• Construction of marshes would replace marsh covered during island construction. • Containment dikes would contain emplaced materials to allow for consolidation and stabilization. • Sand fencing and vegetative plantings of disturbed areas would stabilize soil, reduce resuspension of recently deposited sediment, and enhance sedimentation. • Borrow areas would be far enough off shore that no impacts to shorelines are anticipated.
Air Quality	• Best management practices, including sand fencing and revegetation, would minimize exhaust fumes and fugitive dust.
Surface Water and Water Column Resources	• Best management practices would prevent or minimize soil erosion. • Compliance with the Clean Water Act and other regulations would protect water resources.
Wetlands	• Best management practices would minimize disturbance of intact wetlands. • Compliance with the Clean Water Act, Section 404 and Section 301, would protect wetlands from unnecessary disturbance.
Vegetation	• Project-specific evaluations and coordination with appropriate federal, state, and local agencies would focus on effective vegetation management. • Best management practices would reduce scour, erosion, and sedimentation. • Habitat restoration would focus on replanting native species.
Aquatic Biota, Fisheries, and Essential Fish Habitat	• Dredging would be scheduled so as to avoid peak infaunal periods (spring and summer). • Undredged areas adjacent to borrow areas would provide source organisms for recolonization. • Best management practices would minimize turbidity in borrow areas. • Project-specific evaluations and consultation with appropriate federal, state, and local agencies would focus on protecting sensitive species. • Tidal features would be constructed in the marsh to increase habitat complexity for estuarine species. • Retention dikes would be gapped after construction to provide tidal connection.
Terrestrial Wildlife	• Project-specific evaluations and coordination with appropriate federal, state, and local agencies will focus on protecting sensitive wildlife species.
Threatened, Endangered, and Sensitive Species	• The project would be scheduled to minimize impacts on the piping plover. • Use of a cutterhead dredge would not likely impact sea turtles. • Coordination with the U.S. Fish and Wildlife Service, NOAA Protected Resources, and state agencies on state and federally listed species would focus on protecting threatened and endangered species.
Cultural and Historic Resources	• Magnetic and acoustic anomalies identified during the offshore cultural resources survey would be protected by buffers to protect sensitive submerged cultural resources in the borrow areas. • If artifacts of potential cultural or historical significance are unearthed, construction or excavation activities would be immediately halted and the Louisiana State Historic Preservation Office (SHPO) consulted. • Appropriate Section 106 Consultation with the Louisiana SHPO would be completed if necessary.
Land Use/Recreation	• Coordination with appropriate federal, state, and local agencies would focus on maintaining the quality of public recreation. • All staging areas used for construction materials or debris would be restored to pre-construction conditions (or better).
Infrastructure	• Construction would avoid pipelines and other oil and gas equipment, which have already been identified by magnetometer surveys and on-going coordination with the pipeline owners.
Socioeconomics	• Coordination with appropriate federal, state, and local agencies would ensure that public concerns are addressed.

4.1 IMPACT-PRODUCING FACTORS

Several features of offshore dredging generate expected environmental impacts, as a recent EA prepared by MMS for a large dredging project at Ship Shoal, Louisiana, described in detail (DOI MMS 2003). This section relies on and summarizes information from that report. Impacts from offshore dredging stem from (1) the dredge operating characteristics, (2) effluent discharge at sea, (3) total depth of cut expected within the borrow areas, and (4) emplacement of dredged material on the headland.

4.1.1 Dredge Operating Characteristics

Offshore dredging operations for beach nourishment projects generally involve hydraulic dredges. Along with other considerations (including practicality and costs), the distance from borrow site to beach determines the dredging and sand transport method. A 30-inch hydraulic cutter-suction dredge with pipeline would be used to transport material from the borrow areas to the project site.

Most modern high-capacity dredges are hydraulic — employing suction produced by high-speed centrifugal pumps to excavate sediment and dispose of it into a pipeline. Material dislodged from the ocean floor by the suction is suspended in water in the form of a fluidized mass (slurry) and then passed through the centrifugal pump and discharge pipeline to the nourishment or disposal site. Hydraulic dredges work at high production rates when the dredged materials are relatively soft and contain a high ratio of water to sediment.

A cutter-suction dredge pumps and excavates the slurry through a pipeline deployed on the seabed through which it is discharged onto the beach. The cutter-suction dredge is the most widely used in the industry. It can efficiently excavate all types of compacted sediments, such as dense sands, gravel, clay, and soft rock. It is equipped with a rotating cutter that surrounds the intake end of the suction pipe. The dredge uses a rotating cutter head, usually an open basket with hardened teeth or cutting edges. In standard practice, the dredge swings back and forth in an arc pivoted from a large post or spud attached to the stern. The cutter head cuts downward a short distance with each swing. The bite is much stronger on one swing than the other because the cutter head rotates in one direction only.

About 90 to 95 percent of excavated sand reaches the beach via the pipeline discharge. A significant amount of water that contains fine particulate materials thus may discharge at the end point. Treatment of the decanted solids normally is unnecessary for beach nourishment.

The cutter-suction dredge continuously excavates and pumps sand through a pipeline previously placed on the seabed from the borrow area to the beach. A pipeline with larger than 1.17 foot (0.36 m) diameter may be floated into position when sealed. The dredge is deployed on a five-anchor spread (referred to as a Christmas Tree). Operational uptime generally is between 50 percent and 70 percent of total time; downtime results from weather conditions (5 to 10 percent in summer) and need for repairs.

4.1.2 Effluent Discharge at Sea

When the dredge is operating, resuspended materials are localized in the vicinity of the excavation tool. Fine-grained overburden is removed and disposed of in nearby dump areas or sidecast.

4.1.3 Total Depths of Cut Expected within the Borrow Areas

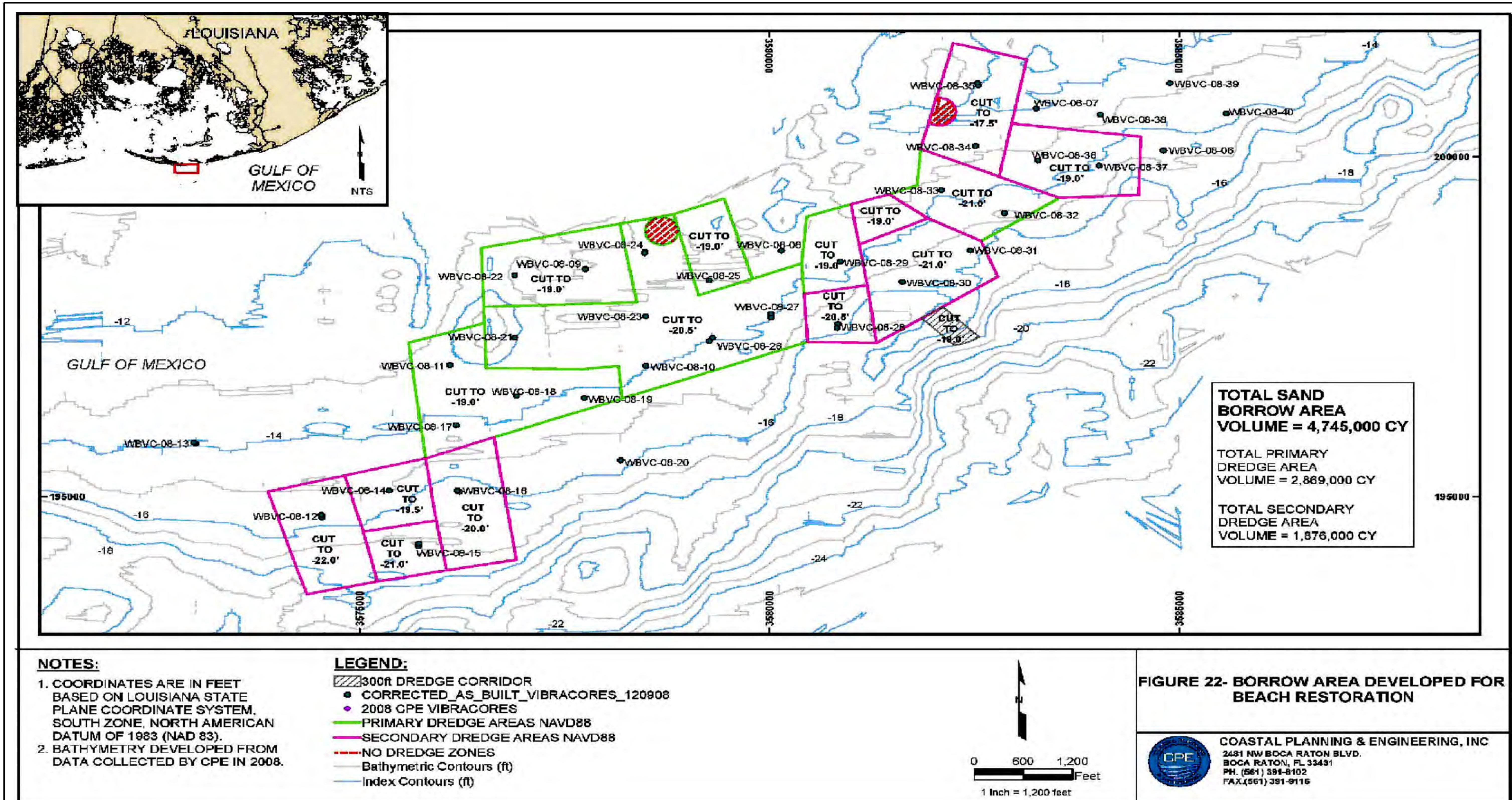
The beach fill borrow area has 15 cut elevations that range from -17.5 feet to -22.0 feet NAVD (Figure 7). The total dredgeable volume in this borrow area was calculated to be approximately 4.7 million cubic yards (Table 2). Alternative 1 requires 1,180,000 cubic yards of beach fill material. Alternative 3 involves the largest beach fill volume requirement (1,553,000 cubic yards).

Therefore, the beach fill borrow area has sufficient volume to construct any of the alternatives assuming a 2:1 cut to fill ratio. The proposed dredge plan divides the beach fill borrow area into primary and secondary dredge areas. The Primary Dredge Area consists of six cuts ranging from -19 to -21 feet NAVD. The primary borrow area contains approximately 2.9 million cubic yards. The secondary borrow area consists of nine cuts ranging from -17.5 feet to -22 feet NAVD. The total secondary volume is approximately 1.9 million cubic yards. Figure 7 shows the shape and cut depths of the beach fill borrow area.

The marsh borrow area has nine cut elevations that range from -41.0 feet to -50.0 feet NAVD (Figure 8). The proposed dredge plan divides the borrow area into primary and secondary dredge areas based on the shear strength of the material. The primary dredge area consists of five cuts ranging from -44 feet to -50 feet NAVD. These cuts include clay that was classified by field vane shear tests as very soft or soft. The secondary dredge area consists of four cuts ranging from -41 feet to -50 feet NAVD. These cuts include clay that was classified by field vane shear tests as very soft, soft, and medium soft. The primary and secondary dredge areas each contain approximately 2 million cubic yards (Figure 8). Assuming a cut to fill ratio of 2:1, the marsh borrow area contains sufficient sediment to construct Alternative 1, which involves the largest volumetric requirement of 1,903,000 cubic yards (Table 1).

4.1.4 Emplacement of Dredged Material

Beach fill would be delivered hydraulically to the project area via a submerged pipeline. The submerged pipeline would be transported to the site on pontoons in approximately 500-foot sections. Once they were in the vicinity of the project area, the various sections of pipeline would be connected by ball joints into lengths of up to 2,500 feet. Once sufficient lengths of submerged pipeline are joined, the pipeline would be floated into position and the 2,500-foot sections of the submerged pipeline would be joined. The connected pipeline would then be allowed to sink to the bottom. Floating pipeline would be attached to the submerged line at the borrow area while the end of the submerged line would be dragged ashore in the project area. Shore pipe would be added to the end of the discharge pipe as the beach fill progresses along shore. It is anticipated that the dredge contractor would use Belle Pass as a temporary storage area for the submerged line and connect the various sections within the shelter of the pass.

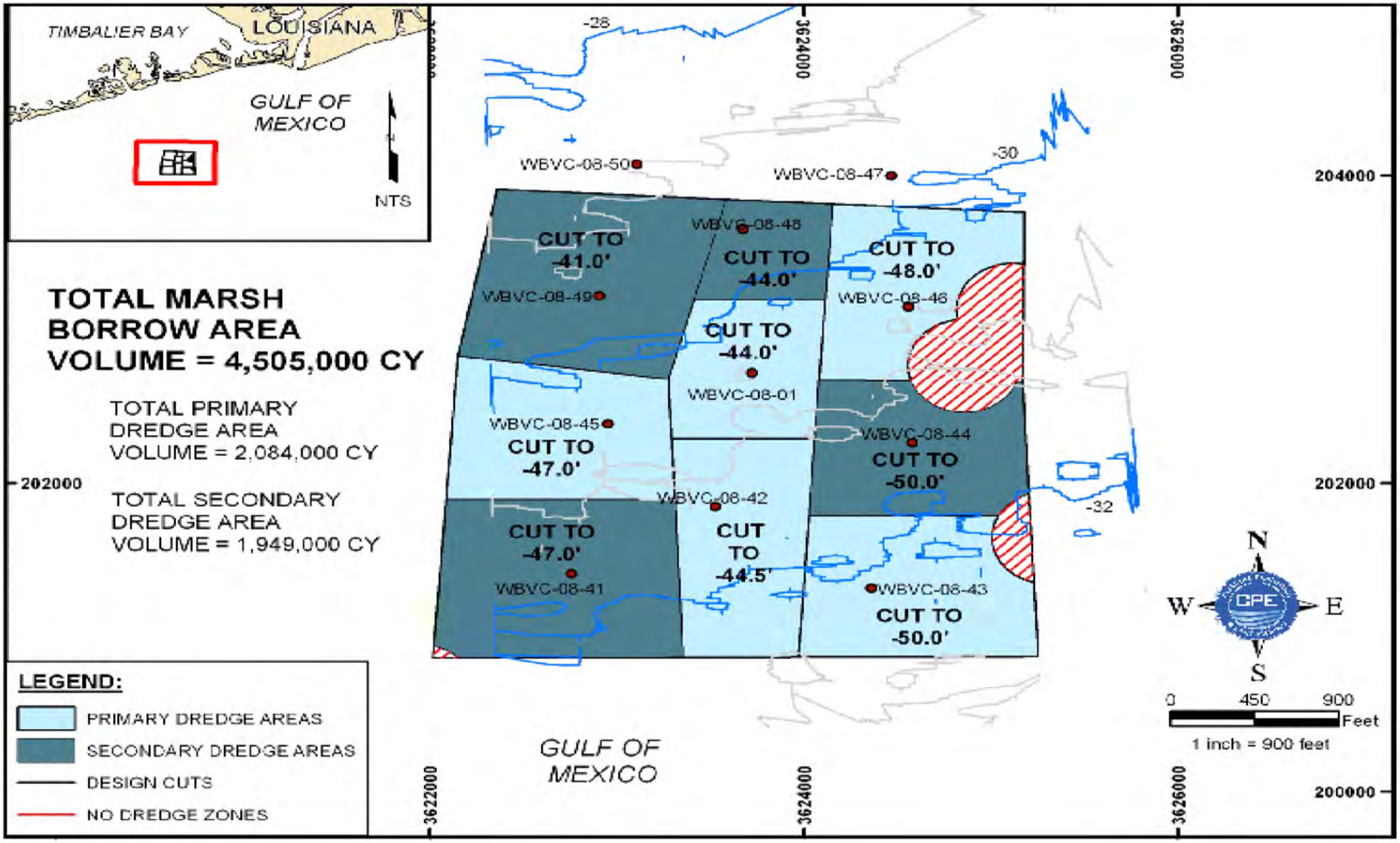


West Belle Pass Barrier Headland Restoration
Draft Environmental Assessment

Figure 7

Beach Fill Borrow Area Details

TETRA TECH EM INC.



West Belle Pass Barrier Headland Restoration
Draft Environmental Assessment

Figure 8
Marsh Fill Borrow Area Details

TETRA TECH EM INC.

X:\S\1278\400\21\03\Projects\mxd\Figure8.mxd

Training dikes would be constructed parallel to the shore to contain the discharge of beach fill material and minimize offshore losses. The sand would settle out while the water would drain to the gulf at the end of the dike. The dikes, which would be several hundred feet long, would be constructed of sand that had already been pumped to the beach. After a given beach section was filled to grade, the shore pipe would be extended by adding additional pipe onto the end. The dikes would be leveled and the beach graded to the required construction slope. Bulldozers would be used to grade the fill above mean low water. Below mean low water, fill would be distributed by gravity and water movement to the area delineated by the dikes.

The breach at the western end of the project area would be filled by directly pumping material from the borrow area into the breach. Additional measures to close the breach would not be required, such as stockpiling sand adjacent to the breach and then bulldozing it closed during low tide, placement of sheet pile, or dumping of rock. A similar breach was closed at the Chaland Headland without additional hard structures (CPE 2009).

After beach construction, the dredge would be relocated to the marsh borrow area; then, marsh fill would be pumped hydraulically to the project area. The beach would form the southern limit of fill while primary dikes would contain the northern side of the marsh fill. A flexible polyvinyl chloride pipe would be used to distribute marsh fill. Marsh buggies would be used to relocate the end of the discharge pipe as necessary to uniformly fill the marsh area. Internal training dikes may be constructed to assist with settlement of the material, if warranted.

4.2 PHYSICAL RESOURCES

This section describes potential impacts to geology, topography, and physical oceanographic processes; air quality; and surface water and water column resources for all alternatives, including no action and the preferred action.

4.2.1 Impacts on Geology, Topography, and Physical Oceanographic Processes

No Action

The West Belle Pass Barrier Headland has already been breached and is subject to severe erosion. Proposed geomorphology in the project area is characteristic of a retreating, sand-deficient system with low beach berms, little or no significant dunes, low elevation overwash, and back-barrier marsh areas. With no action, continued breaching of the island would occur. Without action, the remaining supratidal acreage will disappear by 2015 (CPE 2009). Under the no-action alternative, material from the borrow areas is likely to be used for other restoration projects in the area, as proposed in the LCA (USACE 2004).

Preferred Alternative

Under the preferred alternative, materials dredged from offshore borrow areas would stabilize the headland and create marsh habitat. Dune elevation in the proposed project area would increase to +6.0 feet NAVD, creating more upland habitat and better protect marshes from storm surge. Delft3D modeling predicts that the average shoreline recession rate would decrease to 16 feet per year on the headland (CPE2009).

Island construction would cover existing marsh and shallow open water habitat (CPE 2009). Marsh would be constructed at an elevation of +3.0 feet NAVD to account for eustatic sea-level rise, high marsh loss rate, high subsidence rate, and material desiccation and consolidation. In August 2008, marsh elevation in the proposed project area was about 0.8 foot NAVD**.** Extensive containment diking would be built because marsh would be constructed in currently exposed shallow open water. Diking also would ensure that bayside erosion of the constructed marsh would not occur. After sediment is consolidated, breaches would be placed in strategic places along the dike to return tidal influence to the marsh and thus increase its habitat value (CPE 2009).

The dredged material used in both island and marsh construction would consist of naturally occurring material deposited in the gulf over time by riverine processes. Dredged materials would be sorted according to grain size, with coarser sand used for island construction and finer sand used for marsh construction (CPE 2009). Examination of existing databases for known spills or contaminants in the area indicates there is a low potential for contamination of dredged material. No pipelines are located within the dredging footprint and there are no oil and gas wells within the dredging or construction area.. Sand fencing would protect and build dunes by capturing fine grains transported by the wind. Vegetative plantings would stabilize soil, reduce resuspension of recently deposited sediment, and encourage sedimentation. Planting would occur over 3 years to allow for soil salinities to moderate and created elevations to equilibrate. Dune acreage would be planted with bitter panicum (*Panicum amarum*), seaoats (*Uniola paniculata*), roseau (*Phragmites australis*), marshhay cordgrass, gulf cordgrass (*Spartina spartinae)*, and wax myrtle (*Myrica cerifera*). In the marsh, bare-root plugs of smooth cordgrass (cv. Vermilion) and tube-containers or pots of black mangrove would be planted.

A wave impact analysis using the Delft3D numerical model was conducted to evaluate potential modification of the wave climate caused by the borrow area excavation. This study indicated no significant impact to the nearshore wave climate or sediment transport patterns. Dredging the borrow areas is not expected to change the beach erosion patterns near the proposed project headland or anywhere along the Timbalier Barrier Island shoreline (CPE 2009). Noticeable changes to the wave patterns near the borrow areas during storms may occur after excavation. However, based on the large distances between the borrow areas and the shoreline, changes to the nearshore waves and sediment transport patterns would be negligible during storms and average conditions. Accordingly, sand mining in the borrow areas would not result in any noticeable changes to the long-term storm erosion patterns along the nearby shorelines. The model results for the 20-year storm event show infilling of the borrow area from the immediate surroundings but no bathymetric changes that would extend to the shoreline. Dredging the borrow areas as described in the preferred alternative will not affect adjacent shorelines.

In the short term, dredging would result in suspension of sediments and disturbance to natural sediment sorting and layering within the borrow area. Impacts to biological resources are discussed in Section 4.3. Water depth would increase in the area as sediments were removed. Over the long term, dredged materials removed from the borrow areas would be expected to rearrange by natural processes, and pre-dredging bathymetric contours would return to the dredged areas.

The long-term benefits of the preferred alternative include a reduction of erosion rates and greater structural integrity of the barrier headland at the 20-year mark compared with no action. This alternative meets the 20-year lifespan expected of CWPPRA projects; at the end of the 20 years, some headland and marsh are expected to remain.

Alternative 2

The beneficial impacts are the same as for Alternative 1, but breaching is more likely. Impacts of placing dredged materials onto existing marsh habit would be similar to Alternative 1, but the new marsh would be constructed at an elevation of +2.5 feet NAVD, 0.5 feet lower than Alternative 1. Borrow area impacts are the same as for Alternative 1.

Alternative 3

The beneficial impacts are the same as for Alternative 1. However, breaching is not expected within the 20-year project lifespan; therefore the long-term benefits are greater than for Alternative 1. Impacts of placing dredged materials onto existing marsh habit would be similar to Alternative 1. Borrow area impacts are the same as for Alternative 1.

4.2.2 Impacts on Climate and Weather

Neither the no-action alternative nor any of the construction alternatives would substantially affect the climate or weather. However, there is some suggestion that increases in marsh acreage can contribute to the overall carbon sink and mitigate the effects of atmospheric carbon on global warming, which may indirectly reduce the intensity of hurricanes in the Gulf of Mexico. Given the scale of this project, however, beneficial impacts to climate and weather are negligible.

4.2.3 Impacts on Air Quality

No Action

The no-action alternative would not result in any changes to existing air quality in the area.

Preferred Alternative

Moderate, non significant impacts to air quality from the preferred action would be associated with emissions from diesel engines that would power the dredging machinery, propulsion between the dredge site and mooring buoy, and pump-out operations. Additional emissions would result from tugs and barges used to place and relocate the mooring buoys. On the beach, impacts from diesel emissions would result from bulldozers, graders, and trucks. Emissions would occur over a period of about 4 months, with most emissions occurring at the dredge site and the mooring buoy just off the beach. The emissions would consist predominantly of nitrogen oxides, with smaller amounts of carbon monoxide, sulfur dioxide, particulate matter, and volatile organic compounds.

Prevailing winds would dissipate airborne pollutants and limit them to the proposed project's construction phase. In addition, newly placed, unconsolidated dredged material is subject to drying and blowing during high wind events, adding particulates to the air. Sand fencing would minimize the speed and range of blowing sand in the short term, and revegetation would hold sand in place over the long term. The impact to human health would be negligible because the proposed project area is removed from any residential area.

Other sources of air emissions in the proposed project area are mainly associated with the oil and gas industry, commercial vessel traffic, and commercial fishing. Emission amounts would vary depending on the amount of activity in these sectors. Overall, it is expected that emissions would decrease in the future as a result of more stringent control technologies applied to marine vessels, on-road vehicles, and off-road vehicles. Air quality in the area, therefore, is expected to be unchanged or improved.

Alternative 2

Impacts to air quality are not expected to differ substantially from those described for Alternative 1.

Alternative 3

Impacts to air quality are not expected to differ substantially from those described for Alternative 1.

4.2.4 Impacts on Water Resources

No Action

The no-action alternative would not directly affect local water quality to any great extent. However, the cumulative impact of loss of the barrier headland would be to allow increased exchange of gulf waters with Timbalier Bay. The increased salinity would lead to loss of brackish and intermediate marsh vegetation, rendering the mainland shoreline more vulnerable to storm surge.

Preferred Alternative

Impacts associated with the offshore dredging required for implementation of the preferred alternative would include: (1) increased turbidity in the water column at the dredge site (dredge plume) and at the construction location; (2) exhumation of buried trash and debris; and (3) discharges from the dredge vessel. Two phases of operation would affect water quality: the dredging phase, and the emplacement phase. For this reason the project will require a Section 404 permit under the Clean Water Act from the U.S. Army Corps of Engineers. No special permit conditions are anticipated.

During dredging, sand would be collected from the dredge site with a cutter head dredge. Silt or clay that may be present in the sandy substrate may become suspended in the water column near the dredge site. The suspended sediment would settle in a matter of hours to days (depending on current). If the disturbed sediments were anoxic, the biological oxygen demand in the water column would increase.

Turbidity and suspended particulate levels in the water column above the preferred borrow areas normally fluctuate as a result of seasonal riverine inputs and discharge rate. The increased turbidity is expected to affect water quality only in the immediate area of dredging (DOI MMS 2003).

During emplacement, sand slurry would be pumped onto the beach through a temporary pipeline, as described in Section 4.1.4. Coarse and fine-grained sand would settle out rapidly; water would separate from the slurry and drain off the beach into the surf zone or percolate into the sand. If silt- or clay-sized sediments are part of the slurry, the settling velocity of these suspended solids would control the amount of silt and clay that is emplaced on the beach or that remains in suspension to drain into the surf zone. Drilling mud discharged from offshore operations, exhumed contaminants, or trash and debris present in the dredged sand also could be deposited on the beach, although this is unlikely given the remote location and lack of production facilities within the borrow areas. The emplacement area for dredged sand covers many acres, but only an area of 5 to 10 acres is active at any one time. The sand slurry discharges and bulldozers create and grade a new beach and dune platform area. Though suspended particulate matter levels in the receiving water could increase temporarily, this increase would occur in a limited emplacement area and would minimally affect water quality (DOI MMS 2003).

Alternative 2

Impacts to surface water resources are not expected to differ substantially from those described for Alternative 1. The beach fill volume is identical to Alternative 1, and the marsh fill is slightly less (Table 1).

Alternative 3

Overall impacts to surface water resources are not expected to differ substantially from those described for Alternative 1. Short term impacts would be increased because the beach fill volume is about 50 percent greater than for Alternative 1, requiring a longer duration of dredging. The volume of marsh fill is not substantially different than for Alternative 1 (Table 1).

4.3 BIOLOGICAL ENVIRONMENT

Components of the biological environment evaluated in this section include vegetative communities, fisheries and aquatic resources, EFH, wildlife resources, and threatened and endangered species. Except where noted, all alternatives except the no-action alternative are expected to have similar impacts on the biological environment. The principal difference among the alternatives is the expected longevity of the barrier headland following restoration.

4.3.1 Impacts on Vegetative Communities

The analytic model is not able to distinguish differences in performance resulting from the increase in marsh elevation from 2.5 feet to 3.0 feet NAVD, nor can it predict breakwater performance. Analytic model results, shown in Table 10, indicate that the expected performance of Alternatives 1 and 2 are identical. However, the Delft3D model distinguishes among these features. The Delft3D model was run to look at project performance to identify and compare the added effectiveness of installing a terminal breakwater or increasing the marsh elevation to +3.0 feet NAVD. In target year (TY) 20, the Delft3D model predicts that the most habitat will remain under Alternative 3. However, Alternative 3 is cost-prohibitive. The Delft3D model predicts that Alternative 1 will yield more net acres and more AAHUs than Alternative 2. These results indicate that adding elevation to the marsh yields more benefits than adding a terminal structure.

No Action

With no action, continued erosion and overwash are expected to occur, resulting in losses to vegetative resources. All supratidal habitats are expected to be lost by 2015. Back-barrier marsh would continue to be impaired by subsidence, eustatic sea level rise, and erosion. With no action, it is anticipated that about 56 acres of intertidal habitat are expected to be lost in the next 20 years (Table 10).

Preferred Alternative

The preferred alternative would exert positive, moderate long-term impacts on vegetative communities of the barrier headland and back-bay marsh. Protecting marshes from excessive erosion and tidal scour would increase the overall health and stability of the headland because the accumulation of organic material is a primary factor influencing the vertical accretion of marshes.

Implementing the preferred alternative would unavoidably affect beach, marsh, and shallow open water areas and their associated vegetative communities. Traffic areas (paths for construction materials, dikes, and access canals) and construction areas would be impaired.

The preferred alternative would impair some acres of intertidal saline marsh by converting those acres to supratidal (dune, swale and berm) habitats. As evaluated under CWPPRA's Wetland Value Assessment, the preferred alternative is anticipated to result in the creation and restoration of about 46 acres of dune;

50 acres of swale, beach and berm; and 363 acres of intertidal saline marsh after initial project construction and post-construction consolidation and settlement, in TY 2, or the year 2012 (Table 9). The preferred alternative is also anticipated to result in a long-term, net benefit of about 305 acres of emergent saline marsh and barrier headland habitat (Table 10).

Alternative 2

Detailed habitat analysis was not performed for this alternative because it became apparent during the evaluation process that Alternative 2 was not a sustainable design. However, overall adverse and beneficial impacts would be similar to Alternative 1, except that the headland created in Alternative 2 is expected to have a shorter lifespan.

Alternative 3

The number of AAHUs expected to result from Alternative 3 is slightly higher than for Alternative 1 (Table 10), and the likelihood of breaching is less than for Alternative 1. Otherwise, the adverse and beneficial impacts on vegetative communities are expected to be similar to those for Alternative 1.

TABLE 9

PLANFORM PERFORMANCE PROJECTION FOR THE NO-ACTION AND PREFERRED ALTERNATIVES

Year (Target Year)	Dune (acres)		Supratidal (acres)		Intertidal (acres)		Total (acres)		
	No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative	Difference
2010 (TY0) (Pre-Construction)	0	0	12	12	122	122	134	134	0
2011 (TY1)	0	52	11	358	124	58	135	468	333
2012 (TY2)	0	46	8	50	126	363	134	459	325
2013 (TY3)	0	42	5	49	126	363	131	454	323
2014 (TY4)	0	39	2	54	127	356	129	449	320
2015 (TY5)	0	36	0	60	127	350	127	446	319
2020 (TY10)	0	0	0	117	79	305	79	422	343
2025 (TY15)	0	0	0	119	68	271	68	390	322
2030 (TY20)	0	0	0	121	60	244	60	365	305

Notes:

- Not applicable
TY Target year (number of years post-construction)

TABLE 10

SUMMARY OF WVA BENEFITS FOR NO-ACTION AND CONSTRUCTION ALTERNATIVES

Total Benefits in Average Annual Habitat Units (AAHU)				
Habitat	**No Action**	**Preferred Alternative**	**Alternative 2**	**Alternative 3**
Emergent Marsh	61	204	165	194
Open Water	226	-176	-86	-75
Emergent Saline Marsh (3.5EM + OW)/4.5	98	120	109	134
Barrier Headland	1	83	81	81
TOTAL NET AAHUs	**99**	**203**	**190**	**215**

Notes:
These values are based on the analytic model. See **Section 4.3.1** for description of Delft3D model results.

4.3.2 Impacts on Fisheries and Aquatic Resources

No Action

The quality of fish habitat is expected to continue in its decreasing trend as the island erodes and marsh and back-barrier habitats are lost to open water. Marsh vegetation would be lost as marine processes intrude and salinity levels increase. The function of the back-barrier marsh as nursery habitat for estuarine-dependent species would be further degraded.

Preferred Alternative

Under the preferred alternative, short-term, local, adverse impacts to fisheries resources would occur during the construction phase of the proposed project. The immediate effect of dredging is the removal of sediment along with the organisms living in the sediment. In addition to direct removal of organisms, impacts could include entrapment and likely death of slow-moving organisms such as crabs and benthic organisms such as polychaetes, during dredging in the borrow areas and canals; and smothering of benthic organisms and more sessile fish species in the deposition sites. Mobile aquatic animals would be expected to move away from the proposed project area during construction and return after construction is complete. Invertebrates and fish that do not move out of the area would likely be injured as suspended particulates clog gills. Short-term severe effects on pelagic fish eggs and larvae in the immediate area may occur. Dredging would change substrate topography, causing a temporary redistribution of organisms in the immediate vicinity.

Benthic organisms would likely recolonize borrow areas and dredged canals, but increased competition likely would ensue for more suitable water bottom habitat (DOI MMS 2003). Early-stage recruitment of defaunated sediments occurs rapidly in coastal systems (Grassle and Grassle 1974, McCall, 1977, Simon and Dauer 1977, Ruth and others 1994, all as cited in EPA 2003). Dredged sites would be rapidly colonized by opportunistic infauna (EPA 2003). Later stages of colonization would be more gradual and would depend on environmental conditions after cessation of dredging.

The impacts of dredging on benthic resources can be mitigated by considering temporal and spatial elements. For example, timing to avoid dredging during the peak infaunal recruitment periods (spring and summer months) would facilitate more rapid faunal recovery. In addition, preservation of non-dredged areas throughout an offshore borrow site can potentially contribute to more rapid community recovery after dredging, presumably through immigration of fauna from the non-dredged areas

(EPA 2003). It is important to note that the nature of the reestablished community would not necessarily be similar to the pre-dredged species composition. Although levels of diversity and abundance may be reached or exceeded within a relatively short time after dredging, the pertinent goal of recovery success is for infaunal assemblages to become equivalent to nearby non-dredged areas within a relatively brief interval after dredging (about 1 to 2 years). Because assemblages vary over time, efforts to ascertain recovery success can be confounded by natural variability, and so overall temporal changes in community parameters of nondredged areas must be taken into account (EPA 2003). Fish and invertebrates are expected to recover as turbidity returns to pre-construction levels.

Neither the total volume of sand to be dredged nor the estimated area of sea bottom disturbed is significant. Nearshore benthic communities in the preferred borrow areas 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 (DOI MMS 2003). Natural recurrent disturbances result in a benthic community characterized by early successional stages; a return to the typical community structure is expected to occur rapidly.

The quality and quantity of fish habitat would increase over the 20-year life of the preferred alternative. The surf zone would stabilize. Species that use intra-island habitats during some or all life stages would benefit from tidal channels created post-construction (Williams 1998). Further access to interior portions of the island for aquatic organisms would occur during high-water or storm events. Access to the Gulf would still be possible through existing passes.

Alternative 2

Short-term adverse and beneficial impacts would be similar to Alternative 1. However, the headland created in Alternative 2 is expected to be breached some time during the 20-year project lifespan, which would reduce the net benefit of the restoration to fisheries and aquatic resources.

Alternative 3

The adverse and beneficial impacts on fisheries and aquatic resources would be similar to Alternative 1, but would be more stable over the long term. Alternative 3 is considered less likely than Alternative 1 to breach within the 20 years after construction. In addition, an encrusting community of invertebrates may increase the value of the terminal groin as foraging habitat for fish and invertebrates.

4.3.3 Impacts on Essential Fish Habitat

No Action

The variety and quality of EFH associated with estuarine areas are expected to continue to decrease as the headland erodes and marsh and back barrier are converted to open-water habitat. Only open-water EFH, which is not in short supply, would increase.

Preferred Alternative

In the long term, the preferred alternatives would improve marine/estuarine-related EFH by re-establishing marsh and protecting marsh habitat from erosion. Headland 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 of Timbalier Bay and near-shore Gulf of Mexico ecosystems. Decreases in erosion rates and tidal scour also would protect estuarine mud bottoms and marsh ponds. Thus, the preferred alternatives would greatly benefit brown shrimp, white shrimp, and red drum. King mackerel, cobia, bonnethead, and lane snapper also likely would benefit since these species depend on various types of estuarine features during their life cycles and on prey species that rear in the marsh.

Short-term, unavoidable, adverse impacts to habitats supportive of various life stages of brown shrimp, white shrimp, red drum, and juvenile cobia, lane snapper, and bonnethead shark would occur during the construction phase of the proposed project as beach, dune, and marsh are filled or created. Approximately 64 acres of marsh behind the proposed project headland would be covered by fill (CPE 2009), and turbidity would increase. However, post-construction increases in the quality and quantity of the marsh would offset these impacts. Compared with pre-construction acreage, a net increase of 241 acres of intertidal habitat would be created by TY1 (2012). Turbidity would return to ambient conditions post-construction.

Short-term adverse minor impacts to EFH could result from dredging the preferred borrow areas. Turbidity of the water column would increase during dredging, affecting pelagic and shallow EFH of brown shrimp, white shrimp, red drum, king mackerel, cobia, bonnethead shark, and lane snapper. Turbidity would be expected to return to ambient conditions once dredging is complete (DOI MMS 2003). EFH for adult brown shrimp, adult white shrimp, adult red drum, and adult lane snapper include either sand or mud substrates located in marine waters; therefore, dredging of the borrow areas could negatively affect these species for a short time. In light of natural sedimentation rates, borrow areas are expected to fill to pre-dredging bathymetric contours. Other potential short-term impacts to EFH include movement of prey species away from the construction area, interruption of feeding or spawning by some species, and other effects on behavioral patterns. No significant effects on EFH are expected, however, because hundreds of thousands of acres of similar substrate are available to organisms outside of the small areas to be dredged.

Alternative 2

The impacts to EFH would not differ substantially from those associated with Alternative 1.

Alternative 3

Temporary impacts to EFH in the beach fill borrow area would be somewhat greater than for Alternative 1 because a greater volume of material would be dredged. Otherwise, the impacts to EFH would not differ substantially from those associated with Alternative 1.

4.3.4 Impacts on Wildlife Resources

No Action

With no action, the continued conversion of marsh to open water may increase the foraging area for the lesser scaup. Over time, the habitat would become less suitable for this species as aquatic vegetation declines. Since most ducks prefer freshwater marshes, the increase in salinity caused by fragmentation and the resulting increase in connectivity with the gulf would most likely deter mottled duck, gadwall, blue-winged teal, and green-winged teal from using the limited marsh area behind the proposed project headland.

Seabird colonies have been identified on barrier islands and headlands within the Barataria-Terrebonne system, although there are no known specific colonies in the proposed project headland. The loss of the

West Belle Pass Barrier Headland would further limit the options available to seabirds for locating colonies in the area.
Mammals, reptiles, and amphibians within the proposed project area would likely decline as a result of the loss of habitat if no action is taken. Loss of vegetation and conversion of the shoreline to marine conditions would limit suitable habitat for these wildlife resources in the proposed project area.

Preferred Alternative

During construction of the proposed alternatives, wildlife may vacate or avoid the proposed project area or suffer mortality if they do not vacate fill sites quickly enough. Those individuals that avoid the area during construction are expected to return once construction is complete. The most significant wildlife resource likely to be affected by covering the existing beach and marsh with fill is the seabird colonies. Proposed project modifications to avoid impacts to colonial nesting birds during the nesting season would be coordinated with USFWS. In the long term, nesting habitat for seabirds would be protected by decreasing the erosion rate of the proposed project headland.

The quantity and quality of habitat for wildlife would increase over the 20-year life of the proposed alternatives. Many bird species are migratory or permanent residents and depend on marsh and shore areas within and surrounding the proposed project area. Population numbers of bird species are expected to increase in response to implementation of the proposed alternatives. Mammals, reptiles, and amphibians would also most likely increase in the proposed project area as habitat improves in quantity and quality.

Alternative 2

The temporary disturbance of wildlife during construction would be similar to Alternative 1. However, the long-term benefits of increased supratidal habitat would be less than for Alternative 1, as this design is expected to breach within a few years. Avian wildlife may use the breakwater as a roosting site.

Alternative 3

Temporary adverse impacts to wildlife during construction would be similar to Alternative 1, but long-term benefits would be greater than for Alternative 1. This design is considered less likely to breach than Alternative 1. The restored dune is 100 feet wider than Alternative 1, creating more supratidal habitat for terrestrial wildlife. In addition, avian wildlife may roost on the terminal groin, and an encrusting community of invertebrates may increase the value of the groin as foraging habitat for birds at low tide.

4.3.5 Impacts on Marine Mammals

No Action

Without action, the existing headland would continue to retreat. Loss of the headland would increase the area of open water; however, open water is not a limiting resource for marine mammals in the northern Gulf of Mexico. Adverse impacts to the dolphin would result from loss of the headland and the associated wetlands because the dolphin's prey species depend on the wetland nursery habitat behind the headland.

Preferred Alternative

The bottlenose dolphin is likely to occur intermittently at the project site. This marine mammal is not expected to be adversely affected by the activities at the borrow areas or the restoration site. While dolphins may temporarily avoid the borrow area during dredging operations because of the noise and decreased visibility raised by suspended sediment, these responses are not expected to rise to the level of MMPA harassement. . The *Marine Mammal Stock Assessment Reports for the Northern Gulf of Mexico Bay, Sound, and Estuarine Stocks* of bottlenose dolphin (Waring and others 2009) documents dolphin mortality due to several types of human interference, including hopper dredging. Cutterhead dredges are not associated with dolphin takings, nor has coastal construction in Louisiana been reported to result in dolphin takings.

Alternative 2

Impacts to marine mammals resulting from Alternative 2 would be similar to the preferred alternative.

Alternative 3

Impacts to marine mammals resulting from Alternative 3 would be similar to the preferred alternative. Temporary disturbances of marine mammals in the beach fill borrow area would be of longer duration than for Alternative 1, but are still not considered significant.

4.3.6 Impacts on Threatened and Endangered Species

No Action

Without action, existing habitat would continue to be lost, reducing available resources for the brown pelican, piping plover, and other rare species. Critical habitat for the piping plover would continue to be lost if no action were taken to restore the headland. Because of the dynamic nature of barrier islands, piping plover critical habitat may continue to be lost or created with each passing storm event; however, it appears that little sediment is currently available in the system to create sand spits, mud flats, and wash-over passes, as evidenced by the lack of accreting areas on the Gulf shoreline and flats on the bayside of the island. Currently, about 18 acres of critical habitat are available in the project area, including unvegetated and sparsely vegetated intertidal and supratidal habitat on the beach face. By the time the project is due to be constructed (2011), the unvegetated acreage is expected to have been reduced to 11.4 acres (Table 11).

Preferred Alternative

In the long term, the preferred alternative would increase the longevity and enhance the quality and quantity of available habitat for protected species. The preferred alternative would result in more stable islands in an area that provides critical habitat for piping plover. It is reasonable to expect that, at some time during the 20-year life of the proposed project, overwintering piping plover would use the newly created island habitat in the proposed project sites. Brown pelican would also benefit from the increased acreage and stability of the restored proposed project areas. The increase in fisheries habitat associated with the preferred alternatives would improve foraging success for both of these species.

Construction of the preferred alternative would temporarily disturb most of the critical habitat for the piping plover on the West Belle Pass Barrier Headland. The exact acreage of suitable habitat varies because the barrier headland is in a constant state of flux. Over the life of the project, the project area will be affected by storm events, wave action, and long-shore transport, such that portions of the created dune would become less favorable as vegetation coverage increases. New piping plover habitat would develop as those natural processes rework the added sediment to create sand spits, mud flats, and wash-over passes.

TABLE 11

ACREAGE OF FORAGING AND ROOSTING HABITAT FOR PIPING PLOVER FOR THE NO-ACTION AND PREFERRED ALTERNATIVES

Year (Target Year)	Critical Habitat (Beach Face Intertidal, Supratidal, and Dune)					
	No Action			Preferred Alternative		
	Total Acres	Percent Vegetated	Total Unvegetated Acres	Total Acres	Percent Vegetated	Total Unvegetated Acres
2008	19	5	18.05	-	-	-
2010 (TY0) (Pre-Construction)	12	5	11.4	12	5	11.4
2011(TY1)	11	5	10.45	410	10	369
2015 (TY5)	0	0	0	96	50	48
2030 (TY20)	0	0	0	121	65	42.35

Notes:
- Not applicable
TY Target year (number of years post-construction)

During construction, it is anticipated that any piping plovers that may be in the area would be temporarily displaced to nearby suitable habitats, shown on Figure 6. Wintering piping plovers generally remain within a 2-mile area. Sufficient habitat would be available for them to disperse into the Caminada Headland, which is within 2 miles of the proposed project area. Although the proposed activities would temporarily displace plovers to adjacent habitats, the birds would not be permanently excluded from foraging and roosting in the project area.

Immediately post-construction, approximately 369 acres of sparsely vegetated intertidal beach and supratidal dune habitat would be available to piping plovers for roosting (Table 11). In addition, 365 acres of intertidal habitat on the back side of the headland would be created. The intertidal habitat would be available for foraging once benthic organisms recolonize such areas. Over the life of the project, the marsh area would become too densely vegetated to provide suitable roosting and foraging habitat; however, the beach habitat would remain and would be reworked by natural processes to create sand spits, mud flats, and wash-over passes. NOAA anticipates that 42 acres will remain unvegetated and suitable for piping plover, compared with zero acres under the no-action alternative, 20 years after the project is built. The proposed project will therefore have a net beneficial effect on designated piping plover critical habitat.

Human activity on the beach would include surveying, emplacement of dredged material on the beach, grading, installing sand fences, and planting vegetation. All of these activities have the potential to disturb foraging and roosting plovers at the site. Under the preferred alternative, emplacement of material on the beach is expected to occur over a period of about 3 months. Nearshore benthic organisms will be displaced or buried by the incoming sand. The plover will likely move laterally to less disturbed foraging grounds during emplacement. Grading the beach may take about a month, and installation of sand fencing and plants will take another month. After the grading and planting phases of the project, the benthic invertebrate community that supports the plover is expected to recover within 6 to 24 months.

While the shoreline is being graded, stabilized, and planted, emplacement of marsh-building material on the back of the headland will begin and will last about 40 days (Table 6). Although the marsh construction project may cause increased noise and activity in the general area, it is not expected to directly affect the foraging or roosting behavior of the piping plover.

The beneficial impacts of Alternative 1 will begin to accrue as soon as the beach fill is placed. Sediment losses will immediately decrease, and the headland will begin to stabilize. An additional 69 AAHU of barrier headland will be created, compared with the no action alternative (Table 10). The project will result in the barrier headland being sustained for at least another 20 years, which is of ultimate benefit to the piping plover.

Brown pelican would be subject to the same disturbances as piping plovers, but to a lesser degree. Pelicans do spend some time on the beach, but forage while flying over the water. Land-based activities are not expected to interfere with pelican foraging to any great extent. Like the plover, the pelican can easily relocate to adjacent headlands and islands during the duration of construction at West Belle Pass Barrier Headland.

Also during construction, contract personnel associated with the proposed project would be informed of the potential presence of sea turtles or manatees and the need to avoid contact. All construction personnel would be responsible for observing water-related activities for the presence of sea turtles and manatees. Manatees are not expected to occur in the work area; however, in the event that a manatee were sighted within 100 yards of the active work zone, special operating conditions would be implemented, including no operation of moving equipment within 50 feet of a manatee; all vessels would operate at no wake/idle speeds within 100 yards of the work zone; and siltation barriers, if used, should be re-secured and monitored. Special operating conditions would no longer be necessary once the manatee left the 100-yard buffer around the work zone on its own accord. In addition, manatee sightings would be reported to appropriate federal and state agencies.

Although the northern Gulf of Mexico is within the range of five species of sea turtles, the Kemps's ridley is the only one likely to occur in the project area. The Kemps's ridley may use the marshes and open waters between the Mississippi and Atchafalaya deltas during warm months. However, the project will be constructed during the fall and spring, when the Kemps's ridley moves to deeper offshore waters.

Consultation on the potential for adverse impacts to protected sea turtles managed by NMFS suggests that the preferred alternative would not likely adversely affect sea turtles. The type of hydraulic cutterhead pipeline dredge that will be used for this project has never been implicated in turtle takes. The dredge is noisy and slow-moving, giving the turtles ample time to move out of its path. NMFS has written several Biological Opinions determining that hydraulic cutterhead pipeline dredges are unlikely to adversely affect any of the listed species for which NOAA is responsible (NMFS 1991, 1995, 1997). Although dredging can result in habitat destruction, no critical habitat occurs in the proposed project area. Dredging may temporarily disrupt a small area of foraging habitat, but food sources are abundant in the immediate vicinity.

Based on the long-term benefits of the preferred alternatives and the conservation measures during construction, the preferred alternatives would not be expected to adversely affect the brown pelican, piping plover, sea turtles, manatee, or any other rare species. FWS has determined that the preferred alternative is not likely to adversely affect the piping plover or its critical habitat.

Alternative 2

The temporary disturbance of protected avifauna, particularly the piping plover, during construction would be similar to Alternative 1. However, the long-term benefits of increased supratidal habitat would be less than for Alternative 1, as this design has a shorter expected lifespan based on the lower marsh elevation.

Alternative 3

Temporary adverse impacts to protected birds, especially the piping plover, during construction would be similar to Alternative 1, although pumping durations would be slightly longer. Long-term benefits would be greater than for Alternative 1 because this design is considered less likely to breach than Alternative 1. The restored dune is 100 feet wider than Alternative 1, creating more supratidal habitat for the piping plover and other species.

4.4 CULTURAL RESOURCES

Cultural resources include those aspects of the human environment with historical or social value. Impacts to historic, prehistoric, and Native American resources, land use, infrastructure, socioeconomics, and noise are discussed below. Except where noted, the impacts from all of the construction alternatives are similar.

4.4.1 Impacts on Historic, Prehistoric, and Native American Resources

Terrestrial and offshore cultural resource investigations were conducted as described in Section 3.3. Potential effects resulting from the no-action and preferred alternative in onshore and offshore areas are evaluated in Sections 4.4.2 and 4.4.3.

4.4.2 Impacts on Terrestrial Cultural Resources

No Action

Under the no-action alternative, the barrier headland would continue to erode. This erosion would not result in any additional loss of historical cultural resources because no significant cultural resources have been identified on the headland. However, the loss of the headland itself is considered a loss of a current cultural resource, as it negatively affects current communities in the region.

Preferred Alternative

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. There are no known significant terrestrial cultural resources in the proposed project site (Weinstein 1994).

Alternative 2

No impacts to terrestrial cultural resources would result from Alternative 2.

Alternative 3

No impacts to terrestrial cultural resources would result from Alternative 3.

4.4.3 Impacts on Offshore Cultural Resources

No Action

The no-action alternative would not directly affect any offshore cultural resources. However, the sand resources identified in the proposed borrow area are in demand by other coastal restoration projects, as sand and useable sediment are in short supply in the area.

Preferred Alternative

In the proposed marsh borrow area, dredging around target cluster WBPA-5 could disturb important submerged cultural resources. To avoid this disturbance, a 300-foot-diameter buffer would be maintained around the target. In the proposed beach fill borrow area, a 300-foot-diameter buffer would be maintained around cluster WBPE-1, and a 300-foot-diameter buffer would be maintained around cluster WBPE-2. Establishment of buffer around identified targets is considered the best management practice for protecting submerged cultural resources during dredging operations. No adverse impacts would result from implementation of the preferred action.

Alternative 2

No adverse impacts would result from implementation of Alternative 2.

Alternative 3

No adverse impacts would result from implementation of Alternative 3.

4.4.4 Impacts on Land Use/Recreation

No Action

With no action, current trends would continue. Neither commercial nor recreational fisheries would be expected to change in the short term for the proposed project area. However, over time, the conversion of the proposed project area to an open marine habitat would change the nature of the recreational activities that it can support.

Preferred Alternative

Over the long term, the preferred action would have direct beneficial impacts to finfish, shellfish, and waterfowl habitats and would provide buffers during storms. Short-term reversible impacts on fishing would occur during construction. However, habitat suitable for fishing is common in the region, and the temporary loss of opportunity for fishing in the proposed project area is considered minimal.

Alternative 2

Impacts to land use and recreation would not differ substantially from implementation of Alternative 1. The design of Alternative 2 is somewhat more likely to breach, so the long-term improvement of recreational fishing would not be as great as for Alternative 1.

Alternative 3

Impacts to land use and recreation would not differ substantially from implementation of Alternative 1. The design of Alternative 3 is expected to be maintained for more than 20 years, providing longer-term stability of the marsh, which favors recreational fishing.

4.4.5 Impacts on Infrastructure

No Action

The no-action alternative would not immediately affect infrastructure in the area. The eventual disappearance of the barrier headland would allow increased wave energy and storm surge to affect the mainland, which could result in damage to roads, pipelines, and other components of the built environment over time.

Preferred Alternative

The preferred alternative would have long-term beneficial impacts on oil and gas infrastructure in the proposed project area. Pipelines within and north of the proposed project areas would be better protected, reducing the likelihood of exposure caused by erosion. Construction would avoid pipelines and other oil and gas infrastructure in the borrow areas. Dredging and other associated activities can affect pipelines if the dredge drag head crosses a buried pipeline. The MMS's regulation at Title 30 CFR Section 250.1003(a)(1) requires all pipelines under water depth less than 200 feet (61 meters) be buried to a depth of 3 feet (1 meter); all pipelines that border or cross the borrow areas are expected to be buried in sediment to a depth of 1 meter. Dredging can exhume a pipeline segment or damage a pipeline already exposed (for example, by storms).

The most serious accident scenario from the dredging operation would be a pipeline rupture.. This event would not be likely, but it warrants consideration because positions of pipelines have been known to shift as a result of strong wave activity and currents during storms or hurricanes. The borrow areas identified in the preferred alternative were surveyed extensively using magnetometers to identify locations of pipelines. Furthermore, construction specifications include requirements of a setback distance from all known pipelines and close coordination between the contractor and pipeline owners during construction. Magnetometer surveys have been completed during the design phase and will be required again just prior to construction in the event that pipelines have shifted. In addition, a sub-bottom profiler survey will be conducted by the state to identify the extent and depth of pipelines located between the borrow areas and project site.

The potential cultural resource targets identified by TAR show that a pipeline, a wreck, and three oil wells occur within the marsh borrow area. The dredge plan would delineate a 300-foot buffer around each of these targets. No wellheads or pipelines were identified during surveys of the beach fill borrow area.

Alternative 2

The adverse and beneficial impacts of implementing Alternative 2 are not expected to differ from those described for Alternative 1.

Alternative 3

The adverse and beneficial impacts of implementing Alternative 3 are not expected to differ from those described for Alternative 1.

4.4.6 Impacts on Socioeconomics

No Action

Under the no-action alternative, the back-barrier marsh would continue to fragment and ultimately would be lost to open water. Loss of shrimp habitat leads to loss of income in the region because marsh habitats provide essential nursery function to shrimp. Shrimp is the most valuable fishery in Lafourche, producing half of the pounds of marine fisheries landings and nearly 50 percent of the value as well, a total of nearly $12 million annually (Hemmerling and Colten 2003).

Collapse of the shrimp industry would directly affect the Houma people, the largest Native American tribe in Louisiana. (They are not a federally recognized tribe.) Current tribal rolls set the population at about 17,000 members, most of who live along Highway 1 in south Lafourche and in the area around Houma, on the western boundary of Lafourche Parish. The Houma have retained traditional language, attitudes, and practices at a time when many of their neighbors left fishing and trapping to work in the oilfields. Many of the Houma who live along Bayou Lafourche continue to make a living from shrimping and to supplement their subsistence by hunting, fishing, and gathering wild resources. Recent encroachment of salt water and loss of coastal marsh currently threaten to displace many Houma communities (Hemmerling and Colten 2003).

In addition to the native Houma, people of Southeast Asian descent are disproportionately affected by declines in shrimping and fishing. By 1990, more than 1 in every 20 Louisiana fishers and shrimpers had roots in Southeast Asia, even though this group made up less than half a percent of the state's workforce. Southeast Asians have progressively dominated the shrimping industry, running large, modern steel-hulled shrimp boats along the Gulf Coast (Hemmerling and Colten 2003).

Preferred Alternative

The preferred alternative would not be expected to adversely affect economic resources. Under the preferred alternative, marshes created in the proposed 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 are expected to enhance fisheries resources in the immediate area. Increased recreational and commercial fishing would, in turn, positively and indirectly support nearby businesses. Pipelines would be protected better, and economic activity in the area would continue at present levels or would increase. During construction, a small increase in employment of dredge operators, crew members, and other construction-related technicians would occur.

Alternative 2

Socioeconomic impacts of Alternative 2 would be similar to those for Alternative 1, but benefits would be shorter term. The long-term improvement of fisheries habitat would be less than for Alternative 1 because Alternative 2 is somewhat more likely to breach.

Alternative 3

Socioeconomic impacts would not differ substantially from implementation of Alternative 1. The economic benefits of fisheries habitat improvement may be greater because breaching is less likely for Alternative 3.

4.4.7 Impacts on Noise

No Action

The no-action alternative would not cause any change to the existing noise conditions in the proposed project area.

Preferred Alternative

Under the preferred alternative, short-term increases in noise associated with construction would occur. No long-term changes in ambient noise levels would result from this proposed project.

Alternative 2

Impacts are similar to Alternative 1.

Alternative 3

Impacts are similar to Alternative 1.

4.5 OTHER CONSIDERATIONS

Cumulative impacts, invasive species, interagency coordination, and regulatory compliance are discussed below.

4.5.1 Cumulative Impacts

Direct and indirect impacts of past, present, and reasonably foreseeable future events were considered in the analysis of the proposed project consequences. These impacts include historical and predicted future land loss rates for the area and other restoration projects in the vicinity. The preferred alternative would have temporary adverse impacts to some environmental resources but cumulative benefits to the environmental resources.

Though CWPPRA projects are nominated and implemented one at a time and must have individual merit, the cumulative value of all wetland restoration and protection projects in an area can far exceed the summed values of the individual projects. Cumulative effects of multiple restoration projects were mentioned in the PEIS for the CWPPRA program (LCWCRTF 1993) that is incorporated by reference; however, the analysis of the projects were not developed in enough detail to provide an adequate assessment for the purposes of this EA. The overall conclusion was that multiple restoration projects in the area would have cumulative beneficial effects with other efforts, but these effects were not classified as significant. For cumulative impacts analysis under the section of barrier shorelines, headlands and islands, the LCA PEIS (USACE 2004), which is incorporated by reference, concluded that there would be long-term significant beneficial direct impacts on barrier systems. Similar projects in the area, described below, would operate synergistically with the preferred alternative to provide moderate beneficial effects by increasing the sediment supply in the area, enhancing the structural integrity of the barrier island system, and reducing regional erosion rates, thereby improving overall environmental resources in the vicinity.

Information on other CWPPRA projects in the vicinity, including BA-38 and BA-35, is available at www.lacoast.gov. In addition to the Pelican Island, Chaland Headland, and Caminada Headland restoration projects undertaken by the CWPPRA agencies, other restoration projects in the immediate vicinity may affect the longshore sediment supply, hydrodynamics, and thus the erosion and migration of the proposed project headland, but the cumulative effect is expected to be moderately beneficial over time.

4.5.1.1 Caminada Headland and Shell Island Restoration

The Coastal Restoration Division of the OCPR and the New Orleans District of the USACE are jointly sponsoring restoration of the Caminada Headland and Shell Island through the LCA Ecosystem Restoration Study (USACE 2004). In a project similar to the West Belle Pass Barrier Headland Restoration described in this EA, sandy sediments from an offshore borrow area would be deposited on shore to nourish and recreate a marsh environment, to restore some of the chenier ridges, and to replenish the present shoreline (Figure 9). That project area covers about 10,345 acres (4,186.6 hectares) situated between Caminada Pass on the east and Belle Pass on the west, immediately east of the West Belle Pass Barrier Headland (CEI 2008). USACE has finalized the feasibility report for this project, and, if funds are appropriated, construction could begin as early as late 2011. Since the projects would not be using the borrow areas or have conflicting project footprints or schedules, no adverse cumulative impacts are expected as a result of constructing this project. The cumulative impacts are expected to be moderately beneficial in the near term, and, as discussed in Section 4.5.1, have long-term beneficial impacts if the LCA plan is fully implemented.

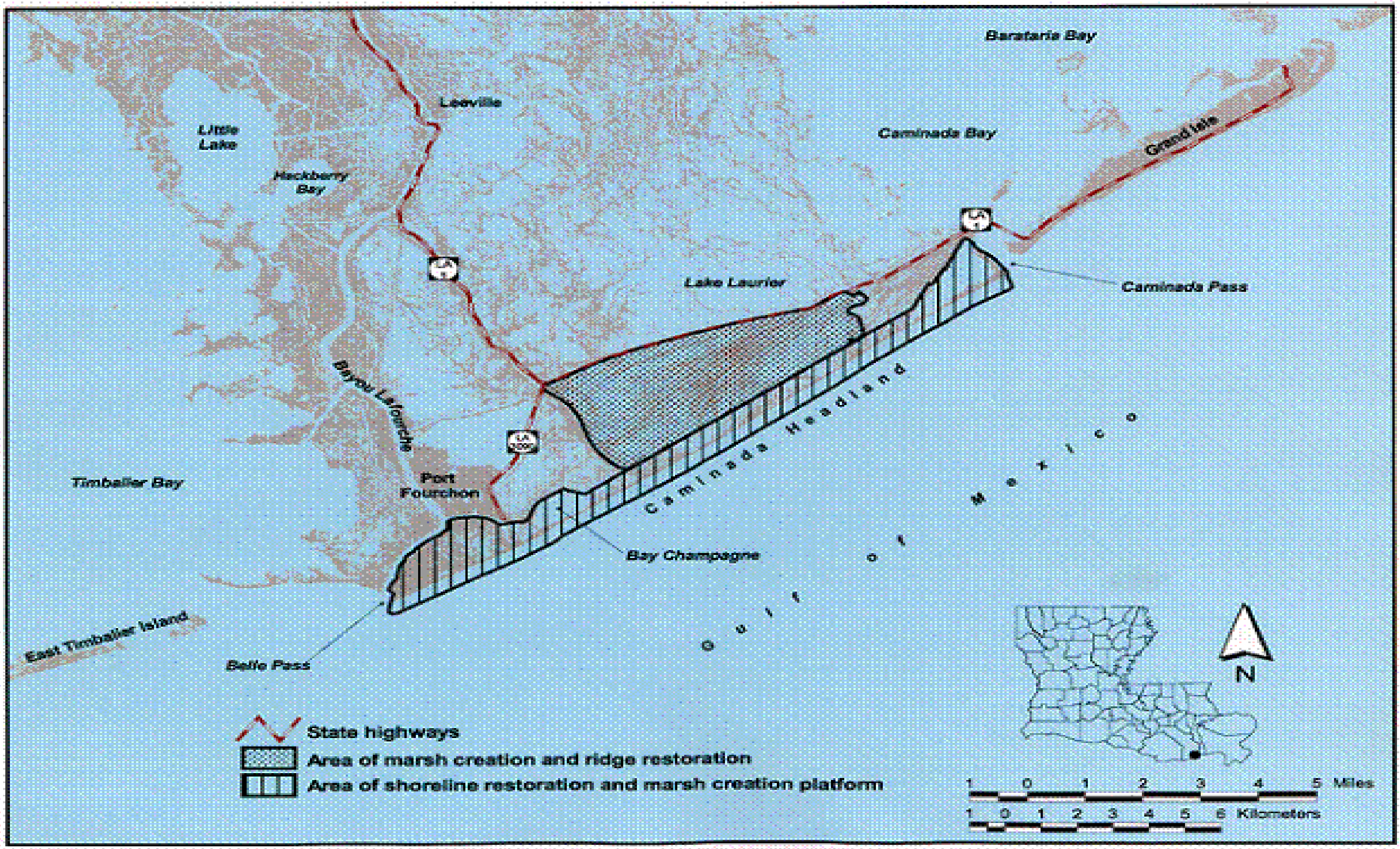
Figure 9 illustrates the Caminada Headland project area and depicts the proposed work elements. Note that the current survey area stopped at the shoreline and does not extend into the gulf as depicted in the figure. (Figure taken from CEI 2008, Figure 1-1)

4.5.1.2 Beneficial Disposal of Dredged Material from Belle Pass

USACE is responsible for maintaining navigable depths in Belle Pass. About 1.5 million cubic yards of sediment has been placed on the eastern portion of the West Belle Pass Barrier Headland (west of Belle Pass) since 1998, creating about 184 acres of marsh. Additional material has been deposited on the east side of Belle Pass, along the Caminada Headland.

Shoreline change from 1996 to 2008 was measured at 48 feet per year. Based on modeling, it is estimated that the shoreline would have retreated an additional 5 feet per year if the beneficial disposal had not been placed on the headland. In addition to slowing the rate of shoreline retreat, the disposal has been credited with helping to keep intact the eastern half of the West Belle Pass Barrier Headland. The western half of the West Belle Pass Barrier Headland does not receive any dredge disposal and has generally low elevation and extensive overwash features.

Although a small amount of sediment (about 5,000 cubic yards per year) from the face of the West Belle Pass Barrier Headland is lost to Belle Pass, and thus gets repeatedly dredged and disposed of, a substantial amount of dredged material is added to the headland system, increasing the longevity and the stability of the headland. USACE protocols are increasingly focused on the beneficial use of dredged materials, particularly in areas where sediment is known to be a limiting resource. It is expected that USACE will continue its current practice of disposing of material dredged from Belle Pass onto the project area shoreline. As addressed in the previous section, the cumulative impacts are expected to be moderately beneficial in the near term and have long-term beneficial impacts if the LCA plan is fully implemented.



West Belle Pass Barrier Headland Restoration
Draft Environmental Assessment

Figure 9
The Caminada Headland Project Area

TETRA TECH EM INC.

X:\S\1278\400\21\03\Projects\mxd\Figure9.mxd

4.5.1.3 Summary of Cumulative Impacts

Cumulative impacts associated with the dredging operation are expected to be minimal due to no other projects being funded in this area that are likely to use the borrow areas identified for this project. As well, borrow areas are not expected to have any interacting cumulative effects on shoreline wave conditions because the borrow areas are some distance from the shore. Cumulative impacts as a result of overburden disposal would be minimal, temporary, and localized to the dredging and disposal sites.

The cumulative impact of the projects on air quality and water quality would not differ substantially from the effects of the preferred alternative alone. Air quality would be temporarily and locally affected during construction of each of the projects. Short-term, localized increases in turbidity would result from all of the projects, but these impacts are considered transient because projects would not co-occur in space or time. The cumulative beneficial impact to water quality would be a long-term decline in saltwater intrusion behind the barrier islands.

Biological cumulative impacts of the CWPPRA and other restoration projects would be similar to the direct and indirect impacts of the preferred alternative; however, there are currently no other funded restoration projects moving to construction within the vicinity of the proposed project. The proposed alternative would work with existing projects to enhance habitat for fish, wildlife, vegetation, and EFH. Cumulatively, the preferred alternative would increase benefits to the area by decreasing land loss rates. No cumulative adverse impacts are anticipated.

Cultural cumulative impacts would result from the preferred actions' synergy with nearby restoration projects on the Caminada Headland. These projects would cumulatively decrease losses of habitat, thereby maintaining more of the economy and storm protection than with no action. The preferred alternative is similar to previous actions in the area that have had no adverse cultural impacts. No adverse cumulative impacts would be expected.

Through the creation of dune, beach, and initial marsh creation, a net increase in piping plover habitat is expected to result from implementation of these projects. Minor adverse impacts to critical piping plover habitat may result from the conversion of habitat to dune or marsh. Without implementation of these projects, however, this piping plover habitat is expected to completely disappear during the proposed project life as a result of erosion. In the long term, the critical habitat would benefit by increases in the longevity, diversity, and acreage of piping plover critical habitat.

4.5.2 Invasive Species

Executive Order 13112 requires federal agencies to use authorities to prevent introduction of invasive species, control (in cost effective and environmentally sound manners), and provide for restoration of native species and habitats in ecosystems that have been invaded. Invasive species have been described in sections of the biological resources and their environmental consequences. As stated in Section 2.0, the purpose of the preferred alternative is to restore the native habitat. The proposed project would not introduce invasive species.

4.5.3 Coordination

Coordination in development of the proposed action and its alternatives and the selection of the preferred alternative has been maintained with each CWPPRA Task Force agency. The project was vetted publicly through the CWPPRA process, which includes opportunity for the public and CWPPRA agencies to comment on the proposed project. The public was invited to participate in the Technical Committee meeting in January 2007, as well as in the CWPPRA Task Force meeting in February 2007. A draft EA was provided to those listed in Section 7.0 in August 2009. Comments received from reviewers are provided in Appendix A. The preferred alternative is not expected to cause adverse environmental impacts that would require compensatory mitigation. Additionally, a notice was published in the Times Picayune (New Orleans, LA) on March 26, 2010 referencing the availability of the draft final Environmental Assessment through an internet site, as well as a contact name and number if any interested parties wished to receive a paper copy for review. No requests were made nor comments received from the public through this process.

4.5.4 Compliance with Laws and Regulations

This section presents a review of the potentially applicable laws and regulations that govern this proposed restoration project. Many federal, state, and local laws and regulations are considered during development of the proposed restoration project, as well as several regulatory requirements that are typically evaluated during the permitting process. A brief review of potentially applicable laws and regulations that may pertain to this proposed project is presented below. The project manager will ensure that there is coordination among these programs where possible and that project implementation and monitoring are in compliance with all applicable laws and regulations. Informal consultations received from the cognizant agencies are provided in Appendix A.

National Environmental Policy Act of 1969: NEPA was enacted in 1969 to establish a national policy for the protection of the environment. The CEQ was established to advise the President and to carry out certain other responsibilities relating to implementation of NEPA by federal agencies. Pursuant to Presidential Executive Order, federal agencies are obligated to comply with NEPA regulations adopted by the CEQ (40 CFR Parts 1500-1508). These regulations outline the responsibilities of federal agencies under NEPA and provide specific procedures for preparing environmental documentation to comply with NEPA. Completion of this document, including multiagency review and concurrence, will be considered compliance with this Act.

Clean Water Act (CWA): The CWA is the principal law governing pollution control and water quality of the nation's waterways. It requires the establishment of guidelines and standards to control the direct or indirect discharge of pollutants to waters of the United States. Discharges of material into navigable waters are regulated under Sections 401 and 404 of the CWA. The USACE has the primary responsibility for administering the Section 404 permit program. Under Section 401 of the CWA, projects that involve discharge or fill to wetlands or navigable waters must obtain certification of compliance with state water quality standards. The local government will be the holder of this permit, which has been submitted to the Louisiana Department of Natural Resources and the U.S. Army Corps of Engineers (USACE) for consideration. Execution of the permit under the CWA will be considered compliance with this Act. Furthermore, a water quality certificate will be applied for through the Louisiana Department of Environmental Quality to comply with this Act.

Rivers and Harbors Act of 1899: This act regulates development and use of the nation's navigable waterways. Section 10 of the act prohibits unauthorized obstruction or alteration of navigable waters and vests USACE with authority to regulate discharges of fill and other materials into such waters. Actions that require Section 404 CWA permits are also likely to require permits under Section 10 of this act. A single permit usually serves for both purposes so this proposed project can potentially ensure compliance through this mechanism. The Section 404 permit under the CWA also includes a permit under this Act. Upon completion by the USACE of the submitted permit for this project, the project will be in compliance with both Acts.

Coastal Zone Management Act: The Coastal Zone Management Act (CZMA) provides for protection of resources found in the coastal zone, proactive land management practices, and preservation of unique coastal resources. Included in the CZMA is the requirement that all federal actions within the coastal zone of Louisiana must be consistent with the federally approved State of Louisiana Coastal Resource Management Plan. The joint State-USACE permit that has been submitted for this project includes a Consistency Determination from the state. Upon receipt of this determination, the project will be in compliance with this Act.

Executive Order 11990, Protection of Wetlands: The intent of Executive Order 11990, Protection of Wetlands, is to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support for new construction in wetlands whenever there is a practicable alternative.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs that the programs of federal agencies identify and address disproportionately high and adverse effects on human health and the environment of minority or low-income populations.

The Endangered Species Act of 1973 (ESA): The ESA directs all federal agencies to conserve endangered and threatened species and their habitats and encourages such agencies to utilize their authorities to further these purposes. Under the Act, NMFS and USFWS publish lists of endangered and threatened species. Section 7 of the act requires that federal agencies consult with these agencies to minimize the effects of federal actions on endangered and threatened species. A Section 7 consultation was completed with the USFWS on December 1, 2009, that concurred with the determination of not likely to impact listed species, including piping plover. Additionally, an informal consultation Section 7 with NMFS was completed on May 27, 2010 that concurred that the proposed action was not likely to adversely affect sea turtles.

Fish and Wildlife Coordination Act: The Fish and Wildlife Coordination Act requires agencies to consult with the USFWS and appropriate state agencies, prior to modification of any stream or other body of water, to ensure conservation of wildlife resources.

Archeological and Historic Preservation Act of 1974: The Archeological and Historic Preservation Act of 1974 states that, if an activity may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archeological data, the responsible agency is authorized to undertake data recovery and preservation activities, in accordance with implementing procedures promulgated by the Secretary of the Interior.

National Historic Preservation Act of 1966: The National Historic Preservation Act of 1966, as amended in 1992, requires that responsible agencies taking action that affects any property with historic, architectural, archeological, or cultural value that is listed on or eligible for listing on the NRHP comply with the procedures for consultation and comment issued by the Advisory Council on Historic Preservation. The responsible agency also must identify properties affected by the action that are potentially eligible for listing on the NRHP, usually through consultation with the state historic preservation officer. A Section 106 consultation was completed on August 7, 2009 with the State Historic Preservation Office.

Information Quality Guidelines issued Pursuant to Public Law 106-554: Information disseminated by federal agencies to the public after October 1, 2002, is subject to information quality guidelines developed by each agency pursuant to Section 515 of Public Law 106-554 that are intended to ensure and maximize the quality of such information (the objectivity, utility, and integrity of such information). The information collected herein has undergone Section 515 pre-dissemination review and complies with applicable guidelines.

Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act): In 1996, the act was reauthorized and changed by amendments to require that fisheries be managed at maximum sustainable levels and that new approaches be taken in habitat conservation. EFH is defined broadly to include "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (62 Fed. Reg. 66551, § 600.10 Definitions). The act requires consultation for all federal agency actions that may adversely affect EFH. Under Section 305(b)(4) of the act, NMFS is required to provide advisory EFH conservation and enhancement recommendations to federal and state agencies for actions that adversely affect EFH. Where federal agency actions are subject to ESA Section 7 consultations, such consultations may be combined to accommodate the substantive requirements of both ESA and the Magnuson-Stevens Act. An EFH consultation for this project was completed with the NOAA National Marine Fisheries Service on September 16, 2009.

5.0 CONCLUSIONS

The natural processes of subsidence, habitat switching, and erosion of wetlands have been exacerbated by widespread human alterations of sediment delivery and other processes, resulting in marked degradation of the Louisiana coastal area. Without intervention to retard or reverse the loss of barrier headlands and back-barrier marshes, Louisiana's healthy and highly productive coastal ecosystem cannot be maintained.

This EA finds that the West Bells Pass Barrier Headland Restoration would have long-term beneficial impacts on the coastal resources of south Louisiana and would not result in any significant long-term adverse environmental impacts. Construction-related adverse impacts are considered minor and not significant because they are temporary or reversible. Positive impacts would be moderate. This conclusion is based on a comprehensive review of relevant literature, site-specific data, quantitative modeling, and project-specific engineering reports related to biological, physical, and cultural resources, as well as on the cumulative experience gained through many similar coastal restoration projects in south Louisiana over the past decade. Construction of the preferred alternative would increase the structural integrity of the barrier headland and create supratidal and intertidal habitat on both sides of the headland, within a budget considered reasonable within the CWPPRA program. The increase of fisheries habitat is expected to have long-term beneficial impacts on the local economy and culture as it relates to recreational and commercial fishing. In addition, the preferred alternative would result in increased protection for infrastructure in the area to be restored.

6.0 PREPARERS

This EA was prepared by Tetra Tech under contract to the Central Administrative Support Center of NOAA. It was written by June Mire, Ph.D., under the guidance of Cheryl Brodnax and John Foret, Ph.D. of NMFS.

7.0 DISTRIBUTION LIST

This EA was distributed for comment to agencies of the CWPPRA Task Force and resource agencies as listed below. A 30-day comment period was provided. Responses received are in Appendix A. A final EA will be made available to the public at www.lacoast.gov along with other public records for the West Belle Pass Barrier Headland Restoration Project (TE-52).

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8.0 LITERATURE CITED

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Appendix A
Comments on Draft Environmental Assessment and Informal Consultations

United States Department of the Interior

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

September 22, 2009

Ms. Cheryl Brodnax
NOAA
LSU Sea Grant Building, Room 124C
Barton Rouge, LA 70803

Dear Ms. Brodnax:

The U.S. Fish and Wildlife Service (Service) has reviewed the National Marine Fisheries Service's (NMFS) draft Environmental Assessment (EA) for the West Belle Pass Barrier Headland Restoration Project (TE-52) located in Lafourche Parish, Louisiana. The preferred alternative plan consists of constructing a 36-acre, 169 foot by 9,200 linear foot dune 6.0 feet (NAVD 88) high with 1.18 M cubic yards of fill material, and restoring approximately 310 acres of saline marsh with 1.9 M cubic yards of material placed in an 1,880 foot-wide by 9,200 foot long area north of the dune. A total of 346 acres of dune and saline marsh will be restored immediately after construction. The Service provides the following comments in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), and the National Environmental Policy Act (83 Stat. 852, as amended; 42 U.S.C. 4321-4347).

General Comments

The EA is well written, comprehensive, and generally accurate in its assessment of impacts to fish and wildlife resources. Specific comments on the EA and information regarding federally listed threatened and endangered species are provided below.

Specific Comments

Page ES-2, First Paragraph – The preferred alternative should be clearly described in this paragraph. Only partial information concerning the preferred alternative's features is presented in this and the following paragraphs. Table 1 (page 11) shows more information concerning the preferred alternative features than any preceding narrative.

Page 5, Paragraph 3, Land Sentence – A borrow area located 9 miles west of the project site will increase dredging costs over that of a borrow area located closer to the project site. We assume that closer borrow sites were investigated. The reason this dune borrow site was selected over one closer should be provided.

Page 8, Figure 2 – The Service agrees that using fill from inside the marsh creation area is a better design than constructing the borrow area outside of the marsh fill area.

Page 11, Table 1 – The table should also show net dune and marsh acres restored in addition to Average Annual Habitat Unit (AAHU) benefits.

Page 18, Last Paragraph, Essential Fish Habitat – The EFH sections and table are well prepared.

Page 27, First Paragraph – We recommend that the first sentence of this paragraph be revised to state that although brown pelicans may nest on barrier islands in the vicinity of the project area, there are no known nesting colonies within 2,000 feet of the project area. We also recommend that the last sentence be revised to state that brown pelicans use the current project area for foraging and roosting only.

Page 27, Second Paragraph – We recommend that this paragraph be revised to state that bald eagles generally utilize bald cypress trees but will nest in mature trees of other species. We also recommend that the last sentence be revised to state that there are no known bald eagle nesting locations within or in the vicinity of the project area due to lack of suitable nesting habitat.

Page 32, Paragraph 3 Bullets – The items listed, except for wetland benefits and costs, are considered subjectively by CWPPRA agencies, but they are no longer included in a formal Prioritization Criteria analysis.

Page 32, Paragraph 4, Last Sentence – The "WVA Team" described consists of the combined Environmental and Engineering Work Groups.

Page 34, Table 6, Net Acres – AAHU values are shown below the column heading, "net acres benefitted". The heading should be revised to state, "Net AAHU's benefitted". Another column should be added that lists net acres benefitted.

Page 38, Table 7, Threatened, Endangered, and Sensitive Species – We recommend that the rationale for impacts to the piping plover and its designated critical habitat include the following statement: "Construction of the proposed project would temporarily affect piping plover critical habitat by depositing new material in intertidal and supratidal areas, which would render those areas unsuitable for foraging until benthic prey species re-colonize the project area."

Page 53, Paragraph 3, Sentence 2 – The sentence implies that "tidal features" would be constructed after construction, yet there is no description of those features. We would recommend construction of limited fisheries access tidal creeks post construction.

Page 62, Paragraph 6, Sentence 2 – The sentence stating that 1.5 million cubic yards of dredged material has been placed west of Belle Pass seems to contradict the last sentence of Paragraph 7 that states, "The western half of the headland does not receive any dredge disposal, . . .".

Endangered Species Comments

As you know, the Service and NMFS share Section 7 ESA consultation responsibilities for federally listed sea turtles and the threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*). When sea turtles leave the aquatic environment and come onshore to nest, the Service is responsible for consultation. Based upon our records and the information provided in the EA, there are no known sea turtle nesting sites within the project area; therefore, no further consultation with the Service for listed sea turtles is necessary. Based upon the critical habitat designation for Gulf sturgeon, the NMFS is responsible for its own intra-agency consultation for that species; thus, no further consultation with the Service is necessary for the Gulf sturgeon.

According to the EA and our species records, the endangered West Indian manatee (*Trichechus manatus*) rarely occurs along the Louisiana Gulf coast during summer months. In addition, as standard operating procedures, all of NMFS' contractor personnel would follow the standard manatee sighting and avoidance protocol (as described on page 57 of the EA) to further reduce the likelihood of affecting that species. Based upon that information, the Service concurs with the NMFS's determination that the proposed project is not likely to adversely affect the West Indian manatee.

Based on our records, the proposed project would not be located within 2,000 feet of any known nesting colonies of endangered brown pelicans (*Pelecanus occidentalis*). According to the EA, any pelicans foraging and/or roosting in the area would be temporarily displaced to nearby suitable habitat during project construction, but they would benefit from the newly created foraging and roosting habitat throughout the life of the project. Based upon that information, the Service also concurs with the NMFS' determination that the proposed project is not likely to adversely affect the brown pelican.

The EA also provides a discussion of potential project effects to the threatened piping plover (*Charadrius melodus*) on pages 56 and 57 of the document. That section indicates that approximately 75 acres of suitable plover habitat currently exist within the project area (based upon 2008 aerial photography). That section also indicates that human activities on the beach during construction of the dune and beach portions of the project would temporarily (approximately 5 months) displace piping plovers to nearby suitable habitat areas and placement of sand fill would smother benthic prey communities within that portion of the project area. The NMFS anticipates that benthic prey communities on the Gulf side of the project area would naturally recover while project work on the bay side of the project area would continue. Based upon their calculations, the NMFS expects that piping plovers would be able to resume foraging and roosting within that portion of the project area once the newly created dune area is planted and sand fencing is installed. Because those effects would be temporary, insignificant, and discountable, the Service concurs with the NMFS' determination that the proposed project is not likely to adversely affect the piping plover.

The EA does not, however, provide an adequate discussion of project effects to designated critical habitat for the piping plover. Although the EA states that approximately 75 acres of suitable plover habitat currently exist within the project area and that an additional 69 AAHU of barrier headland would be created, it does not provide an analysis of project effects to the primary constituent elements of existing critical habitat and whether the proposed project is, or is not, likely to adversely affect those elements. Tables 9 and 10 discuss total project benefits in terms of acres and AAHUs, respectively; however, the Service is unable to use those numbers to determine acres of impacts and/or benefits to critical habitat because the supratidal and intertidal acreages also include marsh (which is not a primary constituent element of piping plover critical habitat). The Service, therefore, recommends that the NMFS contact this office for further consultation regarding their analysis of potential project effects to piping plover critical habitat.

Summary Comments

The Service concurs with the EA that the preferred plan will have benefits to coastal wetlands and estuarine fish and wildlife resources by reducing shoreline erosion along the West Belle Pass Gulf shoreline and restoring eroded saline marshes. We strongly support implementation of the preferred plan as indicated in the draft EA, especially one in which tidal creeks are implemented post construction for greater fisheries access to the created marsh platform north of the restored dune.

Thank you for the opportunity to provide comments on the above-referenced EA. If your staff has any questions regarding our comments, please have them contact Mr. Darryl Clark (337/291-3111). For specific questions regarding federally listed species and/or Section 7 ESA consultation, please contact Ms. Brigette Firmin (337/291-3108) of this office.

Sincerely,

for James F. Boggs
Supervisor
Louisiana Field Office

cc: Corps of Engineers, New Orleans, LA
NMFS, Baton Rouge, LA
EPA, Dallas, TX
NRCS, Alexandria, LA
LA Office of Coastal Protection and Restoration, Baton Rouge, LA
LA Department of Wildlife and Fisheries, Baton Rouge, LA
LA Office of Coastal Protection and Restoration, Baton Rouge, LA
LA Department of Natural Resources (CMD), Baton Rouge, LA

Coastal Protection and Restoration Authority of Louisiana

State of Louisiana

Bobby Jindal
Governor

September 14, 2009

To: Cheryl Brodnax, Project Manager

From: David Lindquist, Coastal Resources Scientist III

RE: West Belle Pass Barrier Headland Restoration Environmental Assessment

Cheryl,

The following is a list of comments (mostly editorial) on the Environmental Assessment prepared for the West Belle Pass Barrier Headland Restoration (TE-52) project.

- Replace "Louisiana Department of Natural Resources" and the acronym "LDNR" with "Office of Coastal Protection and Restoration" and "OCPR" where appropriate.
- The word "offshore" should replace "off shore" where it occurs throughout the document.
- In several places in the first few pages of the Introduction the phrase "west of West Belle Pass" is used in descriptions of the project location. Is "West Belle Pass" an actual place-name? Also, "West Belle Pass" seems to be used interchangeably with "Belle Pass". For example, on Page 6, Section 1.4.2, the first sentence reads "Shoreline retreat rates immediately west of West Belle Pass…". Then in the next paragraph it is mentioned that "Hurricanes Katrina and Rita removed almost all the subaerial headland west of Belle Pass." I suggest that "west of West Belle Pass" be replaced with the simpler and geographically accurate "west of Belle Pass".
- Page 4, Section 1.3, Paragraph 2: I think the scientific name of black mangrove is *Avicennia germinans*. Also the phrase "Black mangrove were frozen badly…" sounds odd. I suggest this sentence be reworded to say something like: "Black mangrove (*Avicennia germinans*), the abundance of which is controlled by periodic freezing events, has proliferated since the last hard freeze in 1990 and is now common in the intertidal zone of the project site."
- Page 4, Section 1.3.1, Paragraph 1: The eastern portion of the Terrebonne Basin is hydrologically isolated from what? Freshwater input?
- Page 5, Section 1.3.2, Paragraph 4: Mention when beneficial placement of material dredged from Belle Pass began.
- Page 18, Section 3.2.2.2, Paragraph 2: "…sea turtles drift with the *Sargassum* and feed off their living organisms" sounds odd. Perhaps reword to: "sea turtles drift with the *Sargassum* and prey on biota associated with the algae."
- Page 20, Table 4: Delete the space between "*Farfante*" and "*penaeus*".
- Page 20 and 21: Spanish mackerel and gray snapper are probably more likely to occur in the project and borrow areas than their congeners king mackerel and lane snapper. Why weren't these species discussed?

Planning Branch
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CPRA
Coastal Protection and Restoration Authority of Louisiana

State of Louisiana

BOBBY JINDAL
GOVERNOR

- Page 22, blacknose shark paragraph, last sentence: Should this read "Neonates or juveniles…"?
- Page 23, Section 3.2.5, Paragraph 5: Edit the last sentence. "More importantly, barrier islands and headlands provide…"?
- Page 24, Section 3.2.6.1, Paragraph 2: What barrier island is immediately east of Belle Pass?
- Page 24, Section 3.2.6.1, Paragraph 4: Replace "samipalmated plover" with "semipalmated plover" and "hudsonian godwit" with "Hudsonian godwit".
- Page 24, Section 3.2.6.1, Paragraph 6: Replace "savannah sparrow" with "Savannah sparrow".
- Page 26, Section 3.2.7: You may have received different information from USFWS, but based on the LDWF's Natural Heritage website neither sturgeon species are listed for Lafourche Parish (or Terrebonne for that matter). Also, manatees are not listed for Lafourche Parish but are for Terrebonne, although it is reasonable to assume that the odds of manatee appearing in Lafourche are the same as for Terrebonne.
- Page 39, Socioeconomics row, No Action column: Edit the last sentence.
- Page 52, Section 4.3.2, Paragraph 2: What does "re-assorting" mean? Perhaps a different word.
- Page 53, Section 4.3.2, Paragraph 4 or 5: Perhaps re-emphasize that the current benthic communities are representative of an early successional stage due to frequent perturbation, and therefore it shouldn't take long for the post-dredging assemblages to attain pre-dredging levels.
- Page 56, Section 4.3.6, Paragraph 4, second sentence: Replace "planning vegetation" with "planting vegetation".
- Page 57, Section 4.3.6, Paragraph 9: This paragraph (starting "Based on the long-term benefits…") should be placed at the end of the subsection (i.e., after the subsequent paragraph about sea turtles).
- Page 58, Section 4.4.2, Paragraph 2: Edit last sentence. "There are no known, significant terrestrial cultural resources in either proposed project site." Delete comma and replace "either" with "the".
- Page 59, Section 4.4.4, Paragraph 2: Delete the second "long-term".
- Page 61, Section 4.4.6, Paragraph 4: The third sentence is unclear. Please edit.
- Page 62, Section 4.5.1.1, Paragraph 1, last sentence: Replace "Bell Pass" with "Belle Pass".

Thank you for the opportunity to review. If you have any questions please don't hesitate to contact me.

David Lindquist
Coastal Resources Scientist
Environmental Section
Planning and Project Management Division
Office of Coastal Protection and Restoration
David.Lindquist@la.gov
phone: (225) 342-9683

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

September 16, 2009 F/SER46/RS:jk
225/389-0508

Ms. Cheryl Brodnax
National Oceanic and Atmospheric Administration
LSU Sea Grant Building, Room 124C
Baton Rouge, Louisiana 70803

Dear Ms. Brodnax:

NOAA's National Marine Fisheries Service has received the draft Environmental Assessment (EA) titled "West Belle Pass Barrier Headland Restoration (TE-46)." The draft EA evaluates the potential impacts associated with restoration of 9,200 feet of beach and dune and creation of about 365 acres of saline marsh in Lafourche Parish, Louisiana. The proposed project would involve excavation from two borrow areas located in Timbalier Bay and the Gulf of Mexico to generate over three million cubic yards of dredged material required for project construction.

We offer the following general comments regarding the draft EA:

Page 15, Section 3.1.1, Geology, Soils and Topography. This section of the document does not describe existing wave conditions in the vicinity of the proposed borrow areas. Summary wave climate data would provide background for interpretation of results provided in later sections of the document. Also, potential changes in wave climate are addressed in Section 4.2.1, Impacts on Geology, Topography, and Physical Oceanographic Processes, and again in Section 4.2.4, Impacts on Water Resources. We recommend that information regarding existing conditions be incorporated into the appropriate section of the document and that the discussion regarding anticipated wave climate changes be consolidated into one part of the Environmental Consequences section.

Page 11, Table 1, and throughout. The document presents information regarding projected benefits in terms of Average Annual Habitat Units and Net Acres. Typically, these data would be generated after project review by the Environmental Work Group. We recommend that the final EA be held in abeyance until such data has been reviewed and approved by the appropriate work group.

Based on our review of the draft EA, we find that the document adequately assesses potential impacts to resources of concern. The EA also analyzes the potential effects of the proposed action on essential fish habitat (EFH). We concur with the document's conclusion that the proposed project is not likely to adversely affect EFH and furthermore, that the project should result in the creation and restoration of intertidal marsh and surf zone habitats. As such, we have no EFH Conservation Recommendations to provide and no further comments to offer on the draft EA.

We appreciate the opportunity to review and comment on the draft EA.

Sincerely,

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

c:
F/SER46, Swafford
Files

The Final Report has been reviewed and accepted.
22-3276

Scott Hutcheson 8/7/09
Scott Hutcheson Date
State Historic Preservation Officer

TIDEWATER ATLANTIC RESEARCH, INC.

GORDON P. WATTS JR., DIRECTOR
VOICE: 252.975.6659 FAX: 252.975.2828
EMAIL: jimr@coastalnet.com

POST OFFICE BOX 2494
WASHINGTON
NORTH CAROLINA 27889

27 July 2009

Dr. Scott Hutcheson
State Historic Preservation Officer
Division of Archaeology
1051 N. 3rd Street, Room 405
Baton Rouge, Louisiana 70802-5239

Dear Dr. Hutcheson:

Per your request, two archival-quality final reports entitled *Phase I Remote-Sensing Submerged Cultural Resource Survey of Offshore Borrow Sites located in Lafourche and Terrebonne Parish, Louisiana in Association with the West Belle Pass Barrier Headland Restoration Project* are enclosed for the Division of Archaeology library. A CD version is attached to the back cover of both reports to facilitate reproduction.

On behalf of Tidewater Atlantic Research, we appreciate the opportunity to work with the State of Louisiana and the firm of Coastal Planning & Engineering to support this important coastal restoration project.

Best regards,

Robin Arnold

Robin Arnold
Senior Historian

Enclosures-2

Copy: Jeffrey Andrews [Coastal Planning & Engineering]

cc: Cheryl Broadnax

Mitchell J. Landrieu
Lieutenant Governor

State of Louisiana

**Office of the Lieutenant Governor
Department of Culture, Recreation & Tourism
Office of Cultural Development
Division of Archaeology**

Pam Breaux
Secretary

Scott Hutcheson
Assistant Secretary

June 16, 2009

Ms. Cheryl Brodnax
Federal Project Manager
NOAA National Marine Fisheries Service
NOAA Restoration Center
LSU Sea Grant Building, Room 124C
Baton Rouge, LA 70803

Re: Draft Remote-Sensing Report
LA Division of Archaeology Report No. 22-3276
Remote-Sensing Submerged Cultural Resources Survey of Offshore Borrow Sites Associated with the West Belle Pass Barrier Headland Restoration Project [Lafourche And Terrebonne Parishes, Louisiana]
Tidewater Atlantic Research, Inc.

Dear Ms. Brodnax:

We acknowledge the receipt of your letter dated May 13, 2009, and two copies of the above-referenced draft report. We have completed our review of this document and offer the following comments.

The report is concise and well written. Based on the information provided in the 1994 Report *Cultural Resources Investigation Related to the West Belle Pass Headland Restoration Project, Lafourche Parish, Louisiana* and the current remote sensing survey results along with the recommendation of avoidance of areas WBPA-5, WBPE-1, and WBPE-2, we concur that the proposed project will have no effect on historic properties.

We have provided a few technical comments for your consideration and look forward to receiving two copies of the final report for our library. If you should have any questions, please contact Stacie Palmer in the Division of Archaeology by email at spalmer@crt.state.la.us or by phone at (225) 342-5737.

Sincerely,

Scott Hutcheson
State Historic Preservation Officer

SH:SP:s

Enclosures: as stated

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
(727) 824-5312, FAX (727) 824-5309
http://sero.nmfs.noaa.gov

MAY 27 2010 F/SER3:AH

MEMORANDUM FOR: F/HC3 – Cheryl Brodnax

FROM: F/SE – Roy E. Crabtree, Ph.D.

SUBJECT: Endangered Species Act (ESA) Section 7 Consultation for West Belle Pass Barrier Headland Restoration Project

This responds to your letter received January 26, 2010, requesting this office's concurrence with your determinations pursuant to section 7 of the ESA for the referenced NOAA Restoration Center project. You determined the proposed action may affect but is not likely to adversely affect sea turtles. Responses to our requests for additional information regarding the project were received during e-mail correspondence from February 2 to February 10, 2010. Our determinations regarding the effects of the proposed action are based on the description of the action in this consultation. You are reminded that if the proposed action changes, or if any new species are listed or critical habitat designated before all work is completed, the findings of the present consultation may be negated and reinitiation of consultation may be required.

The proposed action seeks to restore an existing area of marsh/dune habitat currently eroding at rates of 55 ft per year,[1] located at 29.09657°N and 90.26229°W (WGS 84), in Lafourche Parrish, Louisiana, bordering the Gulf of Mexico on the south and Timbalier Bay on the north. The proposed action would create approximately 8,500 linear ft of beach/dune habitat and 150 acres of marsh habitat. Due to the need for two types of fill material (i.e., sand versus marsh material) two offshore borrow sites would be utilized. The borrow area containing fill material appropriate for beach restoration is located 9 miles west of project site; the borrow area with marsh appropriate fill is located 2.8 miles south of the project area. Neither offshore borrow site is located in waters managed by the Mineral Management Service. Dredging is anticipated to occur during the fall and winter of 2010-2011. Approximately 1 million cubic yards (cys) of sand will be obtained by cutterhead dredge from the western borrow area to restore the beach/dune habitat. An additional 2 million cys of organic muck material will be obtained by cutterhead dredge from the southern borrow area to restore the marsh habitat. A submerged pipeline will discharge dredge materials on to the beach where bulldozers, operating entirely from the uplands, will push the discharged fill to its appropriate location and grade. Pipeline sections will be floated into place, assembled, and sunk at predetermined locations over sand/muck bottom devoid of seagrasses and corals. Native vegetation will be planted to stabilize

[1] Finkl, C.W., B. Forrest, B. Suthard, M. Larenas, and J. Andrews. 2008. *West Belle Pass Barrier Headland Restoration (TE-52). Phase I Investigations*. Boca Raton, Florida: Coastal Planning & Engineering, Inc. 17p (Prepared for the Louisiana Department of Natural Resources, Baton Rouge, LA.). September.

restored marsh and upland dune areas. The total construction footprint for the project is expected to affect approximately 392 acres of sandy/muck bottom, devoid of corals and seagrasses. The project area is accessible only by boat; therefore, all equipment and materials will be transported to/from the project area via barges. Project construction will take approximately four months. The applicant will require all work be done in compliance with NMFS' "Sea Turtle and Smalltooth Sawfish Construction Conditions" (enclosed).

Five species of ESA-listed sea turtles under NMFS' purview (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) may occur in the project area and may be affected by the proposed action. No designated critical habitat occurs in the project area.

We have analyzed the potential routes of effects from the proposed project and concur with the NOAA-Restoration Center's determination that ESA-listed species are not likely to be adversely affected. Sea turtles may be affected by project activities if the cutterhead dredge struck them, however, the likelihood of this occurring is discountable. Cutterhead dredges move slowly and sea turtles are highly mobile and able to avoid an approaching dredge. Sea turtles could also be affected when the pipeline is submerged, but such an event is so unlikely that any adverse effects are discountable. The placement of dredged material by bulldozers will occur entirely on the uplands and will not affect these species. Alterations to marine habitat will be insignificant. Currently, the projects site is sand/muck bottom devoid of seagrasses and corals or other habitat features utilized by ESA-listed species likely to occur in the project area.

This concludes your consultation responsibilities under the ESA for species under NMFS' purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. We have enclosed additional information on other statutory requirements that may apply to this action, and on NMFS' Public Consultation Tracking System (PCTS) to allow you to track the status of ESA consultations.

Thank you for your continued cooperation in the conservation of threatened and endangered species under NMFS' purview. If you have any questions on this consultation or PCTS, please contact Andy Herndon at (727) 824-5312, or by e-mail at Andrew.Herndon@noaa.gov.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosures (2)

File: 1514-22.C.
Ref: I/SER/2010/00211

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 7-15-2009)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at **https://pcts.nmfs.noaa.gov/** that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.