BAYOU DUPONT MARSH AND RIDGE CREATION
CWPPRA PROJECT Fed No. BA-48

ENVIRONMENTAL ASSESSMENT
Jefferson and Plaquemines Parishes, Louisiana

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

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ACRONYMS

AAHU	Average annual habitat unit
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection and Restoration Act
CZMA	Coastal Zone Management Act
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
NAAQS	National Ambient Air Quality Standards
NAO	NOAA Administrative Order
NAVD88	North American Vertical Datum 88
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
NRHP	National Register of Historic Places
OCPR	Louisiana Office of Coastal Protection and Restoration
SAV	Submerged aquatic vegetation
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
WVA	Wetland Value Assessment

UNITS OF MEASURE

cfs	cubic Feet per Second
cm	centimeter
cy	cubic yard
ft	feet
g	gram
ha	hectares-rounded to the nearest whole number
km	kilometer
m	meter
m^3	cubic meter

EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared to assess impacts related to the proposed implementation of the Bayou Dupont Marsh and Ridge Creation Project (BA-48) in Jefferson and Plaquemines Parishes, Louisiana. The purpose of this proposed project is to support the coastal restoration objectives of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) by redefining a natural bank or ridge along Bayou Dupont and re-establishing adjacent marsh using renewable sediment from the Mississippi River. This project would create and nourish approximately 331 acres (134 ha) of marsh, and restore approximately 11,058 linear ft (3,370 m) of ridge. The borrow area is the Mississippi River located in Plaquemines Parish, Louisiana. Native marsh and ridge vegetation would be planted after construction to help stabilize the rebuilt marsh habitat. This proposed project was selected by the CWPPRA Task Force through a publicly vetted process to proceed to engineering and design on October 17, 2007 (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] 2008). 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 Bayou Dupont Marsh and Ridge Creation Project, the National Oceanic and Atmospheric Administration (NOAA) is responsible for oversight of federal funding contributions to the project and in partnership with the State of Louisiana Office of Coastal Protection and Restoration (OCPR) for the design, construction and alternatives reviewed and selected of the proposed project. 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, 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 CEQ regulations. The CWPPRA program was evaluated in a programmatic 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). This EA specifically evaluates the impacts on the human environment associated with the proposed Bayou Dupont Marsh and Ridge Creation Project and alternatives.

The Bayou Dupont Marsh and Ridge Creation Project was included on the CWPPRA annual Priority Project List making it 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 331 acres (134 ha) dominated by intermediate to brackish marsh and shallow open water. Most of this area is marsh converted to open water through a combination of subsidence, dredging of oil and gas canals, and lack of freshwater input. The goal of this proposed project is to redefine a natural bank or ridge of the bayou and reestablish the marsh using the renewable sediment from the Mississippi River. Borrow for the ridge creation would come from in situ material

available adjacent to, but not within, Bayou Dupont. Riverine borrow would be used primarily to nourish and re-establish marsh and supplement the ridge feature.

Through the CWPPRA process, it was determined that creation of the ridge and marsh features was the appropriate approach to restoration. Alternatives available to achieve this goal focus on repairing the ridge, establishing the marsh elevation, and using dredged sediments to build up important surrounding marsh habitat.

All proposed alternatives involve moving sediment from borrow areas into the proposed project area. Differences among alternatives include re-establishment of a ridge and location of borrow areas. The marsh construction elevation for all design alternatives is +3.0 North American Vertical Datum (NAVD88) to achieve a settled elevation at +1.3 ft NAVD88 in the first five years and settle to within the intertidal zone (0.5 to 0.9 ft NAVD88) over the twenty-year project life. The location of marsh creation is similar across all construction alternatives, except where the location was adjusted to avoid impacts to cultural resources. All construction alternatives would confine fill material within containment dikes constructed to +4.0 NAVD88. Containment dikes would be gapped after appropriate dewatering and consolidation of fill material. Areas of newly created marsh would be planted with vegetation, cordgrass (*Spartina* spp.) or similar, if local vegetation does not colonize soon after construction to stabilize soils.

Similar components of the three alternatives include the following features: (1) marsh creation and nourishment; (2) sediment containment; and (3) vegetative planting. The three alternatives for the proposed project include placing 2,620,455 cubic yards (cy) (2,003,482 m^3) of material within the proposed projects marsh creation area. Two sources of material have been identified for this purpose: (1) interior lake and bayou sediments and (2) Mississippi River sediment.

Construction of the preferred alternative (Alternative 1) would include 2,620,455 cubic yards (cy) (2,003,482 m^3) of hydraulically dredged Mississippi River sediment and 140,218 cy (107,204 m^3) of manually dredged in situ material. A marsh constructed at +3.0 ft NAVD88 would quickly settle and remain within the intertidal zone for approximately 20 years (typical project lifespan). The preferred alternative would result in a net benefit of 186 acres over the 20-year lifespan.

This EA provides the supporting analysis that no significant long-term adverse environmental impacts are anticipated from implementing the preferred alternative. Short-term impacts related to construction are considered reversible. This conclusion is based on a comprehensive review of relevant literature, site-specific data, and project-specific engineering reports related to biological, physical, and cultural resources. The natural resource benefits anticipated from implementing the preferred alternative would include enhancement of marsh 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 from storm surge for infrastructure inland of the marsh and ridge to be restored. This EA identifies proposed action plans to avoid adverse impacts to existing resources, such as cultural resources and threatened and endangered species.

1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared to assess impacts related to proposed implementation of the Bayou Dupont Marsh and Ridge Creation Project (BA-48) in Jefferson and Plaquemines Parishes, 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 October 17, 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 Bayou Dupont Marsh and Ridge Creation Restoration Project, the National Oceanic and Atmospheric Administration (NOAA), in partnership established through cooperative agreements with the State of Louisiana Office of Coastal Protection and Restoration (OCPR), is responsible for project funding, design, alternative selection and alternative evaluation. 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 BA-48 is to create and protect habitat on and around Bayou Dupont in an area of subsided marsh.

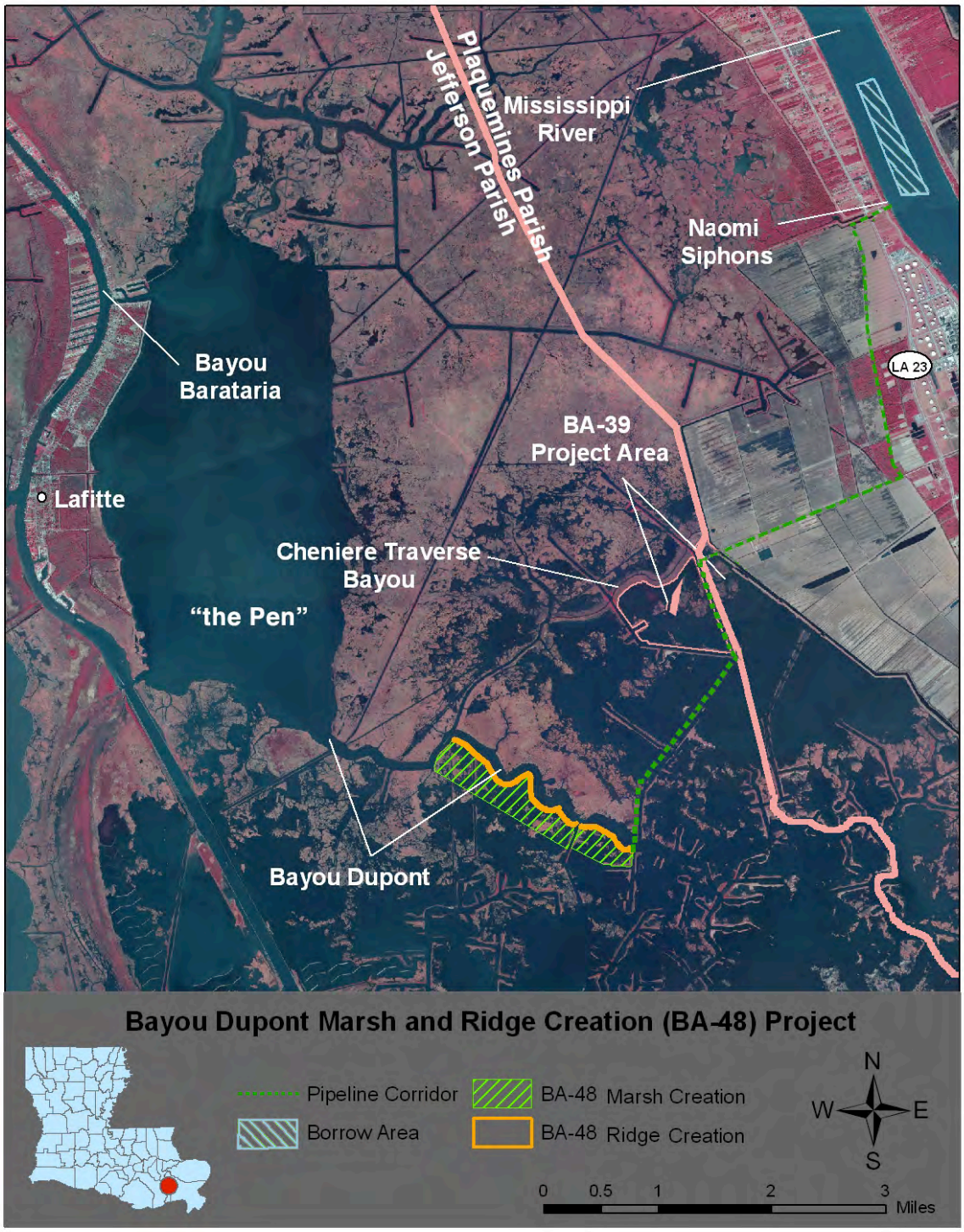
This EA complies with requirements set forth under the National Environmental Policy Act (NEPA) of 1969, the regulations of the Council on Environmental Quality (CEQ) for implementation of NEPA (Title 40 *Code of Federal Regulations* [CFR] Parts 1500 through 1508 [CEQ 1992]) and NOAA Administrative Order (NAO) 216-6 (NOAA 1999), which describes NOAA's policies, requirements, and procedures for complying with NEPA and the CEQ regulations. An Environmental Impact Statement (EIS) was prepared for the Louisiana Coastal Wetlands Restoration Plan by the CWPPRA Task Force and the 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). Those EISs provide information relevant to this EA and this EA extends the analysis and information covered in the scale of those EISs down to the project-specific geographic area of the proposed Bayou Dupont Marsh and Ridge Creation Project and alternatives.

1.1 PROJECT LOCATION

The proposed Bayou Dupont Marsh and Ridge Creation Project is located in Jefferson and Plaquemines Parishes, Louisiana approximately 5.5 miles (1.6 km) southeast of the town of Lafitte (see Figure 1). The proposed project area encompasses 331 acres (134 ha) dominated by intermediate to brackish marsh and shallow open water. The borrow area and pipeline corridor proposed for this project are located in Plaquemines Parish as described in Section 2.3.

The proposed project area is in the historic Lafourche and St. Bernard delta system located between the natural levees of the active Mississippi River and the abandoned Bayou Lafourche distributary (Conner and Day 1987). The area is included in the Myrtle Grove Mapping Unit in Region 2 of the Coast 2050 Restoration Plan (LCWCRTF and Wetlands Conservation and Restoration Authority [WCRA] 1998, 1999). The proposed project area, which is about 1.3 miles (2.1 km) long, is bounded on the north and west by Bayou Dupont. The east boundary of the project area is an unnamed pipeline access canal. The southern boundary is open water and marsh approximately 0.5 miles (0.8 km) from Bayou Dupont.

FIGURE 1 LOCATION OF BAYOU DUPONT MARSH AND RIDGE CREATION PROJECT



The Myrtle Grove Mapping Unit consists of 70,200 acres (28,409 ha) in Jefferson and Plaquemines parishes, which historically had 61,810 acres (25,014 ha) of marsh (LCWCRTF and WCRA 1999). The majority of marsh losses occurred from 1956 to 1974 due to hydrology, wind erosion, subsidence and direct loss from dredging with additional losses continuing to present time. Subsidence in the Myrtle Grove Mapping Unit is high (2.1 to 3.5 ft/century), and future projections of loss are estimated to be 10,220 acres (4,136 ha) if no action is taken (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)).

As federal sponsor for the Bayou Dupont Marsh and Ridge Creation Project (BA-48), the NOAA National Marine Fisheries Service (NMFS), Department of Commerce, is responsible for NEPA compliance. Louisiana OCPR is the non-federal local project sponsor. Other federal agencies that make up the CWPPRA Task Force include USACE, USFWS, NRCS, and EPA. The CWPPRA Task Force approved the project "Bayou Dupont Marsh and Ridge Creation" in 2007. Project documents also refer to the project as "Bayou Dupont Ridge Creation and Marsh Restoration Project". 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 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 address 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 the first months of each calendar 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. 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. These ridges form adjacent to bayous and rivers from the deposition of suspended sediments. Behind these ridges, lower elevations and finer sediments support wetland vegetation. Interconnecting rivers, bayous, and lakes are part of water flow toward the shallow Gulf of Mexico. These waters are influenced by ocean waters via tidal exchange and storm surges.

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 is predominately saltmeadow cordgrass (*Spartina patens*) with species such as marsh elder (*Iva frutescens*), and hairypod cowpea (*Vigna luteola*) (Sasser and others 2008).

Hydrology / Geomorphology: The Barataria Basin drainage area is approximately 2,446 square miles (6,359 square km) in size. Much of the northern portions of the basin are cypress-tupelo swamp. South of the swamps are marsh that increase in salinity from fresh to saline as they extend toward the Gulf of Mexico. The majority of marshes in the basin are isolated from freshwater inputs from the Mississippi River (USACE 2004) directly. Some river input is accomplished with freshwater diversions, such as the Naomi Siphon Diversion Project (BA-03).

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 (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.

Wetland Loss: Marshes of the Myrtle Grove Mapping Unit experience a high subsidence rate (2.1 to 3.5 ft/century) and also suffer from storms and cold front passages. Of the 61,810 acres (25,014 ha) of marsh in the mapping unit that existed in 1932, 19% has been lost. The majority of losses occurred between 1983 and 1990 (LCWCRTF and WCRA 1999).

A recent detailed analysis of the project area reports annual land losses of 0.52 % from 1985 to 2009 (NMFS 2010a). Relative sea-level rise, natural subsidence, and frequent intense coastal storm surge have threatened the remaining marshes. Future projected losses over the next twenty years without the proposed action are expected to be approximately 10 acres (4 ha, assuming a 0.52 % annual land loss rate) (NMFS 2010a).

1.4 PURPOSE AND NEED

1.4.1 Purpose

The purpose of this proposed project is to support the coastal restoration objectives of CWPPRA by redefining a natural ridge of Bayou Dupont and re-establishing adjacent marshes using renewable sediment from the Mississippi River. This project would be accomplished through partnering with OCPR to implement proposed actions within the proposed project area. This project would create and nourish marshes in the 331-acre (134 ha) project area using materials dredged from the Mississippi River and restore approximately 11,058 linear ft (3,370 m) of ridge using in situ, adjacent material. Native intertidal marsh and ridge vegetation would be planted after construction to help stabilize the rebuilt marsh habitat.

The goals of this specific proposed project are to create and nourish marshes and create a ridge along a portion of the southwestern shoreline of Bayou Dupont. Specific targets include the following:

- Create a ridge along a portion of the southwestern edge of Bayou Dupont using in situ materials
- Create, and nourish marshes south of the created ridge using renewable materials.

1.4.2 Need for Action

The need for the proposed action is directly related to the rapidly degrading environmental conditions at the proposed project site and the necessity to re-establish the structural integrity and value of the marsh as habitat. Marshes of the Myrtle Grove mapping unit experience a high subsidence rate (2.1 to 3.5 ft/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 (589,670 metric tons) of fisheries landings reported for the Gulf Coast in 2007, more than 71 percent were caught in Louisiana (NOAA 2009). Marshes provide nursery, foraging, and spawning habitat for numerous marine and estuarine species of commercial and recreational importance. Maintaining ridges and marshes also helps protect the habitat, infrastructure and communities inland by reducing storm surge. Thus, there is need to take action, consistent with the policies, purposes, goals and mandates of CWPPRA, to identify and implement projects which reduce the pace of coastal habitat degradation and loss in Louisiana and provide for its protection and restoration. NOAA's discretion in meeting this need is limited by the mandates of CWPPRA, its implementing procedures and the interagency decision making role of the Task Force.

2.0 PROPOSED ACTION AND ALTERNATIVES

Identification of reasonable alternatives was limited to consideration of those capable of meeting the stated purpose and need. The no-action alternative and construction alternatives were considered in detail. All construction alternatives involve dredging sediments to create marsh in the proposed project area. The alternatives vary in inclusion of a ridge re-establishment, and borrow areas used. All construction alternatives involve containment dikes that would be gapped after sediments settle. All construction alternatives include vegetative plantings during the 20-year project lifespan. This section briefly describes the alternatives and a summary of primary alternative differences considered in the selection of the preferred alternative (Table 1). Figures 2 through 5 illustrate important design features of the alternatives.

TABLE 1. FEATURE DIFFERENCES OF ALTERNATIVES CONSIDERED

Alternative	Marsh acres	Ridge acres	Borrow sediment
No action	95 existing, 0 created or nourished	0 existing or created	None
1 (preferred)	289 created or nourished	20 created	Mississippi River
2	309 created or nourished	0 existing or created	Mississippi River
3	289 created or nourished	20 created	Bayou and Lake

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. Successful completion of Phase 1 is required before consideration for construction funding, but does not guarantee Phase 1 projects will proceed to construction. In both Phase 1 (design) and Phase 2 (construction), the NMFS as federal sponsor of the project, develops alternatives and reviews impacts, with the authority to recommend changes to the project or recommend deauthorization of CWPPRA Task Force approved funds if the project is believed to be not fiscally or environmentally responsible.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

The no-action alternative and three construction alternatives were considered in detail in this EA. Construction alternatives were designed based on results of geotechnical studies and topographic, bathymetric, and magnetometer surveys (OCPR 2010).

2.2.1 The No-Action Alternative

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. Though the no-action alternative does not meet the purpose and need, it has been carried forward for full consideration as it establishes a baseline against which the action alternates may be compared and contrasted.

2.2.2 Alternative 1 (Preferred Alternative)

Alternative 1 maximizes time the marsh creation area would be at a healthy marsh elevation for 20 years after construction. It consists of building marsh and re-establishing the ridge along Bayou Dupont (Figure 2) where the existing ridge is mostly a deteriorated, subsiding marsh-edge. Containment dikes are necessary to retain dredge sediments and allow their initial settlement. This alternative considers surrounding the marsh creation area with containment dikes and ridge for this purpose.

The ridge re-establishment would be approximately 11,058 linear ft (3,370 m) in length, with a crown width averaging over 30 ft (9.1 m) for a total ridge area of approximately 20 acres (8 ha). The ridge would be reconstructed along the south edge of Bayou Dupont using adjacent material. Those borrow materials would than be replaced with Mississippi River borrow materials during marsh creation. The initial ridge elevation would be +4.5 ft NAVD88 with a projected elevation of approximately +1.8 ft NAVD88 after 20 years (OCPR 2010). The recreated ridge would be planted with herbaceous and woody species such as, but not limited to, smooth cordgrass (*Spartina alterniflora* cv. Vermilion), seashore paspalum (*Paspalum vaginatum*), wax myrtle (*Myrica cerifera)*, mulberry (*Morus sp.),* hackberry, baccharis (*Baccharis halimifolia*), marsh elder (*Iva frutescens*), and yaupon (*Ilex vomitoria*) during the first three years after construction. Should invasive woody species, such as the Chinese tallow tree (*Triadica sebifera*) occur along the created ridge, they would be removed manually or by herbicide, such as Clearcast®.

Marsh fill material would be from the Mississippi River borrow area described in detail in section 2.3. This material would be contained by building a ridge along the eastern perimeter (Figure 3), and containment dikes along the remaining perimeter (Figure 4). In-situ material would be excavated no more than -20 ft NAVD88 and at least 25 ft (7.6 m) from the dike/ridge toe. Excavated areas would be then replaced with material dredged from the Mississippi River borrow area during marsh creation. Containment dikes would be constructed at +4 ft NAVD88 with a crown width of 6 ft (1.8 m) and side slopes of 1:4. This would be accomplished using a marsh buggy making several lifts. To maintain an existing access canal that cuts through the marsh creation area, two marsh creation areas would be encircled with dikes and constructed separately. Figure 5 shows the location of the spoil banks that flank the existing access canal. The first marsh creation area is 249 acres (104 ha) and the second is 82 acres (33 ha) (Tables 2 and 3). A cut: fill ratio of 2.5:1 is anticipated requiring a total of 140,218 cy (107,204 m^3) of borrow sediment for dike construction (Table 2). The dikes would settle approximately 1 ft (0.3 m) the first two years, and experience erosion over the 20-year project life. Because they would not settle to marsh elevation in 20 years, the dikes would be gapped and degraded to the marsh elevation after construction of the marsh (OCPR 2010). Upon dewatering and compaction of the marsh platform, approximately 20% of the marsh platform would be planted with indigenous intertidal vegetation to help stabilize the sediments such as, but not limited to, smooth cordgrass and switchgrass (*Panicum virgatum*).

This bayou ridge re-establishment would be similar to previous ridge creation projects that were considered in the selection of this preferred alternative design. Lindquist (2010) compared this alternative with similar completed projects to determine the likelihood it would attain ecological goals:

> [A] maritime ridge … was constructed north of Port Fourchon in the summer of 2004 [that] beneficially used dredge material from the port's expansion to create a 400-foot wide chenier ridge/salt marsh corridor with maximum elevations of +8 feet NAVD 88 for the ridge and +1.6 feet NAVD 88 for the marsh platform (Barataria-Terrebonne National Estuary Program 2006). Initial plantings of the ridge were impacted by the 2005 hurricanes and the following drought, which permitted soil salinities to remain high and prevented many plantings from becoming established (Barataria-Terrebonne National Estuary Program 2006). Subsequent plantings, however, have been more successful and

efforts are continuing to increase vegetative cover and monitor soil and vegetation development. In addition… there have been several studies of the vegetation communities of coastal ridges and ridge-like features in Louisiana (Monte 1978, Neyland and Meyer 1997, Wall and Darwin 1999, Didier 2007) [that] have found that elevation gradient, and specifically the hydroperiod dictated by the gradient, is the most important factor influencing species composition and diversity. At higher elevations, soils are less inundated, better drained, and more aerated, thus providing suitable conditions for the development of a bottomland forest community that is clearly distinct from adjacent marsh.

Soil and vegetation characteristics were investigated along elevation gradients on the Caminada-Moreau maritime beach ridges (Didier 2007). Elevation was negatively correlated with moisture content, soil salinity, loss on ignition (a measure of the soil organic content), total nitrogen, total phosphorus, and total carbon within the top one foot of the soil; whereas elevation was positively correlated with bulk density and pH (Didier 2007). These results reflect the greater hydroperiod at the lower elevations, where due to the relative lack of oxygen in flooded soils organic matter accumulates rather than decomposes. Vegetation communities were also correlated with elevation on the ridges, i.e., herbaceous marsh species dominated the lower, more frequently-inundated elevations; whereas shrubs and trees … were primarily found at higher because they are more sensitive to soil waterlogging and soil salinities, young trees will have difficulty becoming established. The elevations also may be unsuitable for mature trees, as evidenced by the nearby Chenier Traverse Bayou ridge, much of which is currently around +2.0 feet NAVD 88 (T. Baker Smith and Son, Inc. 2005) and occupied by numerous dead and stressed live oak and hackberry (*Celtis laevigata*) (Ensminger and Simon 1993). The BA-48 ridge [proposed here], however, should support flood-tolerant shrubs… for the duration of the project life.

The length of time required for a shrub-dominated community to develop on the BA-48 ridge will be dependent on the availability of recruits and substrate conditions. Marsh elder and groundselbush are common in brackish and intermediate habitats of the Barataria Basin (Monte 1978, Visser et al. 2002), and considering both produce large numbers of widely-dispersed seeds there should be a high availability of propagules to colonize the ridge. However, an initial successional stage of marsh grasses may be required to facilitate the survival and growth of the shrub seedlings (Monte 1978, Egerova 2002). Under these circumstances, the planned vegetative plantings should help expedite natural succession. Soil conditions on the ridge should further facilitate the establishment and development of vegetation. The marsh soils that will predominantly comprise the ridge are fine-grained and relatively organic and, therefore, should have sufficient nutrients to sustain vegetation during the critical establishment period (Broome et al. 1988). Oxidation of the organics may lower soil pH to detrimental levels; however, the pH should stabilize and rebound within one to two years post-construction (Monte 1978). The relatively low ridge that will be created along Bayou Dupont should have many of the same ecological benefits of a higher, tree-lined feature. The ridge, combined with the marsh creation platforms, will help prevent the continuing coalescence of the bayou with adjacent water bodies, re-establish the bayou's bankline, and thus restore the natural hydrology of the area. Interior wetlands will also be protected from increased erosion due to tidal scour and wave action. The ridge will provide enough of an elevation gradient to support an array of vegetation types, from herbaceous marsh species on the lower slopes to a scrub-shrub community on the higher elevations. The corresponding habitat diversity should support a variety of local wildlife, as well as provide critical

resting and foraging habitat for neotropical migrant birds. Migratory birds, in fact, selected scrub-shrub over more available habitats on Horn Island, Mississippi, possibly due to the combination of abundant food resources and refuge from predators (Moore et al. 1990).

Planting would occur over several years to allow for soil salinities and elevations to stabilize. Marsh and ridge acreage would be planted with a variety of bare-root plugs, seeds and/or seedlings of appropriate species that would increase plant diversity in the area. Planting plans depend on final site conditions and species availability. The species to be planted are therefore subject to change.

FIGURE 2 BAYOU DUPONT MARSH AND RIDGE CREATION

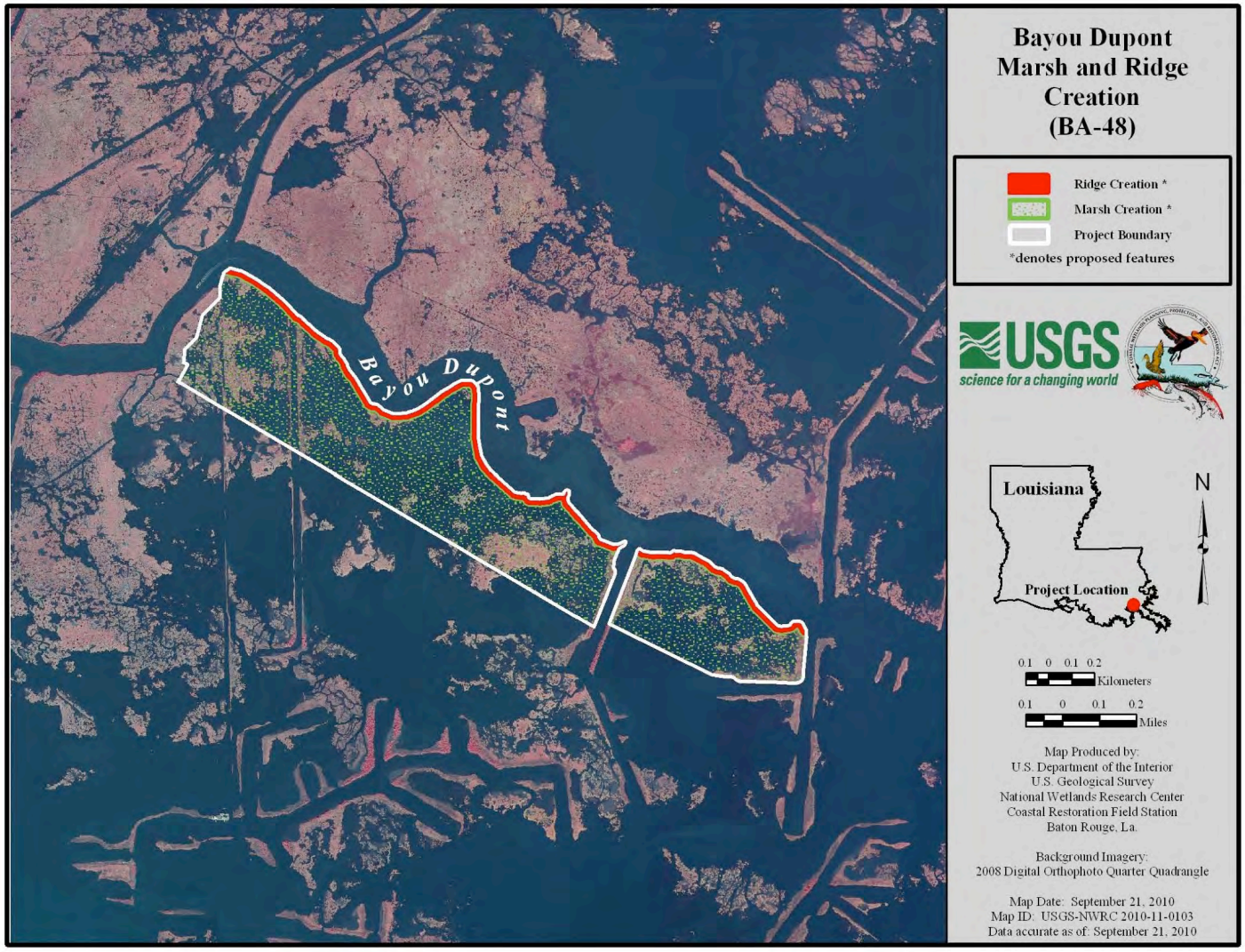


FIGURE 3 RIDGE CREATION AND DIKE/RIDGE BORROW AREA DETAILS

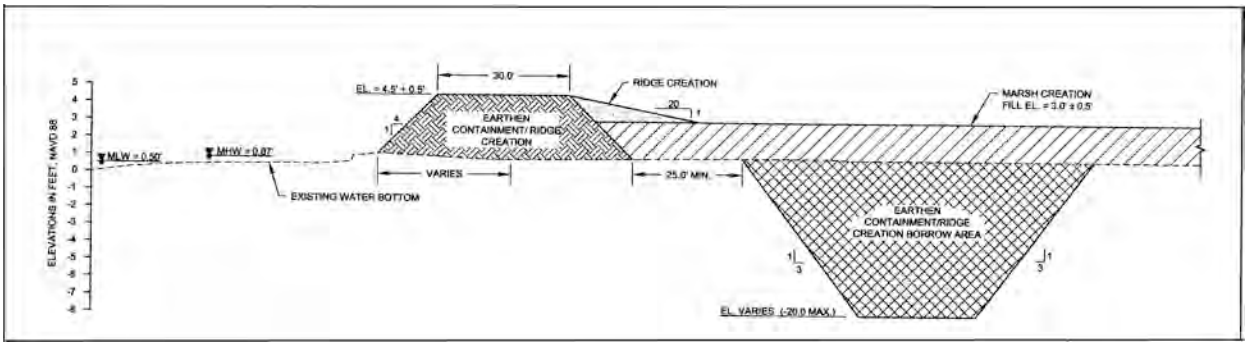


FIGURE 4 EARTHEN CONTAINMENT DIKE TYPICAL SECTION

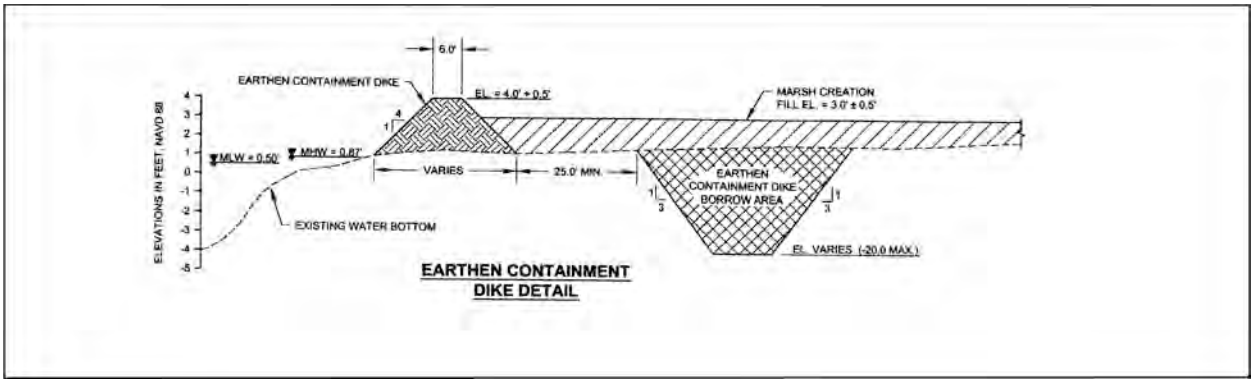


FIGURE 5 LOCATION OF SPOIL BANKS AND EXISTING ACCESS CANAL IN THE MARSH CREATION AREA

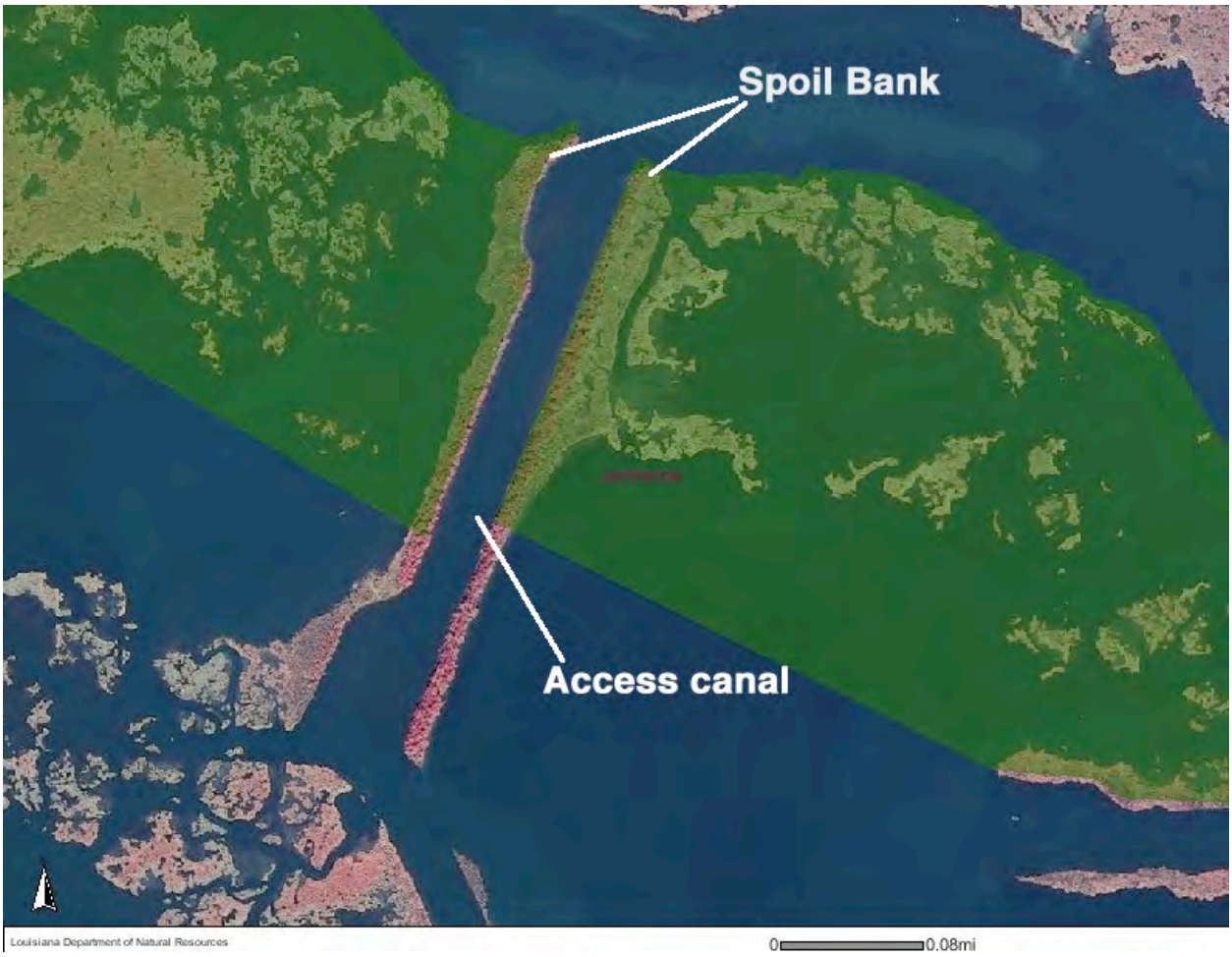


TABLE 2. CONTAINMENT DIKE LENGTH AND VOLUMES

Earthen Containment Dike	Linear Feet of Dike (m)	Cubic Yards of Dike (m^3)
Area 1 dikes	10,082 (3,073)	37,401 (28,595)
Area 2 dikes	5,038 (1,536)	18,686 (14,286)
Total (in place)	15,120 (4,609)	56,087 (42,882)
Total (borrow) 2.5:1 cut: fill	-	140,218 (107,204)

The marsh fill area would be constructed to +3 ft NAVD88. In settlement analyses based on soil borings, this height was predicted to maximize the time the marsh fill would be at a healthy marsh elevation (near +1.3 ft NAVD88) in the first five years and and settle to within the intertidal zone (0.5 to 0.9 ft NAVD88) over the twenty-year project life. A total of 2,620,455 cy (2,003,482 m^3) would be borrowed from the Mississippi River bottom for this purpose (Table 3, section 2.3, Figure 1).

TABLE 3. MARSH FILL AREA VOLUMES

Marsh Fill Area	Area Acres (hectares)	Marsh Fill Cubic Yards (m^3)	Hydraulically Dredged Cubic Yards (m^3)
Area 1	249 (101)	1,295,101 (990,176)	1,942,652 (1,485,264)
Area 2	82 (33)	451,869 (345,479)	677,804 (518,218)
Total	331 (134)	1,746,970 (1,335,654)	2,620,455 (2,003,482)

2.2.3 Alternative 2

Alternative 2 is identical to Alternative 1 in most design features. The key difference is that Alternative 2 does not include re-establishment of the ridge shown in Figure 2 and 3. Instead of ridge re-establishment, that location would consist of marsh creation temporarily contained by an earthen dike (Figure 4). With this alternative there would be a crown width of 6 ft (1.8 m) of containment dike, rather than the 30 ft (9.1 m) crown width and 20 ft (6.1 m) of slope toward the marsh that is the ridge re-establishment feature in Alternative 1. This alternative would include more marsh creation than Alternative 1 and no elevated ridge (Table 1). The containment dike would subside or be mechanically gapped after sediment consolidation to allow for tidal and organism exchange, as it would be in Alternative 1. This alternative differs from Alternative 1 in that a lower initial elevation in combination with natural subsidence of the material would provide an intertidal marsh-edge instead of a higher elevated, woody-vegetated ridge in the long term. The total acreage of the project would be 309 acres (125 ha) of constructed intertidal marsh. The containment dike would be constructed through the mechanical dredging and placement of in situ material from within the project footprint. This borrow area would be subsequently backfilled using material mined and pumped from the Mississippi River, as described in section 2.3, to construct the marsh platform. Upon dewatering and compaction of the marsh platform, approximately 20% of the marsh platform would be planted with indigenous intertidal vegetation to help stabilize the sediments similar to Alternative 1.

2.2.4 Alternative 3

Alternative 3 is similar to Alternative 1 with variation on the borrow sediment. This alternative considers using borrow sediment from lakes and bayous in the area, rather than the Mississippi borrow area described in section 2.3. The cross section of the ridge creation feature (Figure 3), the marsh creation feature, and vegetative plantings would be identical to Alternative 1. The borrow material, however, would be dredged from the interior marshes and lakes in lieu of the river. Borrow material would be from

Bayou Dupont and the lake just north of Bayou Dupont (Figure 1), which is called "the Pen" by locals of that area. Soil borings of Bayou Dupont are of soft clay and organic soils with no sand (OCPR 2010). Similar soils would occur in "the Pen", where numerous pipelines limit access to sediment sources (personal communication Russ Joffrion, geotechnical engineer, OCPR Aug 17, 2010).

This alternative would allow a shorter dredging distance and lower pipeline costs than the other alternatives. However, because the type of material would be different than previous alternatives, the long-term subsidence and erosion would differ along with impacts to benthic organisms, and water quality (e.g. anoxia, turbidity). Because the interior material is more likely to subside and less likely to stack than sand-containing borrow, this alternative differs from Alternatives 1 and 2 in its ability to achieve desired fill elevations. Fill elevations determine the longevity and amount of marsh acres created. This alternative would either create less marsh than Alternatives 1 and 2 or require additional dredging events to create the marsh. Additional dredging events would increase expense and the potential for adverse impacts due to more dredge time and repeated access events. The additional dredging events could provide the target elevation, because the first borrow placement would compact and stabilize thereby allowing future placement events. However, stabilization, via natural dewatering and compaction, takes a couple years. One or two additional marsh creation/dredging events would be required 2 and 4 years after the initial marsh placement. With each additional placement, established vegetation would be disturbed or buried, significantly lengthening the marsh establishment time. Once created, the marsh sediments would be more likely to erode leading to less marsh acres in the long term than Alternatives 1 and 2.

2.3 BORROW AREA

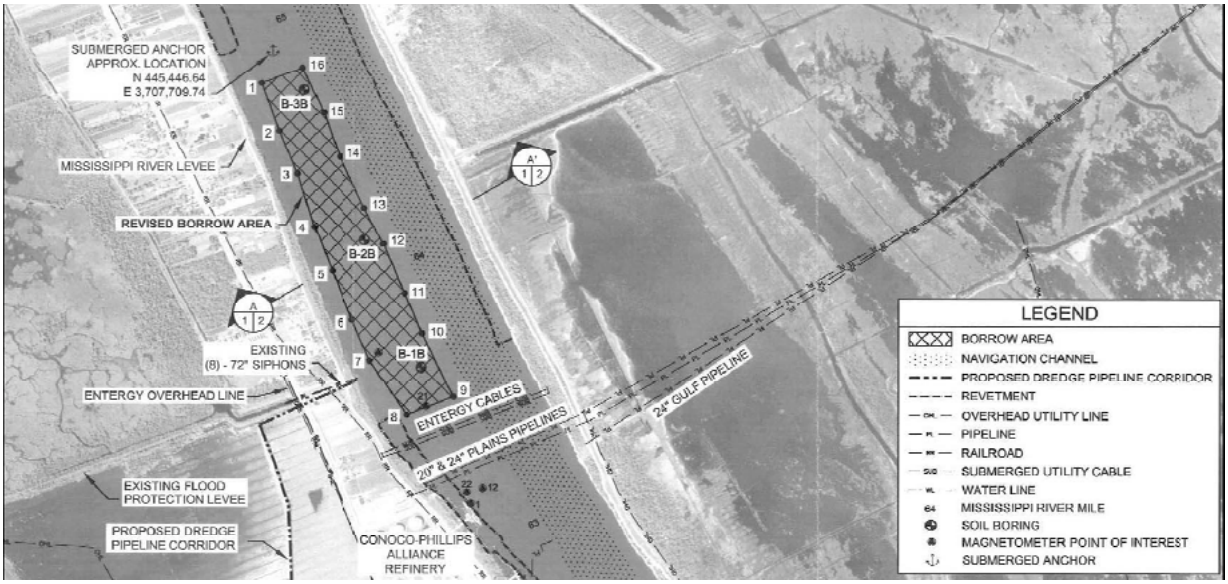
The borrow area was determined by evaluation of available sources, pipeline dredge limitations, and USACE dredging guidelines. While the Barataria Basin could be used for borrow materials, the location of the project near the Mississippi River provided an opportunity to use renewable sediments from the river system, thereby increasing sediments in the Barataria Basin in a manner similar to historic deposition of river sediments. Areas that would pose navigational hazards or contain known cultural resources were avoided.

The proposed borrow area is located between River Miles 63.5 and 65 (Figure 6), restricted immediately upriver by inaccessible depth and restricted downriver by pipelines, revetment, and depth. It is adjacent to the Naomi siphon owned by Plaquemines parish and north of Alliance Refinery. The borrow delineation is consistent with USACE dredging guidelines and restrictions, which ensure stability of the river levee:

- At least 750 ft (228.6 m) from any levee center line
- Outside the USACE maintained navigation channel
- Over 4,000 ft (1,219 m) upstream from any bridge crossing
- Borrow area side slopes no steeper than 1(V):5(H)

The southern boundary is 500 ft (152.4 m) upstream of an Entergy pipeline located by magnetometer survey. The total volume of available sediment in the proposed borrow area is 4,066,800 cy (3,109,291 m^3). The material is composed of sand, silt and clay on the Mississippi River bottom at depths of approximately 40 to 60 ft (12-18 m) (Fig 8, pg 19 OCPR 2010).

FIGURE 6 BORROW AREA LOCATION MAP
(OCPR 2010)



3.0 AFFECTED ENVIRONMENT

The proposed project area is within the 70,200 acres (28,409 hectare) Myrtle Grove Mapping Unit located between two natural levee banks. Historically, this area had 61,810 acres (25,013 ha) of marsh (LCWCRTF and WCRA 1999), and natural levees or ridges along the bayous. Approximately 19% of the marshes have converted to shallow open water along with erosion of natural ridges. Subsidence rates are 2.1 to 3.5 ft/century in the Myrtle Grove mapping unit and current land losses in the proposed project area are 1.7% per year. Continued relative sea-level rise, natural subsidence, and frequent intense coastal storm surges are converting the remaining marshes to open water.

The proposed project area was visited by the Wetland Value Assessment (WVA) team in the spring of 2007. Information from the site visit, as well as any references cited in the initial WVA, was considered in writing this EA. A second (final) WVA was completed in 2010 that included minor changes that did not change the overall impact analysis of this EA. Other sources of data on the existing conditions near the proposed project area in the Coast 2050 Region 2 Supplemental Information – Appendix D (LCWCRTF and WCRA 1999), the USACE Final Programmatic Environmental Impact Statement for the Louisiana Coastal Area Ecosystem Restoration Study (USACE 2004), a Biological report of Barataria Basin (Conner and Day 1987), and NEPA documents prepared for similar projects in neighboring areas, such as for previously mentioned projects BA-26 (NRCS 1998) and BA-39 (EPA 2007).

3.1 PHYSICAL ENVIRONMENT

The Barataria Basin was built by the Lafourche delta, and received river flow from the Lafourche and Mississippi River until flow of these rivers was closed in 1902 and leveeing of the Mississippi River in the 1930-40s (Connor and Day 1987). Precipitation and constructed canals provided the areas water today. Elevations in the basin range from -2 to 4 feet above sea level (Louisiana Department of Environmental Quality (LDEQ) 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 the proposed project area.

The proposed marsh and ridge creation area consists of Lafitte-Clovelly soils. These are soils that are often flooded and support wetland vegetation. Semifluid, saline clay and silty clay loam characterize Lafitte soils. Clovelly soils are similar to Lafitte soils but have thinner organic layers over mineral material and usually occur on submerged ridges along natural streams (U.S. Department of Agriculture 1984).

Borrow area soils are typical of Mississippi River bottom deposits, as indicated from soil borings (OCPR 2010). The borrow area is located on a growing sand bar that consists of sand, silt and clay similar to historic borings from the 1980s.

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 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

Jefferson and Plaquemines Parishes air quality is ranked good to moderate with ozone levels being unhealthy for sensitive groups, according to the EPA and the LDEQ Office of Environmental Assessment who monitor air quality at a station south of Marrero (the nearest station to the proposed project area). In the vicinity of the proposed project area, air quality is generally good with hazardous air pollutants ranked among the lowest in the nation. 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 Basin, and no specific groundwater information is available for the proposed marsh and ridge project area (GEC 2001). The borrow area is located on the floor of the Mississippi River, the largest river in North America.

The marsh creation area is tidally influenced. Precipitation and tide are the primary factors that affect surface water in the proposed marsh creation area. Riverine inputs are minimal, and the freshwater aquifer present in much of Louisiana is not found in the basin. Tides in the Barataria 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 ft (0.3 m) in the Gulf and 0.1 ft (0.03 m) in the upper basin (LCWCRTF 1993). Tidal data from 3 years of hourly waters indicate a mean tidal range of approximately 1.0 ft NAVD88. A longer period of record from a tidal station at Grand Isle, Louisiana recorded a mean high water of 0.87 ft NAVD88 and mean low of 0.50 ft NAVD88 (OCPR 2010). Daily water-level fluctuations in the basin are 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 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 between 2 to 4 ppt in and around the proposed project area. Salinity in the project area is influenced by the Davis Pond Freshwater Diversion Project, which began operations in July 2002 (LDNR 2005) and discharges between 422 cfs and 1,500 cfs of river water over the Barataria Basin. As it was designed for a 10,650 cfs discharge capacity (LDNR 2005), it is possible that the operations could be modified for a higher freshwater input within the proposed project area; however, to date there have been no negative impacts to water quality in terms of algal blooms (LDNR 2005). Reported decreases in salinity are less than the effect of precipitation events.

According to LDEQ's "2008 Louisiana Water Quality Integrated Report and Appendices," Barataria Basin (Subsegment LA021102_00) fully supported the designated uses of primary and secondary contact recreation and oyster propagation. Fish and wildlife propagation was designated as not fully supported due to oxygen depletion from upstream sources (LDEQ 2008). Additionally, there is a mercury warning for fish consumption from Barataria Basin waters, the source of impairment is unknown (LDEQ 2008).

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 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

The proposed project marsh and ridge creation area is composed of intermediate marsh vegetation as indicated on the 2007 Coastal Reference Monitoring System (CRMS) vegetative surveys (Sasser and others 2008). Vegetation from similar surveys conducted in 1968, 1997, and 2001 showed the area as a mix of brackish and intermediate marsh; intermediate; and brackish, respectively.

Based on USGS habitat mapping, the CWPPRA Environmental Working Group agreed that the current marsh area is 95 acres (38 ha). Ridge habitat is higher than marsh elevation and supports woody species, such as trees and shrubs. Currently there are no woody species in the proposed project area. The majority of the vegetation is a common brackish marsh species, saltmeadow cordgrass. Other species present are marsh elder, hairypod cowpea, wand lythrum (*Lythrum lineare)*, dodder (*Cuscuta indecora)*, Virginia saltmarsh mallow *(Kosteletzkya virginica)*, camphor pluchea *(Pluchea camphorata)*, and herb of grace *(Bacopa monnieri)* (Sasser and others 2008). Common names are from the US Department of Agriculture PLANTS Database, which standardizes plant information for the US and its territories.

No submerged aquatic vegetation (SAV) was observed in the areas during the spring of 2007 site visit, but SAV may occur in the project area shallow waters. No vegetation is present in the borrow area.

3.2.2 Aquatic Habitats

There are 200 acres of mostly shallow open-water habitat in the proposed marsh and ridge creation project area. The borrow area is of similar size on the Mississippi River floor.

The river water-column above the proposed borrow area contains: (1) primary producers—phytoplankton and bacteria; (2) secondary producers—zooplankton; and (3) consumers—larger freshwater species, including fish, reptiles, cephalopods, crustaceans, and furbearers.

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 coastal Louisiana. An increase in open water habitat comes at the expense of submerged vegetation and emergent habitats, which are much less common and more vulnerable to disturbance. Potential impacts to aquatic habitats are discussed in Section 4.3.

3.2.3 Benthic Habitats

The description of benthic resources primarily derives from ”Benthic Invertebrates of the Lower Mississippi” (Wells and Demos 1979) and “The Ecology of Barataria Basin, Louisiana (Conner and Day 1987). Benthic habitats near the marsh area support bacteria, fungi, microalgae, meiofauna, and microfauna (Mitsch and Gosselink 1993). In the proposed marsh and ridge creation area, estuarine benthic organisms include macrobenthic (mollusks, polychaetes, decapods), microbenthic (bivalves), suspension feeders (bryzoa and many bivalves), filter feeders (tunicicates, porifera, bivalves), non-

selected deposit feeders (gastropods), selective deposit feeders (nematodes), and predators and parasites (flatworms) (Day and others 1989). 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. Other variables affecting the distribution of benthic organisms include water depth, salinity, illumination, food availability, currents, and tides.

In the borrow area, the most common and most numerous benthic organisms collected in the Mississippi are *Corbicula* and tubificid worms (Wells and Demos 1979). The benthic community structure of the lower Mississippi River is influenced by substrate type and stability, channel geometry, river velocity, vegetation and organic detritus, and salinity (Wells and Demos 1979).

3.2.4 Essential Fish Habitat

The proposed project marsh and ridge creation 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). Categories of EFH in the project area include estuarine emergent wetlands, mud substrates, and estuarine water column. 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 estuary, 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.

Red drum, brown shrimp and white shrimp are estuarine-dependent species. Habitats within the Barataria Basin are considered EFH for postlarval and juvenile life stages of these species. In addition, these species migrate through tidal passes during their post-larval life stage. These species also depend on the estuarine 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 the marsh areas of the proposed project. The brown shrimp fishery was 42 percent of the Gulf of Mexico shrimp landings in 2008 (NMFS 2010b). 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. Larval stages are planktonic and postlarvae move into the estuary 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 Barataria Bay and are highly abundant from April through July (Patillo and others 1997). They use tidal creeks, inner marsh, and shallow open water. Muddy bottoms are preferred habitat in unvegetated areas. Juveniles and subadults are found in estuarine channels, shallow marsh areas, and estuarine bays. They prefer vegetated habitat. 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 (Patillo and others 1997; GMFMC 1998).

White Shrimp: White shrimp are likely present in the marsh of the project area. White shrimp made up 52 percent of the Gulf of Mexico shrimp landings in 2008 (NMFS 2010b). White shrimp are estuarine-dependent. Within Barataria 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 postlarvae are common during the summer. White shrimp stay in the estuary longer than brown shrimp, but brown shrimp may displace white shrimp from marshes to nearby mud substrates in areas where their distributions overlap. Larval stages are planktonic, and postlarvae migrate from marine areas 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. 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 ft (9 to 34 m) deep, with most spawning occurring in water less than 88.6 ft (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 PROPOSED PROJECT AREA, INCLUDING BORROW AREAS

Common Name	Latin Name	Life Stage	System	EFH
Brown shrimp (Estuarine-dependent)	*Farfantepenaeus aztecus*	postlarvae/juvenile	Estuarine (E)	marsh edge, SAV, tidal creeks, inner marsh
White shrimp (Estuarine-dependent)	*Litopenaeus setiferus*	postlarvae/juvenile	E	marsh edge, SAV, marsh ponds, inner marsh, oyster reefs
Red drum (Estuarine-dependent)	*Sciaenops ocellatus*	postlarvae/juvenile	Marine (M)/E	SAV, estuarine mud bottoms, marsh/water interface
		adults	M/E	Gulf of Mexico and estuarine mud bottom

Source: GMFMC 2005

Red Drum: The red drum is likely present in both marsh 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 Barataria 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. 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. Postlarvae 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 postlarvae and juveniles, while juveniles are abundant around the perimeters of marshes. Adults prefer shallow bay bottoms or oyster reefs. The USFWS developed a habitat suitability index model for postlarval and juvenile red drum which indicated that shallow water (5 to 8.2 ft [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 km) 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.

3.2.5 Fisheries Resources

A wide variety of estuarine-dependent fishery species are found in the Barataria Basin (LCWCRTF and WCRA 1999). Commercially fished species include bay anchovy (*Anchoa mitchilli)*, brown shrimp, white shrimp, blue crab (*Callinectes sapidus)*, gulf menhaden *(Brevoortia patronus)*, Atlantic croaker (*Micropogonias undulatus)*, gafftopsail catfish (*Bagre marinus)*, blue hardhead catfish (*Arius felis)*, and oysters *(Crassostrea virginica)*. These resources are species of national economic importance in accordance with Section 906(e)(l) of PL 99-602, the Water Resources Development Act of 1986. Sport fishes sought after include sand seatrout (*Cynoscion arenarius)*, spotted seatrout (*C. nebulosus)*, spot (*Leiostomus xanthurus)*, black drum *(Pogonius cromis)*, red drum and southern flounder *(Paralichthys lethostigma)*. Nearly all of these species vary in abundance from season to season due to their migratory life cycle, habitat preferences according to life stage, and the variation in salinity (Herke 1978, Rogers and others 1993, LCWCRTF and WCRA 1999). Most spawn offshore in the open Gulf of Mexico and enter the marsh area as postlarvae or young juveniles to use the marshes as a nursery. Most species return to the open gulf as subadults or adults.

Fisheries resources in Barataria Basin are monitored as part of the long-term plan of the Davis Pond Freshwater Diversion Project. The most recent report for that project includes catch data of freshwater catfish, bluegill, and bass; and saltwater shrimp, crab, redfish, trout and oyster species from 1998 to 2004 (LDNR 2005). Those data are incorporated by reference and considered in analysis of the proposed action and the alternatives.

3.2.6 Wildlife Resources

The populations of the brown pelican (*Pelecanus occidentalis)* and American alligator (*Alligator mississippiensis)* have had increasing trends over recent decades in the Myrtle Grove Mapping Unit, whereas other avifauna, furbearer and game mammals have remained steady. By 2050, numbers of pelicans, ducks, coots, and American alligator are expected to increase, while seabirds, wading bird, shorebird, raptor, furbearer and game mammal populations are expected to decline (LCWCRTF and WCRA 1999).

Duck populations in the Barataria basins have declined as marsh converts to more saline 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, seabirds, waders, birds of prey, and passerine birds described below. The proposed project is located near an area where colonial nesting waterbirds (herons, egrets, night-herons, ibis, and roseate spoonbills) may be present but are undocumented on databases maintained by the Louisiana Department of Wildlife and Fisheries. However, no evidence of colonial nesting waterbirds have been observed within 1500 ft (147 m) of the proposed project site during numerous project planning visits throughout 2009 and 2010.

Ducks are part of the swimmer functional group. The marshes in 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*) (American Ornithologists' Union 1983, as cited in Gosselink 1984).

Seabirds are common along inland bays of the Barataria estuaries (Conner and Day 1987).

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 marsh. 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).

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 may 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. Waterfowl migration begins in mid-August, and population peaks 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

The intermediate to brackish marshes of the proposed project area provide habitat for nutria (*Myocastor coypus)*, raccoon (*Procyon lotor)*, and alligator. Additionally, muskrat (*Ondatra zibethicus)*, mink (*Mustela vison)*, river otter (*Lutra Canadensis)*, white-tailed deer (*Odocoileus virginianus)*, rabbit (*Sylvilagus* sp.), squirrel (*Sciurus* sp.), and snapping turtle (*Macroclemys temmincki)* (McNease and Joanen 1978, Palmisano 1973) are likely to occur in the project area.

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*). However, the high salinities in the proposed project area likely limit the diversity of amphibians and reptiles that occur there.

The Barataria Basin has 8 species of bats, 11 species of small mammals, armadillo and marine mammals that could occur in the marshes and ridges around the proposed project area (Connor and Day 1987). Bats are most common along natural levees where they can roost. Bats feed on primarily on flying insects that are abundant in Louisiana coastal marshes. The bottlenose dolphin (*Tursiops truncatus*) occurs throughout estuaries and bays of the Gulf of Mexico and could occur at the project areas. The swamp rabbit (*Sylvilagus aquaticus*) is the only species of mammal harvested as game from the marshes typical of the proposed project area (GEC 2001). Trapping is not common in the area. 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*).

3.2.7 Threatened and Endangered Species

The legal status, and likelihood of occurrence in the proposed project area are listed for each threatened or endangered species. USFWS was consulted in preparation of the project design and this EA (USFWS 2010a and 2010b). Information from that consultation is included in threatened and endangered species sections of this EA.

It is unlikely that the endangered West Indian manatee (*Trichechus manatus*), the threatened piping plover (*Charadrius melodus*) or its critical habitat would occur in the project area (USFWS 2010a). The brown pelican was officially removed from the List of Endangered and Threatened Species on December 17, 2009 (USFWS 2010a).

Bald Eagle: Forested wetlands near the proposed project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), which was officially removed from the List of Endangered and Threatened Species as of August 8, 2007. Bald eagles continue to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles nest in Louisiana from October through mid-May. Eagles typically nest in mature trees (such as bald cypress, sycamore, and willow) near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the marsh/ridge complex south of Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter, and infrequently nest in the mature pine trees near large lakes in central and northern Louisiana. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants, specifically organochlorine pesticides and lead.

The USFWS developed the National Bald Eagle Management Guidelines with information and recommendations to minimize potential project impacts to bald eagles. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest; (2) maintaining natural areas (preferably forested) between the activity and nest trees; and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary and should identify, avoid, and immediately report any such nests to USFWS staff. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting. A determination on the need for additional USFWS consultation would be made at that time.

Pallid Sturgeon: The pallid sturgeon (*Scaphirhynchus albus*) was listed as an endangered species on September 6, 1990. The proposed borrow area would be located within areas of the Mississippi River that are inhabited by the endangered pallid sturgeon. The pallid sturgeon is an endangered fish found in Louisiana, in both the Mississippi and Atchafalaya Rivers. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical characteristics that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and damming has adversely affected this species throughout its range. Entrainment issues associated with dredging operations in the Mississippi River are potential effects of the proposed project.

3.3 CULTURAL RESOURCES

3.3.1 Historic, Prehistoric, and Native American Resources

3.3.1.1 Terrestrial Cultural Resources

Terrestrial cultural resource investigations were conducted for the marsh creation project area by Earth Search, Inc. (2010a). The investigations were conducted in preparation of the proposed action for compliance with the National Historic Preservation Act of 1966, as amended, in partial fulfillment of the documentation required under the NEPA of 1969, as amended. Field surveys were conducted in October 2009 and summarized along with background research of Louisiana Division of Archaeology and Division of Historic Preservation, Baton Rouge records, cultural resources reports, site files, and National Register of Historic Places (NRHP) records for the proposed project area. That report is summarized below.

There are no standing structures of any kind in the proposed project area. Three archaeological sites (16JE11, 16JE59, and 16JE147) have been previously recorded in the vicinity of the proposed marsh creation project area (Figure 7). Surveys confirmed that 16JE59 has been destroyed and 16JE147 lies outside the active work zone of the proposed project area (Earth Search, Inc. 2010a). Sites (16JE11 and 16JE147) were considered potentially eligible for nomination to the NRHP, however due to its location outside the area of work, no additional investigations are recommended for 16JE147 (Earth Search, Inc. 2010a).

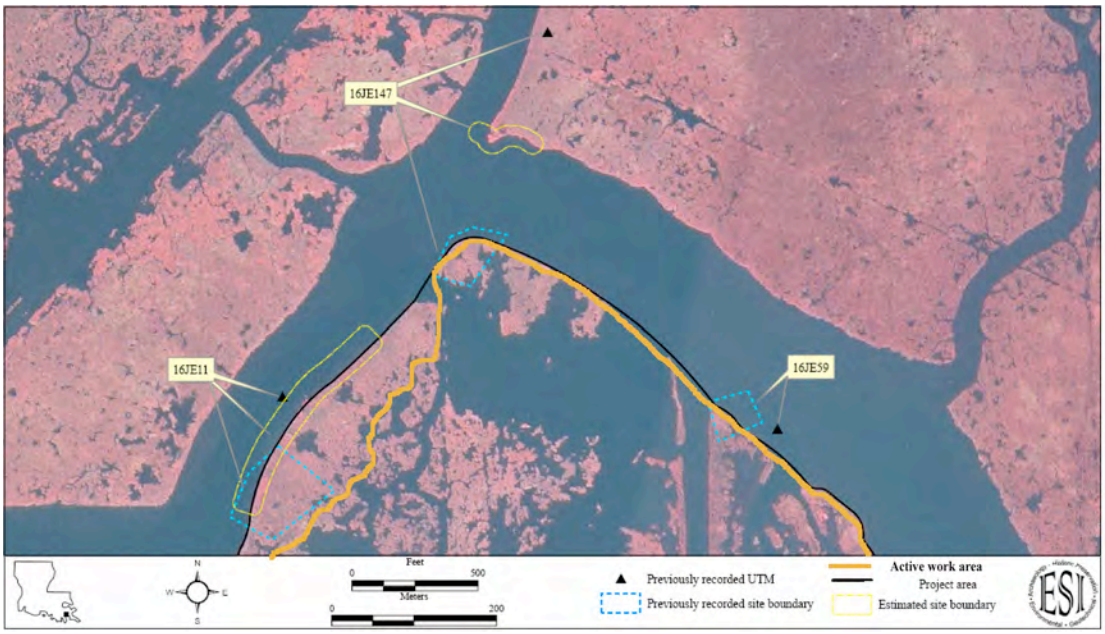
Auger tests at 16JE11 revealed a probable intact shell midden. Ceramic and faunal remains from Auger test were collected and recorded (Table 5). Earth Search, Inc. recommended that 16JE11 be avoided during marsh restoration activities. Since the Earth Search, Inc. report, the proposed project area active work area was adjusted to avoid the 16JE11 site, as recommended. Excavations of 16JE11 produced ceramics and study concluded the site is eligible for NRHP nomination (Earth Search, Inc. 2010b).

TABLE 5. CULTURAL RESOURCE AT 16JE11, JEFFERSON PARISH, LOUISIANA

Auger Test #	Depth (cm)	Type	Count	Weight (g)
Prehistoric Ceramics				
2	8-12	Baytown plain, *var. unspec*. body fragment	2	-
3	35-100	Baytown plain, *var. unspec*. body fragment	5	-
4	35-100	Mississippi plain, *var. unspec*. body fragment	1	-
6	35-100	Baytown plain, *var. unspec*. body fragment	1	-
11	35-100	Baytown plain, *var. unspec*. body fragment	3	-
Fauna				
1	8-12	*Rangia cuneata*	-	N/A
2	8-12	deer (*Odocoileus virginianus*)	-	1
3	35-100	bone	-	0.6
3	35-100	possible alligator (*Alligator mississippiensis*)	-	1.1
3	35-100	bowfin (*Amia calva*)	-	0.5
3	35-100	fish	-	0.6
3	35-100	alligator gar (*Lepisosteus spatula*)	-	2.3
3	35-100	*Rangia cuneata*	-	151.9
4	35-100	bone	-	1
4	35-100	gar (*Lepisosteus* sp.)	-	0.4
4	35-100	alligator gar (*Lepisosteus spatula*)	-	32.4
4	35-100	fish	-	4.4
4	35-100	*Rangia cuneata*	-	234.6
6	35-100	*Rangia cuneata*	-	20.4
11	35-100	*Rangia cuneata*	-	108.7
11	35-100	fish	-	0.7
11	35-100	bone	-	1.6
13	35-100	muskrat (*Ondatra zibethicus*)	-	0.9
13	35-100	crawfish/crab	-	>0.1
18	35-100	*Rangia cuneata*	-	N/A

Source: Earth Search, Inc. 2010

FIGURE 7 CULTURAL RESOURCE LOCATION MAP



3.3.1.2 Submerged Cultural Resources

Surveys of the proposed borrow area were conducted by Louisiana State University Coastal Studies Institute in 2007 using side-scan sonar, chirp sonar sub bottom profilers, and magnetometers. The borrow area is monitored at bi-monthly intervals as part of the Mississippi River Sediment Delivery System-Bayou Dupont Project (BA-39). No cultural resources have been located as a result of these surveys, nor through geotechnical investigations performed during project planning (OCPR 2010).

Nineteen magnetometer surveys were conducted in the proposed marsh and ridge creation area. Numerous anomalies were detected and determined to be noise, storm debris, or abandoned oil wells (OCPR 2010).

3.3.2 Socioeconomics (Income and Environmental Justice)

The population of Jefferson Parish is approximately 443,342 according to the 2009 census estimate (U.S. Census Bureau 2010). Jefferson Parish is home to an Asian-American population (3.6 percent) and African-American population (27.1 percent). A few Native Americans also reside in the parish (0.6 percent). In total, nearly 32.7 percent of the parish population is minority. Furthermore, 12.9 percent of the residents of Jefferson Parish are below the U.S. Census Bureau's definition of poverty.

Over 31,000 businesses operate in Jefferson Parish including health care, retail, and manufacturing professional services for the offshore oil and gas industry. Other prominent industries include banking, food processing, and transportation and distribution, according the parish Chamber of Commerce. According to the 2000 census, the median full-time annual income of Jefferson Parish residents was $47,065 (U.S. Census Bureau 2010). Jefferson parish is located along the Mississippi River and extends to the Gulf of Mexico including the Port of Grand Isle. Due to this strategic location, shipping and fishing are major industries.

3.3.3 Land Use

Once a largely rural area of farms, dairies and vast tracts of undeveloped land, Jefferson Parish today is New Orleans' first suburb, with Metarie as the largest of these communities. Human settlement is along rivers and bayous resulting in an elongated settlement patterns throughout much of the parish. As the population has increased, the once-isolated towns have spread and become an almost continuous settlement with few firm boundaries between communities.

3.3.4 Infrastructure

Substantial oil and natural gas activity occurs in Barataria Bay and along the Mississippi River adjacent to the proposed project area. The Mississippi River is the main source of shipping navigation for much of the nation. The Conoco-Philips Alliance Refinery is the nearest major infrastructure to the proposed project; the borrow area boundaries are north of the refinery to avoid impacting navigation. A 24” Gulf pipeline, 20” and 24” Plains pipelines are located downriver of the proposed borrow area.

3.3.5 Noise

The proposed marsh creation 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. The borrow area is a navigation route with noise associated with navigation and industries along the Mississippi River.

4.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA evaluates the anticipated environmental impacts 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 alternatives evaluated in this EA differ primarily in the construction of ridge and borrow location. All of the alternatives are designed to meet 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. Specific sources of analysis used to consider environmental impacts throughout proposed project development are the WVA and engineering design analyses (OCPR 2010). 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 the spring of 2007.

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 (OCPR 2010) provided the basis for designations of short- and long-term impacts. In the following sections, adverse 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 beneficial impact of increased elevation. 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 that causes 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 several meters away. 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 marsh habitat during the construction phase. Although the loss is spatially extensive, it is temporary, and the restoration would more than compensate for the temporary disruption of marsh 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 are those that involve “taking” of an endangered species, interfering with reproduction of a local population of fish or wildlife, or otherwise causing long-term, irreversible negative effects. In that case, the alternative would either be rejected or amended to include mitigative actions that reduce the impacts to acceptable levels, based on the EIS process.

The qualitative assessment 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 marsh habitats likely would occur along with associated declines in the quality of fish and wildlife resources. However, the preferred alternative could offset adverse impacts to these habitats.

Table 1 provides a quick reference for differences in the elements of the construction alternatives. Table 6 summarizes general construction plans for the preferred alternative. 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	Construction Equipment Deployed	Depth of Dredging Cut (NAVD88)	Cut: fill estimate	Quantity of Material Placed (cubic yards)
Containment Dike	mechanical dredge	-20 ft	2.5:1	56,087
Ridge	mechanical dredge/ marsh buggy hoe	-20 ft	2.5:1	100,655
Marsh	hydraulic dredge	-70 ft	1.5:1	1,746,970

Notes:

Depth of Dredging Cut is the maximum depth below existing grade for plan.
Quantity of Material Placed is without losses due to dredge cut:fill ratio.
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	With no-action, remaining marsh and ridge would continue to erode. Under the no-action alternative, material from the borrow area is likely to be used for other restoration projects in the area.	Materials for marsh and ridge construction would result in long-term, direct, beneficial impacts in the proposed project area. Marsh construction would result in coverage of shallow water habitat. Short-term, direct, moderate, adverse effects would occur in the proposed borrow areas associated with suspension of sediments.	Temporary impacts to existing marsh are the same as Alternative 1 and 2. Long-term benefits are less than Alternative 1, but more than no action. Borrow area impacts are the same as for Alternative 1.	Long-term beneficial impacts are the similar but less than to Alternative 1 and 2. Temporary impacts to existing marsh are the same as for Alternative 1. Borrow area impacts are greater than Alternative 1and 2.
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 and earthmoving equipment.	Same as Alternative 1	Same as Alternative 1
Surface Water and Water Column Resources	No direct impact. The cumulative impact of loss of the ridge and marsh would be to allow increased exchange of saline waters, leading to loss of intermediate marsh vegetation, and increased vulnerability to storm surge.	Dredging and material placement would result in adverse, direct, short-term, minor impacts to surface water quality associated with (1) increased turbidity and decreased dissolved oxygen 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 with less longevity.	Adverse impacts would be generally the same as for Alternative 1, but slightly greater. Beneficial impacts are similar to Alternative 1.
Wetlands	Continued erosion is expected to occur, resulting in losses to wetland resources.	Material placement would result in adverse, direct, short-term, minor impacts to wetlands. Material placement 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. More marsh would initially be created, but would be more vulnerable to erosion.	Adverse impacts would be the same as for Alternative 1. Beneficial impacts would be similar to 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
Vegetation	Continued conversion of marsh and shrub (ridge) vegetation to shallow open water.	The proposed action would result in short-term, adverse, direct, minor, and long-term, direct moderate, beneficial impacts to vegetation. Long-term increase in marsh and ridge vegetation would result.	Adverse impacts would be the same as Alternative 1. Beneficial impacts would be less than Alternative 1. More marsh would initially be created, but would be more vulnerable to erosion.	Adverse impacts would be the same as for Alternative 1. Beneficial impacts would be similar to Alternative 1.
Aquatic Biota, Fisheries, and Essential Fish Habitat	Marsh habitat would be lost, and shallow open water habitat would increase. Animals that rely on marsh vegetation and marsh edge habitat would 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 placement areas may be buried or injured. Short-term increases in turbidity may temporarily reduce habitat quality in the borrow areas and the placement areas. Long-term, moderate, direct and indirect beneficial impacts to EFH and nursery resources through protection, restoration, creation of marsh.	Beneficial and adverse impacts would be similar to Alternative 1.	Adverse impacts would be greater than Alternative 1 or 2. Positive impacts would be similar to Alternative 1 and 2.
Terrestrial Wildlife	Continued loss of terrestrial habitat (ridge and wetland).	Construction and dredging would result in localized, adverse, direct, short-term, minor impacts by construction disturbance. Ridge creation would result in beneficial, direct, long-term, minor impacts to terrestrial wildlife, and increase the longevity of existing ridge habitat.	The adverse impacts would be the same as Alternative 1. There would be less beneficial impacts than Alternative 1.	Impacts would be similar to those for Alternative 1.
Threatened, Endangered, and Sensitive Species	Loss of marsh habitat would adversely affect many species and is expected to diminish during the next 20 years.	Construction would avoid impacts to sensitive species, as coordinated with the USFWS and described in sections below. The proposed action would result in positive, direct, long-term, moderate impacts by increasing the marsh and ridge habitat for nesting birds.	Adverse impacts would be similar to those for Alternative 1. Beneficial impacts would be less than for Alternative 1.	Adverse impacts would be less than those for Alternative 1 for pallid sturgeon, but overall be the same as Alternative 1. Benefits would be similar to those for 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
Cultural and Historic Resources	No impact.	No impact. Dredging would not occur around cultural resources and placement would not require accessing cultural resource sites.	Same as Alternative 1.	Same as Alternative 1.
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, beneficial impacts to recreation, including improved fisheries nursery habitat.	Same as Alternative 1 with less long-term benefit to fisheries than the preferred alternative.	Same as Alternative 1.
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, moderate, adverse impacts are possible and would be avoided through buffer zones around areas of potential impact.	Similar to Alternative 1.	Similar to Alternative 1.
Socioeconomics	Loss of habitat that supports fisheries may lead to reduced income. Increased damage to the environment from storms has an economic impact.	No adverse impacts to socioeconomics are expected. The preferred project would 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 shorter duration.	No adverse impacts would occur. Positive impacts would be similar to Alternative 1.

TABLE 8. SUMMARY OF AVOIDANCE, MINIMIZATION AND MITIGATION MEASURES OF PROPOSED ACTION

Resource	Potential Avoidance, Minimization and Mitigation Measures
Geology, Topography, and Physical Oceanographic Processes	• Construction of the marsh area would replace borrow sediments used to construct the ridge and containment dikes. • Containment dikes would contain placed materials to allow for consolidation and stabilization. • Vegetative plantings of disturbed areas would stabilize soil, and reduce resuspension of recently deposited sediment. • Borrow area in the river would refill naturally through river processes.
Air Quality	• Best management practices, including possible revegetation through plantings, would minimize exhaust fumes and fugitive dust. Creation of marsh habitat, primary production, would benefit air quality in long-term.
Surface Water and Water Column Resources	• Best management practices, containment dikes, and compliance with COE river dredging regulations would prevent or minimize soil erosion. • Compliance with the Clean Water Act and other regulations would protect water resources. • Post-construction dike gapping would allow natural surface water flow when regulation of flows is no longer needed for soil retention.
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 use native species in vegetative plantings.
Aquatic Biota, Fisheries, and Essential Fish Habitat	• 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 coordination with appropriate federal, state, and local agencies would focus on protecting sensitive species. • Tidal features would be maintained in the marsh via containment dikes to retain 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 would focus on protecting sensitive wildlife species.
Threatened, Endangered, and Sensitive Species	• Coordination with the U.S. Fish and Wildlife Service, NOAA Fisheries Protected Resources, and state agencies on state and federally listed species would focus on protecting threatened and endangered species. • Bald Eagle, nesting colonial waterbirds, and pallid sturgeon would be avoided given provisions listed in sections 4.3.4 and 4.3.5.
Cultural and Historic Resources	• Magnetic and acoustic anomalies identified no sensitive submerged cultural resources in the borrow areas. • Access and construction would avoid the identified cultural resources as stated in section 4.4.2. • Appropriate Section 106 Consultation with the Louisiana State Historic • Preservation Office 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 extensive magnetometer surveys of proposed borrow areas.
Socioeconomics	• Coordination with appropriate federal, state, and local agencies would ensure that public concerns are addressed.

4.1 IMPACT-PRODUCING FACTORS

Some features of dredging generate expected environmental impacts. Dredging is a common engineering practice, as evidenced from its widespread use and information on the subject, such as the Handbook of Dredging Engineering (Herbich 2000). Using dredge material has become a common method of restoring marsh since 1969, as discussed in Approaches to Coastal Wetland Restoration: northern Gulf of Mexico (Turner and Streever 2002). This section summarizes information from those texts and other pertinent literature on the subject.

4.1.1 Dredge Operating Characteristics

Dredging operations for marsh creation projects generally involve hydraulic pipeline dredges (cutterhead, dustpan, plain suction, and sidecaster dredges), hopper dredges, and mechanical dredges (bucket dredges or draglines). The type of dredge used is determined by the kind and quantity of material to be dredged, depth of dredging, distance to placement area, environment of placement area, degree of contamination of sediments, and equipment availability. Marsh buggy excavators would be used to build containment and ridge features. A 30" hydraulic dredge with approximately 50,000 linear ft of steel pipeline would be used to transport material from the Mississippi River borrow area to the project marsh creation site.

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.

Not all material dredged is retained for use in the disposal area, as loss of sediments occurs at the dredge site and fill site. The proposed alternative would create dikes with mechanical dredges prior to pumping in hydraulically dredged material for the marsh creation to confine material until it settles and dewaters. The physical characteristics of the borrow material and fill area determine losses. For example, fine silts are more likely to be lost since they more easily suspended in water (slurry) than heavier materials. The proposed alternative would involve mostly heavier materials (sand) and minimize losses.

Impacts to water quality are less for mechanical dredging than for hydraulic dredging, because there is less mixing of sediment with water than in hydraulic dredging. Mechanically dredged material requires less de-watering, so less is lost from the disposal area. However mechanical dredging requires more direct handling of material by equipment and is limited by the consolidation and weight characteristics of dredge sediments.

4.1.2 Effluent Discharge

When the dredge is operating, resuspended materials are localized in the vicinity of the excavation tool. These materials then act as other river suspended sediment movements by staying suspended or settling based on river water flow.

4.1.3 Placement of Dredged Material

Marsh fill would be delivered hydraulically to the project area via steel pipeline. The pipeline would be transported to the site on pontoons and roads in approximately 40-ft sections. Approximately 50,000

linear feet of pipeline would be placed into position alongside waterways and roads. Floating (pontoon) pipeline may be necessary to traverse waterways.

Containment dikes would be constructed along the perimeter of the marsh creation area along current and historic ridges to retain discharge of marsh fill material and minimize material losses. Containment dikes would enclose two marsh creation areas in order to maintain an existing access canal (Figures 4 and 5). The sediments would settle out while the water would drain to the adjacent waterways. The dikes, which would be several hundred feet long, would be constructed of in situ sediments prior to marsh fill disposal using marsh buggy excavators. After a given marsh section was filled to grade, the pipe would be extended by adding additional pipe onto the end or material moved into place using the marsh buggies. The dikes would be gapped approximately 1 year after construction. This period of settlement and dewatering of materials varies due to weather, and material characteristics. Gapping dikes would allow water channels to naturally development in the marsh creation area and allow water exchanges with the creation area to improve productivity and aeration. 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 Bayou Dupont ridge has severely eroded, such that sections historically in the proposed project area are now shallow open water. Adjacent to the project area ridges exist in a degrading state from erosion and subsidence. Geomorphology in the project area is characteristic of a highly eroding, sediment-deficient system with marsh areas increasing in salinity and converting to open water bays. With no action, continued erosion and continued excess water exchange with existing marsh and adjacent bayou edges would occur. Without action, the WVA predicts 10 acres (4 ha) of the remaining marsh would disappear and no ridge would be formed. Under the no-action alternative, material from the borrow areas is likely to be used for other restoration projects in the area as sediment sources have long been recognized as a limited resource (Galliano and van Beek 1973).

Preferred Alternative

Under the preferred alternative, materials dredged from borrow areas would recreate the ridge and create marsh habitat. The WVA predicts ridge habitat would increase from zero to 20 acres (8 ha) for the first ten years of initial construction and maintain approximately 19 acres (8 ha) 20 years after construction. Elevation in the proposed project area would increase, creating upland and more marsh habitat. The WVA predicts this action would bury approximately 95 acres (38 ha) during construction. By the fifth year, the WVA predicts recuperation of those 95 acres plus a gain of 92 acres (37 ha). By 20 years after construction, the WVA predicts a net gain of 186 acres (76 ha) compared to the no action alternative.

Construction would cover existing marsh and shallow open water habitat (OCPR 2010). Marsh would be constructed at an elevation of +3.0 ft NAVD88 to account for material desiccation, consolidation, and compaction. In October 2008, marsh elevation in the proposed project area averaged +1.5 ft NAVD88**.** Extensive containment diking would be built because marsh would be constructed in currently exposed shallow open water. After sediment is consolidated, gaps would be placed in strategic places along the dike to return tidal influence to the marsh and thus increase its habitat value (OCPR 2010).

The dredged material used in both ridge and marsh construction would consist of naturally occurring material deposited in the borrow areas over time by riverine processes. Vegetative plantings would be used to stabilize soil, reduce resuspension of recently deposited sediment, and encourage sedimentation. Plantings would increase plant diversity and provide a seed source of diverse species for marsh and ridges in and around the project area.

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 area would be expected to rearrange by natural processes, and pre-dredging bathymetric contours would return to the dredged areas.

Alternative 2

The beneficial impacts are similar to the preferred alternative. Impacts of placing dredged materials onto existing marsh habit would be the same as the preferred alternative. More borrow material would be needed for marsh creation. Therefore short-term, direct, moderate, adverse effects would occur in the proposed borrow area with less long-term benefit to the marsh creation area.

Alternative 3

The initial beneficial impacts of this alternative would be similar to the preferred alternative and Alternative 2. The minor temporary adverse impacts of the borrow area would be in interior marsh with a greater probability to impact nearby marsh vegetation and hydrology. The fine-grained interior lake borrow material would likely settle more than the sand containing material of Alternatives 1 and 2. Therefore, this alternative would produce long-term benefits less than Alternatives 1 and 2 but greater than the no-action alternative.

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.

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

Impacts to air quality from the preferred action would be associated with emissions from diesel engines that would power the dredging machinery, and material placement operations. Emissions would occur over a period of a few months, with most emissions occurring at the dredge and ridge creation sites. 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. Revegetation would hold sediments in place over the long term. The impact to human health would be negligible because the proposed project area is remote 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 recreational 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.

Alternative 2

Impacts to air quality are not expected to differ substantially from those described for the preferred alternative.

Alternative 3

Impacts to air quality are not expected to differ substantially from those described for the preferred alternative.

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 existing marsh would be to allow increased water exchange with adjacent marshes. The increased salinity would lead to loss of brackish and intermediate marsh vegetation, rendering the area more vulnerable to storm surge.

Preferred Alternative

Impacts associated with the Mississippi River dredging required for implementation of the preferred alternative would include: (1) increased turbidity and decreased dissolved oxygen 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. Water quality would be affected by two components of operations: dredging, and marsh/ridge creation.

During dredging, silt or clay 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 dissolved oxygen levels in the water column would decrease. Turbidity and suspended particulate levels in the water column above the preferred borrow area normally high as a result of riverine processes. The increased turbidity is expected to be negligible within the river system.

During ridge and marsh creation, slurry would be pumped into shallow open water through a temporary pipeline, as described in Section 4.1.3. Sands would settle out rapidly; water would separate from the slurry and drain through dike openings. Most silt and clay suspended solids would settle into the marsh creation area prior to slurry waters draining from the construction area. Constructed retention dikes would be necessary to allow the suspended solids to settle. Any exhumed contaminants, or trash and debris present in the dredged material also could be deposited. The construction of ridges and marsh

would occur in stages. Ridges and retention dikes would be constructed first, then creation of marsh. Though suspended particulate matter levels in the receiving waters could increase temporarily, the increase would occur in a limited area where construction was active and would minimally affect water quality.

Alternative 2

Impacts to water quality are not expected to differ substantially from those described for the preferred alternative.

Alternative 3

Overall impacts to surface water resources are not expected to differ substantially from those described for the preferred alternative. Short-term impacts would be increased because the borrow area at the interior lake (the Pen) location would increase turbidity for a larger area. The volume of marsh fill is the same as for the preferred alternative (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 are expected to have similar impacts on the biological environment. The principal difference among the alternatives is the expected longevity of the marsh following restoration.

4.3.1 Impacts on Vegetative Communities

No Action

With no action, continued erosion and subsidence are expected to occur, resulting in losses to vegetative resources. Approximately 10 acres (4 ha) of marsh are expected to be lost in the next 20 years (NMFS 2010a).

Preferred Alternative

The preferred alternative would exert beneficial long-term impacts on vegetative communities of the area (NMFS 2010a). Adding elevation to marshes would help offset local subsidence, increase vegetative productivity and decrease marsh conversion to open water. Increasing the elevation in the area would be beneficial to vegetative communities, reducing flooding stress on the plants and allow time for vegetation to colonize and contribute to the elevation. Accumulation of organic material is a primary factor influencing the vertical accretion of marshes. Creation of the ridge would allow for shrub species to colonize and stabilize the ridge sediments allowing a greater diversity of vegetation to be supported in the project area. Creation of the ridge would also protect marsh vegetation from excessive water exchanges that stress the plants and erode their soils.

Implementing the preferred alternative would unavoidably affect 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, and approximately 95 acres (38 ha) of marsh initially buried by slurry sediments. As evaluated under CWPPRA's Wetland Value Assessment, the preferred alternative is anticipated to result in the creation and restoration of about 186 acres (72 ha) of marsh after initial project construction and post-construction consolidation and settlement.

Alternative 2

This alternative would have long-term impacts on vegetative communities by adding elevation and increasing marsh vegetation, similar to the preferred alternative. The diversity of vegetation would be less than the preferred alternative. Area that would be ridge in the preferred alternative would be containment dike and marsh. While more marsh area would initially be created with this alternative, the marsh would be more susceptible to erosion due to having more fine-grained rather than sandy materials that would likely decrease the amount of marsh by 20 years after construction compared to the preferred alternative.

Alternative 3

Impacts to vegetation are not expected to differ substantially from those described for the preferred alternative.

4.3.2 Impacts on Fisheries and Aquatic Resources

No Action

The quality of fish habitat is expected to decrease as the marsh habitats are converted to open water through erosion and subsidence. The function of the marsh as nursery habitat for estuarine-dependent species would be 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 and polycheates, during dredging in the borrow areas; 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 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. 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. Fish and invertebrates are expected to recover as turbidity returns to pre-construction levels. There is expected to be a low potential for creation of persistent low dissolved oxygen conditions that would impact fisheries and aquatic biota in the borrow and placement areas given the disturbance and turnover of the borrow site from recent use and the shallow nature of placement area, respectively.

Neither the total volume of material to be dredged nor the estimated area of dredge is significant. Benthic communities in the preferred borrow area already inhabit a dynamic environment subject to perturbations and disturbances, such as high turbidity from river bedload, dredging for navigation and hypoxia. Natural

recurrent disturbances result in a benthic community characterized by early stages of succession; a return to the typical community structure is expected to occur rapidly.

The quality of fish habitat would increase over the 20-year life of the preferred alternative. The marsh habitat would provide nursery for estuarine-dependant fisheries. Access to the marsh habitat would still be possible through maintained water channels and gaps in the dike.

Alternative 2

Impacts to fisheries and aquatics are not expected to differ substantially from those described for the preferred alternative. The decreased longevity and diversity of vegetation compared to the preferred alternative could have indirect decreased benefits to fisheries and aquatics. Fisheries dependant on estuarine habitat would have less benefit in the long term than with the preferred alternative.

Alternative 3

The adverse and beneficial impacts on fisheries and aquatic resources would be similar to the preferred alternative, but with more uncertainty in achieving the intended benefits.

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 marsh converts 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 estuarine-related EFH by re-establishing marsh and protecting marsh habitat from erosion. Marsh and marsh edge habitat would increase with vegetative and hydrological features that develop post-construction. Those features may be initiated with gapping of the dikes and vegetative plantings, if necessary. Detrital material, formed by the breakdown of emergent vegetation, would contribute to the aquatic food web of the surrounding ecosystem. Decreases in tidal and storm erosion would protect estuarine mud bottoms and marsh ponds. Thus, the preferred alternative would restore more productive habitats supportive of brown shrimp, white shrimp, and red drum.

Short-term, unavoidable, adverse impacts to habitats supportive of various life stages of brown shrimp, white shrimp, and red drum would occur during the construction phase of the proposed project as marsh is filled and created. Approximately 95 acres (38 ha) of marsh would be covered by fill, according to WVA estimates, 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 of 95 (38 ha), and the anticipated 272 acres (110 ha) to remain after twenty years of no action, a total net of 186 acres (72 ha) of marsh habitat are projected to benefit from the preferred alternative in WVA estimates. Turbidity would return to ambient conditions post-construction.

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 acres of similar substrate are available to organisms outside of the areas to be dredged.

Alternative 2

The impacts to EFH would not differ substantially from those associated with the preferred alternative.

Alternative 3

Temporary, adverse impacts to EFH in the borrow area would be greater than for the preferred alternative because more dredging of estuarine habitat would occur. Otherwise, the impacts to EFH would not differ substantially from those associated with the preferred alternative.

4.3.4 Impacts on Wildlife Resources

4.3.4.1 Coastal Birds

No Action

With no action, the continued conversion of marsh to open water (NMFS 2010a) may increase the foraging area for the lesser scaup. Over time the habitat would become less suitable for this species as aquatic vegetation declines. Ducks, furbearer, game mammals, wading birds, and seabirds would continue to decrease (LCWCRTF and WCRA 1999). No habitat for migratory birds would develop.

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. Proposed project modifications to avoid impacts to wildlife were coordinated with USFWS (2010): For colonies containing nesting wading birds (herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 ft of a rockery would be restricted to the non-nesting period, depending on the species present. USFWS would be contacted if any rookeries were observed in the project area to report their locations. All on-site contract personnel would be informed of the need to identify colonial nesting birds and their nests, to avoid affecting them during the breeding season.

The quantity and quality of habitat for wildlife would increase over the 20-year life of the proposed alternatives (NMFS 2010a). Creation of the ridge would provide habitat for birds, furbearer and game mammal populations that does not exist and would not exist with no action. Many bird species are migratory or permanent residents and depend on marsh of the proposed project area. Population numbers of bird species are expected to increase in response to implementation of the proposed alternatives. The WVA predicts 17 acres (7 ha) of habitat in the project area that does not exist and would not develop with no action would be available to wading birds and other wildlife with the preferred alternative. In the long term, increasing habitat for wildlife through creation of marsh and ridge habitat would offset any losses.

Alternative 2

The temporary disturbance of wildlife during construction would be similar to the preferred alternative. However, the long-term benefits of increased diversity of habitat and upland ridge creation would be less than for the preferred alternative.

Alternative 3

Temporary adverse impacts and long-term benefits to wildlife during construction would be similar to the preferred alternative, but long-term benefits would be less than for the preferred alternative. The erosion of marsh and ridge would be greater than Alternatives 1 and 2, but remaining marsh after 20 years would be greater than with no action.

4.3.4.2 Impacts on Mammals and Reptiles

No Action

Without action, the existing marsh would continue to retreat, and the borrow areas would be dredged for other purposes. Loss of the marsh would increase the area of open water, thereby reducing habitat available for land-based mammals and reptiles. Marine mammal populations would likely remain unaffected by the conversion to open water. Minor, potentially adverse impacts to marine mammals could result from loss of marsh habitat, as marine mammal prey species depend on the wetland nursery habitat.

Preferred Alternative

Mammals, reptiles, and amphibians would also most likely increase in the proposed project area as habitat is either created or improved in quality. Habitat for bats and small mammals would increase over time through creation of the ridge. These species are present in the Barataria Basin, but not currently in the proposed project area. These species are likely to colonize concurrent with establishment of vegetation.

The possibility that bottlenose dolphin would occur at the disposal site in summer is possible but unlikely as water depths around the marsh creation area are shallow for this species. They would avoid the area because of noise and increased turbidity if present. If they were present during construction, contractors would be advised to halt work until they dolphins were out of the active construction location. A long-term beneficial impact from increasing mammal, reptile, or amphibian habitat and/or the habitat of their prey would be expected.

Alternative 2

Impacts to marine mammals resulting from Alternative 2 would be similar to the preferred alternative. Land-based mammals and reptiles would not benefit from the creation of ridge habitat, as expected in the preferred alternative.

Alternative 3

Impacts to marine mammals resulting from Alternative 3 would be similar to the preferred alternative.

4.3.5 Impacts on Threatened and Endangered Species

No Action

Without action, existing marsh habitat would continue to be converted to open water, and no ridge habitat would develop. No increase in nesting location for bald eagle would develop. With no action, there would be no immediate threat of pallid sturgeon being harmed by dredge equipment.

Preferred Alternative

Bald Eagle: By following guidance provided by USFWS listed below, implementation of the project would not likely adversely affect the bald eagle. Potential long-term benefits may result through creation of roosting habitat along the ridge. The State of Louisiana is the owner of the construction contract and would be made aware of the recommendations described below. NOAA would to the maximum extent practicable, continue to inform the State and their Contractor of the construction requirements necessary to prevent effects to the bald eagle. Bald eagle may nest in the tall trees adjacent to the project area (USFWS 2010a), though none are known to occur there at this time. In the event a nest(s) are observed in the area, the proposed project would maintain a distance of 500 ft (49 m) of the nest. Additionally, should any work activities associated with the proposed project encroach within 1,500 ft (147 m) of an eagle nest during the nesting season of October through mid-May, the USFWS would be contacted for further coordination. Finally, construction activities would ensure that bald eagle nest trees are not adversely affected, including their root systems through soil compaction or disturbance.

Pallid Sturgeon: By following guidance provided by USFWS listed below, implementation of the project would not likely adversely affect the pallid sturgeon (USFWS 2010b). The State of Louisiana is the owner of the construction contract and would be made aware of the recommendations described below. NOAA would to the maximum extent practicable, continue to inform the State and their Contractor of the dredging requirements necessary to prevent direct or indirect effects to the pallid sturgeon. These requirements are as follows: 1.) The cutterhead shall remain completely buried in the bottom material during dredging operations. 2.) If pumping water through the cutterhead is necessary to dislodge material, or to clean the pumps or cutterhead, etc., the pumping rate shall be reduced to the lowest rate possible until the cutterhead is at mid-depth, where the pumping rate can then be increased. 3.) During dredging, the pumping rates shall be reduced to the slowest speed feasible while the cutter head is descending to the channel bottom.

Alternative 2

The same avoidance measures would be taken as in the preferred alternative to eliminate impacts to threatened and endangered species. Potential adverse impacts are similar to the preferred alternative, but benefits to bald eagles could be less than with the creation of potential roosting habitat of the preferred alternative.

Alternative 3

Due to the difference in the borrow location, potential impacts to the pallid sturgeon would be less than the preferred alternative and Alternative 2, and the same as with no action. Otherwise, temporary adverse impacts to endangered species would be similar to the preferred alternative. Benefits would be the same as for the preferred alternative.

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

Cultural resource investigations were conducted as described in Section 3.3. Potential effects resulting from the no-action and alternatives are evaluated in Section 4.4.2.

4.4.2 Impacts on Cultural Resources

No Action

Under the no-action alternative, the marsh would continue to erode and subside. This erosion could result in any additional loss of historical cultural resource sites 16JE11 and 16JE147. As sites erode, features become damaged and can be washed into nearby waterways. Additionally, the loss of marsh itself is considered a loss of a current cultural resource, as it negatively affects current communities in the region.

Preferred Alternative

From avoidance procedures, no adverse impacts to cultural resource would result from the preferred alternative because the project area of work was adjusted to avoid 16JE11 (Figure 7). Therefore no project activities would occur on 16JE11. Additionally, 16JE11 would be avoided in accessing the project area. The pipeline access and marsh buggy access would be on the southern and eastern sides of the project area, away from the 16JE11 site. No other resources have been identified in the area.

Alternative 2

Impacts to cultural resources would not differ from the preferred alternative.

Alternative 3

Impacts to cultural resources would not differ from the preferred alternative.

4.4.3 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 water habitat would change the nature of the recreational activities that it can support. In the long term, fishery activities would decline as species dependent on the marsh decline.

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/recreation would be similar to the preferred alternative. The expected benefits would not be as long-lasting, because the created habitat would erode more quickly than with the preferred alternative.

Alternative 3

Impacts to land use/recreation would not differ from the preferred alternative.

4.4.4 Impacts on Infrastructure

No Action

The no-action alternative would not immediately affect infrastructure in the area. Infrastructure would continue to increase in vulnerability to storm surge damages concurrent with marsh erosion and subsidence.

Preferred Alternative

Construction would avoid pipelines, levees and commercial infrastructure near the borrow areas. Dredging in the Mississippi would be in accordance with COE regulations by occurring 1.) at least 750 ft (228.6 m) from any levee center line, 2.) outside the USACE maintained navigation channel, 3.) over 4,000 ft (1,219 m) upstream of any bridge crossing, and 4.) with side slopes no steeper than 1(V):5(H).

Dredging and associated activities can affect pipelines if the dredge drag head crosses a buried pipeline. In addition to the above USACE compliance, dredging would occur no less than 500 ft (152.4 m) from a known pipeline and north of an operating refinery.

The most serious accident scenario from the dredging operation would be a pipeline rupture followed by an oil spill. This event would not be likely, but it warrants consideration because positions of pipelines have been known to be unmarked. Magnetometer surveys of the borrow area would be required of the contractor prior to dredging. Nineteen magnetometer lines were surveyed of the marsh area to identify locations of pipelines. Four possible abandoned wells with locations noted in the preliminary design documents (OCPR 2010). Construction specifications include requirements of a setback distance from all wells.

Alternative 2

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

Alternative 3

The beneficial impacts of implementing Alternative 3 are not expected to differ from those described for the preferred alternative. Although dredging of the interior marsh area would not require following COE Mississippi River guidelines, similar avoidance procedures would be necessary. Area pipelines would require survey by the contractor and avoidance measures.

4.4.5 Impacts on Socioeconomics

No Action

Under the no-action alternative, the marsh would continue to 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.

Collapse of the shrimp industry would directly affect income of fisherman in Jefferson Parish, including Asian-American (3.6 percent), and African-American (27.1 percent) and Native Americans (0.6 percent). People of Southeast Asian descent are disproportionately affected by declines in shrimping and fishing. By 1990, more than 1 in every 20 Louisiana fisher and shrimper 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 (Bankston 1996, as cited in Hemmerling and Colten 2003). This would add to population in poverty in the parish, last reported at 12.9 percent (U.S. Census Bureau 2000). While this alternative would not collapse the shrimp industry, continued loss of marsh habitat would create moderate to significant adverse impacts in the long-term.

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 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 better protected, 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 the preferred alternative, but benefits would be of shorter duration.

Alternative 3

Socioeconomic impacts would not differ substantially from implementation of the preferred alternative.

4.4.6 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 the preferred alternative.

Alternative 3

Impacts are similar to the preferred alternative.

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.

Coastal Louisiana, including the project area, has greatly been impacted by natural subsidence (Reed and Yuill 2009), levees, hurricanes, and oil and gas infrastructure. Sections 1.3 and 1.42 of this EA include information on the past and current environmental conditions of the project area. Land losses result from levees, oil and gas activities, and subsidence in this area of coastal Louisiana. Recent events, such as hurricanes or oil spills, contribute to the loss of habitat but not enough to be discernible from other impacts.

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. Similar projects in the area, listed below, would operate synergistically with the preferred alternative to increase the sediment supply in the area, enhance the structural integrity of the ecosystem, and improve primary productivity rates, thereby improving overall environmental resources in the vicinity. Similar projects in the area include, but are not limited to: Davis Pond Freshwater Introduction (BA-01), Naomi Outfall Management (BA-03c), Jonathan Davis Wetland Protection (BA-20), Barataria Bay Waterway East Side Shoreline Protection (BA-26), Barataria Basin Landbridge Shoreline Protection (BA-27 c and d), Dedicated Dredging on the Barataria Basin Landbridge (BA-36), and Mississippi River Sediment Delivery System –Bayou Dupont (BA-39). Information on other CWPPRA projects in the vicinity is available at www.lacoast.gov. These projects synergistically re-establish hydrology. They are constructed at different times such that there is not a risk of cumulatively significant effects on the biological, physical or socioeconomic resources described. The potential that all projects, when considered cumulative could have a positive effect on the resources, but the degree of significance is unknown.

4.5.1.1 Wetland enhancement projects

The Coastal Restoration Division of the OCPR and the New Orleans District of the USACE are jointly sponsoring the Davis Pond Freshwater Diversion (BA-01). That project consists of managing a diversion of water from the Mississippi River to reduce salinities and increase nutrients and primary productivity of area marshes. The structure was constructed in 2001, and was designed to reintroduce up to 10,650 cfs of water, sediment and nutrients in to Barataria Bay. The Naomi Outfall Management project (BA-03c) sponsored by OCPR and NRCS, manages flow of eight siphons toward a similar of the Davis Pond Freshwater Diversion. The maximum discharge of the siphons is 2,100 cfs.

The Mississippi River Sediment Delivery System-Bayou Dupont (BA-39) finished construction in Spring 2010 and protects marshes adjacent to the preferred alternative of this EA. The proposed dredge pipeline corridor in this project's preferred alternative follows the perimeter of the BA-39 project area. The

pipeline would be placed in a manner to avoid or minimize impacts to the hydrology of the BA-39 area such that they would be temporary and minor.

4.5.1.2 Wetland Protection projects

Several projects in the vicinity of the proposed action have a shared purpose of protecting marsh habitat in the vicinity of the proposed action. Jonathan Davis Wetland Protection (BA-20), sponsored by the NRCS and OCRP, constructed several hydrologic controls and rock dikes in 2001 for the purpose of protecting marsh from erosion. Four projects include construction of rock dike to protect adjacent marsh from erosion caused by excessive water exchange. The Barataria Bay Waterway East Side Shoreline Protection (BA-26) is 17,600 ft (5,364 m) in length, while Barataria Basin Landbridge projects are around 10,000 to 30,000 ft (3,048 to 9,144 m) in combined total length in Jefferson Parish.

4.5.1.3 Summary of Cumulative Impacts

Physical cumulative impacts are related to mining borrow sediments. Borrowing from the river is not expected to have any interacting cumulative effects on river conditions because the river is being continually dredged in specific locations to maintain navigable waters. Borrowing from interior sediment, such as in Alternative 3, could result in minor adverse cumulative impacts by increasing the depth of open water areas. Cumulative impacts as a result of 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 alternatives 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 increase in quality.

Biological cumulative impacts of the CWPPRA and other restoration projects would be similar to the direct and indirect impacts of the alternatives described previously. All alternatives, except the no-action alternative, would work with existing projects to enhance habitat for fish, wildlife, vegetation, and EFH. Cumulatively, all construction alternatives would increase benefits to the area by decreasing land loss rates. No cumulative adverse impacts are anticipated.

Cultural cumulative beneficial impacts may result from synergy of the construction alternatives with nearby restoration projects. These projects would cumulatively decrease losses of habitat, thereby maintaining more of the economy and storm protection than with no action. The construction alternatives are similar to previous actions in the area that have had no adverse cultural impacts. No adverse cumulative impacts would be expected.

4.5.2 Invasive Species

Executive Order 13112 requires federal agencies to use authorities to prevent introduction and control (in cost effective and environmentally sound manners) invasive species, and to provide for restoration of native species and habitats in ecosystems that have been invaded. 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. If woody invasive species colonize the project area, an eradication plan is being developed and funds for its execution are envisioned as part of the projects 20-year maintenance.

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 opportunities for the public and CWPPRA agencies to comment on the proposed project. The project was discussed in public meetings for CWPPRA where project details were made available on several occasions. A draft EA was provided to those listed in Section 7.0, as well as available for public comment via announcement in the Times Picayune in October 2010. Comments received from both of these processes are provided in Appendix A. The preferred alternative is not expected to cause adverse environmental impacts that would require compensatory mitigation.

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 would 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.

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. The EA was prepared for the purpose of complying with the NEPA.

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 USACE chairs the CWPPRA Task Force that approved Phase I of this project so they are familiar with the action and its intent. The Louisiana Department of Environmental Quality was notified of the proposed project through a 404 permit that is in process.

Clean Air Act of 1970: Under the Clean Air Act of 1970, Congress established procedures for developing National Ambient Air Quality Standards (NAAQS) for the protection of human health and public welfare. EPA published the NAAQS in 1971, and they became effective at that time. Standards are provided for the following criteria pollutants: carbon monoxide, sulfur dioxide, nitric oxide, ozone, lead, and fine particulate matter. EPA reviewed a draft of the EA and their concerns were incorporated in the analysis (Appendix A).

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 could potentially ensure compliance through this mechanism. The USACE 404 permit is in process.

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. In order to comply with CZMA, the project will need a Coastal Use Permit prior to construction, which is issued by the LDNR during the USACE 404 permit process. Application for the USACE 404 permit is in process.

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. By restoring and reestablishing wetlands, the proposed action is consistent with this Executive Order.

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. This was evaluated in this EA, no further action taken.

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. USFWS consult was completed November 2010 (Appendix A). NMFS was not consulted as activities of concern were in fresh (river) not marine water.

Migratory Bird Treaty Act of 1918: The Migratory Bird Treaty Act requires the protection of ecosystems of special importance to migratory birds against detrimental alteration, pollution, and other environmental degradation. These consultations are generally incorporated into Section 404 of the CWA, NEPA, or other federal permit, license or review requirements. USFWS was consulted (USFWS 2010a and b, Appendix A).

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. USFWS was consulted (USFWS 2010a and b, Appendix A).

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. This was concluded as reported in Earth Search (2010b).

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 National Register of Historic Places (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. This was concluded via a letter dated January 6, 2011 (Appendix A).

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. This was completed in various stages as indicated throughout this EA.

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. This was concluded via a letter dated November 9, 2010 (Appendix A).

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 marshes, ridges and barrier islands Louisiana's healthy and highly productive coastal ecosystem would not be maintained.

This EA finds that the Bayou Dupont Marsh and Ridge Creation Project would not result in direct, indirect or cumulatively significant impacts on the human environment, including biological and physical aspects. The project 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 to substantial. This conclusion is based on a comprehensive review of relevant literature, site-specific data, 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. The increase of fisheries habitat is expected to have long-term beneficial local social and cultural impacts as it relates to recreational and commercial fishing. In addition, the preferred alternative would result in increased protection of adjacent marsh in the area to be restored. NMFS will prepare a separate Finding of No Significant Impact, if, after consideration of this EA and any other relevant environmental information, it determines that such a finding is warranted.

6.0 PREPARERS

This EA was prepared by Joy Merino, Fisheries Biologist, under the guidance of Cheryl Brodnax, Cecelia Linder, and John Foret, Ph.D. of NMFS, in consultation with USFWS, Louisiana SHPO, NOAA Fisheries Southeast Region Protected Resources Division, and the CWPPRA Technical Committee. Correspondence is provided in Appendix A.

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. A draft EA was announced in the Times Picayune October 2010 and available for public review. A final EA will be made available to the public at www.lacoast.gov along with other public records for the Bayou Dupont Marsh and Ridge Creation Project (BA-48).

Thomas A. Holden, Chairman
Deputy District Engineer
U.S. Army Engineer District, New Orleans
Office of the Chief
7400 Leake Ave.
New Orleans, Louisiana 70160-0267

Darryl Clark
Senior Field Biologist
U.S. Fish and Wildlife Service
646 Cajundome Blvd, Suite 400
Lafayette, Louisiana 70506

Kirk Rhinehart
Acting Asst. Secretary
Office of Coastal Protection and Restoration
617 North 3rd Street
Baton Rouge, Louisiana 70804-4027

Richard Hartman
Fishery Biologist
National Marine Fisheries Service
Rm 266 Military Science Bldg
South Stadium Drive, LSU
Baton Rouge, Louisiana 70803-7535

Karen McCormick

Environmental Protection Agency, Region 6
Water Quality Protection Division (6WQ-EM)
1445 Ross Avenue
Dallas, Texas 75202-2733

Britt Paul, P.E.
Assistant State Conservationist/Water Resources
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Chalres McGimsey
State Historic Preservation Office
1051 North 3rd Street Rm 405
Baton Rouge LA 70802

Heather Dyer
U.S. Fish and Wildlife Service
646 Cajundome Blvd., Suite 400
Lafayette, Louisiana 70506

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Appendix A
Correspondence on Bayou Dupont Marsh and Ridge Creation Project

United States Department of the Interior

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

July 30, 2010

Ms. Joy Merino
National Marine Fisheries Service
646 Cajundome Boulevard, Room 175
Lafayette, LA 70506

Dear Ms. Merino:

Please reference your July 20, 2010, letter requesting a list of endangered and threatened species that may occur within the Bayou Dupont (BA-48) Marsh and Ridge Creation Project, located in Jefferson Parish and Plaquemines Parishes, Louisiana. The proposed project area encompasses 317 acres of intermediate to brackish marshes and shallow open water and will include a borrow area (located within the Mississippi River) and associated pipeline corridor. The U.S. Fish and Wildlife Service (Service) has reviewed the information you provided, and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d), and the Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.)

In your letter you indentified the following species as likely to be present in the proposed project area: the endangered West Indian manatee (*Trichechus manatus*), the endangered brown pelican (*Pelecanus occidentalis*), the threatened piping plover (*Charadrius melodus*), and its critical habitat, the threatened bald eagle (*Haliaeetus leucocephalus*), and the endangered pallid sturgeon (*Scaphirhynchus albus*). Based on our records, it is unlikely that manatees or piping plovers would be present in the proposed project area. There is no designated piping plover critical habitat within the proposed project area. Furthermore, the bald eagle and brown pelican have been officially removed from the List of Endangered and Threatened Species on August 8, 2007, and December 17, 2009, respectively. Therefore, those three species will not be addressed further in our comments under the ESA.

The proposed borrow area would be located within areas of the Mississippi River that are inhabited by the endangered pallid sturgeon (Scaphirhynchus albus). The pallid sturgeon is an endangered fish found in Louisiana, in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it

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is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical characteristics that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has adversely affected this species throughout its range. Entrainment issues associated with dredging operations in the Mississippi and Atchafalaya Rivers and through diversion structures off the Mississippi River are two potential effects that should be addressed in future planning studies and/or in analyzing current project effects. Should the proposed project directly or indirectly affect the pallid sturgeon or its habitat, further consultation with this office will be necessary.

Forested wetlands near the proposed project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), which has officially been removed from the List of Endangered and Threatened Species as of August 8, 2007. Bald eagles nest in Louisiana from October through mid-May. Eagles typically nest in mature trees (e.g., bald cypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the marsh/ridge complex south of Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter, and infrequently nest in mature pine trees near large lakes in central and northern Louisiana. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the Bald and Golden Eagle Protection Act. A copy of the NBEM Guidelines is available at: http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting such consultations. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact the U.S. Fish and Wildlife Service's Louisiana Ecological Services Office (337/291-3100).

The proposed project would be located near an area where colonial nesting waterbirds may

be present. Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season. For colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period, depending on the species present. In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season (i.e., the time period outside the activity window). We recommend further coordination with our office if rookeries are observed in the project area and we request that you report rookery locations to Mr. Mike Seymour (225/765-2281) with LDWF, Natural Heritage Program.

We appreciate the opportunity to provide comments in the planning stages of this proposed project. If you need further assistance, please contact Heather Dyer (337/291-3129) of this office.

Sincerely,

Brad S. Rieck
Deputy Supervisor
Louisiana Ecological Services Office

United States Department of the Interior

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

November 10, 2010

Ms. Joy Merino
National Marine Fisheries Service
646 Cajundome Boulevard, Room 175
Lafayette, LA 70506

Dear Ms. Merino:

Please reference your November 1, 2010, letter regarding your determination of effects to federally listed species by the Bayou Dupont (BA-48) Marsh and Ridge Creation Project, located in Jefferson Parish and Plaquemines Parishes, Louisiana. The proposed project area encompasses 317 acres of intermediate to brackish marshes and shallow open water and will include a borrow area (located within the Mississippi River) and associated pipeline corridor. The U.S. Fish and Wildlife Service (Service) has reviewed the information you provided, and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The proposed borrow area would be located within areas of the Mississippi River that are inhabited by the endangered pallid sturgeon (Scaphirhynchus albus). You have stated that:

1. The cutterhead shall remain completely buried in the bottom material during dredging operations.
2. If pumping water through the cutterhead is necessary to dislodge material, or to clean the pumps or cutterhead, etc., the pumping rate shall be reduced to the lowest rate possible until the cutterhead is at mid-depth, where the pumping rate can then be increased.
3. During dredging, the pumping rates shall be reduced to the slowest speed feasible while the cutterhead is descending to the channel bottom.

Therefore, we concur with your determination that the proposed project is not likely to adversely affect pallid sturgeon. No further endangered species consultation will be required for this project as proposed. If you need further assistance or have any questions regarding our comments, please contact Rob Smith (337/291-3134) of this office.

Sincerely,

Brad S. Rieck
Deputy Supervisor
Louisiana Ecological Services Office

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

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November 10, 2010

John Foret, Ph.D.
NOAA – National Marine Fisheries Service
646 Cajundome Boulevard, Room 175
Lafayette, LA 70506

Dr. Foret:

Thank you for the opportunity to review the draft environmental assessment (EA) for the Bayou Dupont Marsh and Ridge Creation Project (BA-48), Jefferson Parish, Louisiana. As a partner with the National Marine Fisheries Service (NMFS) in protecting and restoring coastal Louisiana and a cooperating Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) agency, we offer the following comments to help ensure the compliance with the National Environmental Policy Act (NEPA).

The proposed project is a marsh and ridge restoration project utilizing a renewable sediment supply from the Mississippi River instead of borrowing from an inland borrow source. The Environmental Protection Agency strongly favors the utilization of the renewable sediment load of the Mississippi River when available. The Environmental Protection Agency has also constructed a CWPPRA project in the vicinity of this project which may be affected by the construction of this project. Our primary concern will be detailed below and additional comments will be attached to this letter.

After reviewing the draft EA and the 95% design report, there is a discrepancy in several of the figures. The map of the proposed pipeline corridor and the map of the project area (Figures 1 and 2) in the draft EA are different than the maps provided in the design report. Which version of the proposed pipeline corridor is correct? The map of the project area should be updated to reflect the cultural resources that will be avoided during the construction of this project.

Both proposed pipeline corridor maps show that the sediment pipeline will run adjacent to the project boundary for the EPA sponsored CWPPRA project BA-39, Mississippi River Sediment Delivery System, Bayou Dupont and the map from the 95% design report shows some of the pipeline crossing BA-39. BA-39 is surrounded by degraded containment dikes. The dikes were degraded post construction to an elevation of approximately 2 ft NAVD 88 and as the project matures, it is anticipated that these dikes will erode and/or subside. Due to these non-intertidal elevations around the project perimeter, gaps were made in the containment dikes to allow for hydrologic connectivity. These project features (i.e. gaps) are a crucial component to maintain a suitable wetland hydrology until the containment dikes erode or subside. What pipeline construction methods will be used (i.e. floatation, land based or sunk) along the BA-39 perimeter

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and how close will the proposed pipeline be to the BA-39 project? Any impacts that would reduce hydrologic connectivity to BA-39 as a result of construction related activities, including but not limited to pipeline location, should be minimized in order to maintain the appropriate hydrology for BA-39. We would recommend that additional gaps be constructed to account for any loss in hydrologic connectivity.

Throughout the EA, there are several references to native vegetation or native emergent vegetation that will be planted post construction. We feel that this is too broad a descriptor and the species of plants should be included in the document. The reason being, without including the species planned to be planted, we are unsure of what the target of the marsh restoration is. There is some discussion in section 2.2.2 on page 10 of the draft that lists many different species of upland and wetland plants that will be planted but is not included anywhere else in the document. Providing information on which species and where these species are intended to be planted will help answer the following questions. What type of marsh is the target? Is this marsh type commonly found in the area or at the elevations proposed?

I would like to conclude and acknowledge the value of utilizing a renewable sediment source, like portions of the Mississippi River, for marsh creation when available. We feel this project and technique are valid and useful tools in restoring coastal Louisiana. Our primary concern focuses on the construction related impacts to BA-39. Additional comments have been attached to this letter. If you have any questions or comments, please do not hesitate to call me at (214) 665-8365 or Chris Llewellyn at (214) 665-7239.

Sincerely,

Karen McCormick, Section Chief
Marine and Coastal Section

cc: Corps of Engineers, New Orleans, LA
Louisiana Office of Coastal Protection and Restoration, Baton Rouge, LA
USDA, Natural Resource Conservation Service, Lafayette, LA
U.S. Fish and Wildlife Service, Lafayette, LA

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Comments for

Bayou Dupont Marsh and Ridge Creation CWPPRA Project Fed No. BA-48
Environmental Assessment
Jefferson and Plaquemines Parishes, Louisiana

Environmental Assessment Prepared by
US Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Comments made on the Environmental Assessment (EA) listed above will be presented in the following document and organized by Section Heading, Subsection Heading, Paragraph Number.

Executive Summary

Paragraph 1

"Native vegetation would be planted after construction to help stabilize the rebuilt marsh habitat."

Comment: This sentence refers to native vegetation being planted on the constructed marsh habitat following construction but does not specify a species or type of vegetation. Further clarification of the type and/or species would be helpful in understanding the type of target marsh you wish to achieve.

Paragraph 4

"The goal of this proposed project is to redefine a natural bank or ridge of the bayou and reestablish the marsh using the renewable sediment from the Mississippi River."

Comment: Further clarification should be given to draw a distinction between the different borrow sources for the ridge creation and marsh creation. Borrow for the ridge creation will come from *in situ* material available adjacent to, but not within, Bayou Dupont. Marsh creation fill will come from the renewable sediment of the Mississippi River.

Paragraph 6

"Areas of newly created marsh would be planted with vegetation, if local vegetation does not colonize soon after construction to stabilize soils."

Comment: Recommend listing the species you plan to plant the marsh surface with. This way we have an idea of what type of target marsh community you seek to achieve.

1.0 Introduction; 1.1 Project Location

Paragraph 1 and Figure 1

"The borrow area and pipeline corridor proposed for this project are located in Plaquemines Parish as described in Section 2.3"

Comment: The proposed pipeline corridor map provided in the 95% Design Report differs from the proposed pipeline corridor map provided in the EA. Which proposed alignment is the correct alignment?

1.0 Introduction; 1.2 CWPPRA Project Selection Process

Paragraph 3

"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."

Comment: I was under the impression that cost was only one of the measures used to evaluate a project and the most cost-effective projects were not necessarily the projects selected.

1.0 Introduction; 1.4 Purpose and Need; 1.4.1 Purpose

Paragraph 1

"The purpose of this proposed project is to support the coastal restoration objectives of CWPPRA by redefining a natural ridge of Bayou Dupont and re-establishing and adjacent marshes using renewable sediment from the Mississippi River."

Comment: The marsh creation is the only part of the project that will utilize renewable sediment from the Mississippi River. The ridge creation feature will be created with *in situ* material in the project area.

Paragraph 1

"Native vegetation would be planted after construction to help stabilize the rebuilt marsh habitat."

Comment: Recommend more detail on which species are planned to be planted. Again, this will help define the type of target marsh you wish to achieve.

Paragraph 2

"The goals of this specific proposed project are to create and nourish marshes and create a ridge along a portion of the southwestern shoreline of Bayou Dupont. Specific targets include the following:

- Create a ridge along a portion of the southwestern edge of Bayou Dupont
- Create and nourish marshes south of the created ridge
- Reduce the current marsh loss rates in the project area during the 20-year proposed project life"

Comment: The 3rd goal listed above, "Reduce the current marsh loss rates in the project area during the 20-year proposed project life" is not consistent with what was presented in the WVA document. Historically, it has been assumed, that marsh creation projects will lead to a 50% reduction in the historical landloss rate. However, in an effort to account for the settlement curve created for this project, a 200% increase in the landloss rate was assumed FWP. Recommend removal of the third goal.

2.0 Proposed Action and Alternatives; 2.2.2 Alternative 1 (Preferred Alternative)

Paragraph 2

"The ridge re-establishment would be approximately 11,058 linear ft (3,370 m) in length with a width averaging over 30 ft (9.1 m) for a total ridge area of approximately 30 acres (12 ha)."

Comment: Is the 30 ft width a crown width, base width, width at a certain elevation? Recommend clarification.

Paragraph 2

"The recreated ridge would be planted with woody and herbaceous species approximately three years after construction."

Comment: While vegetation planting of the ridge is not scheduled to occur until TY 3, a list of species that will be planted would be useful.

Paragraph 3

"Upon dewatering and compaction of the marsh platform, approximately 20% of the marsh platform would be planted with indigenous intertidal vegetation to help stabilize the sediments."

Comment: Recommend listing which species are expected to be planted so we know what the target marsh type is.

Figure 2

Comment: Figure 2 needs to be updated to reflect the new project boundaries due to the SHPO determination for the historic sites on the northwestern end of the project area.

2.0 Proposed Action and Alternatives; 2.2.3 Alternative 2

Paragraph 1

"With this alternative there would be a width of 6ft (1.8 m) of containment dike, rather than the 30 ft (9.1 m) width and 20ft of slope towards the marsh that is the ridge re-establishment feature in Alternative 1."

Comment: Clarification of ridge and containment width needed. Is this a crown width, base width, width at a certain elevation?

Paragraph 1

"Upon dewatering and compaction of the marsh platform, approximately 20% of the marsh platform would be planted with indigenous intertidal vegetation to help stabilize the sediments."

Comment: You wish to achieve an intertidal marsh but which species are you planning to plant to achieve this target?

4.0 Environmental Consequences

Comment: What construction related impacts will there be on the Mississippi River Sediment Delivery System (BA-39) project? BA-39's hydrologic connectivity is maintained through several gaps in the containment dikes around the projects perimeter. The placement of the dredge pipeline may have an impact on reducing this hydrologic connectivity. Since the actual construction duration cannot be known in advance, what steps will be taken to minimize impacts on the hydrologic connectivity at BA-39 that could result in a conversion of wetland habitat?

Table 7; Row: Surface Water and Water Column Resources; Alternatives 1, 2 and 3
Comment: Decreased dissolved oxygen (DO) levels at dredge plume and construction location should be included as a potential environmental impact for all alternatives.

Table 7; Row: Aquatic Biota, Fisheries, and Essential Fish Habitat; Alternatives 1, 2 and 3
Comment: Decreased dissolved oxygen (DO) levels at borrow area and placement area should be included as a potential environmental impact for all alternatives.

4.0 Environmental Consequences; 4.1 Impact-Producing Factors; 4.1.1 Dredge Operating Characteristics

Paragraph 3

> "Unlike heavier sand materials, use of fine silts and clays usually require construction of dikes or other structures to confine material until it settles and de-waters. The proposed alternative would create such dikes with mechanical dredges prior to pumping in hydraulically dredged material for the marsh creation."

Comment: Based on my experience with Mississippi River Sediment Delivery System, Bayou Dupont (BA-39), the borrow site is mostly sand and does not have too much silt or clay but containment dikes will still be used. Based on that information I would recommend these sentences be rewritten.

4.0 Environmental Consequences; 4.2 Physical Resources; 4.2.4 Impacts on Water Resources; Preferred Alternative

Paragraph 1
Comment: Did not include decreased dissolved oxygen as a potential impact.

Paragraph 2

> "If the disturbed sediments were anoxic, the biological oxygen demand in the water column would increase."

Comment: If the sediments were anoxic and they were disturbed, then the biological oxygen demand would increase but so would the chemical oxygen demand as anoxic compounds become oxidized. Recommend simplifying to say "If the disturbed sediments were anoxic, the dissolved oxygen levels in the water column would decrease."

4.0 Environmental Consequences; 4.3 Biological Environment; 4.3.1 Impacts on Vegetative Communities; Alternative 1 & 2

Comment: The proposed sediment pipeline routes for this project both run adjacent to the BA-39 project. The construction techniques used to create the pipeline and support the pipeline from the Parish levee to the project area may have an impact on BA-39 by preventing or reducing a hydrologic connection to the adjacent open water. How will the pipeline be placed where it runs parallel with BA-39? Any impacts that would reduce or eliminate the hydrologic connection of BA-39 should be minimized in order to maintain the appropriate wetland hydrology?

4.0 Environmental Consequences; 4.3 Biological Environment; 4.3.2 Impacts on Fisheries and Aquatic Biota; Alternatives 1, 2 & 3

Comment: There is no mention of the potential for low dissolved oxygen concentrations in the borrow or placement areas for Alternatives 1, 2 and 3.

4.0 Environmental Consequences; 4.5 Other Considerations; 4.5.1 Cumulative Impacts; 4.5.1.1 Wetland Enhancement Projects

Comment: Depending on when this project is constructed, the pipeline corridor used during the construction of BA-39 may now be wetlands. Further, what impact will your pipeline alignment have on the hydrologic connectivity by reducing hydrologic exchange through the gaps created in the containment dike? Due to the elevation of the containment dikes, these gaps are crucial project features that allow hydrologic connectivity and the maintenance of wetland acreage in the project area. Any reduction in this connection could have negative impacts on the BA-39 project. How will the pipeline be laid? How will construction related impacts to the BA-39 hydrologic connection be minimized?

Overall

Comment: There are several minor typos that should be addressed. Contact us if you would like assistance in finding these.

United States Department of the Interior

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

November 16, 2010

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NMFS, LAFAYETTE

Dr. John D. Foret
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
646 Cajundome Boulevard
Lafayette, LA 70506

Dear Dr. Foret:

Please reference the draft Environmental Assessment (EA) for the Bayou Dupont Marsh and Ridge Creation Project, Jefferson and Plaquemines Parishes, Louisiana. That EA evaluates the potential impacts associated with marsh and ridge creation features southeast of the Pen and along the banks of Bayou Dupont within the Barataria Basin. The Bayou Dupont Marsh and Ridge Creation Project was authorized for funding pursuant the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) and is sponsored by the National Marine Fisheries Service (NMFS). The U.S. Fish and Wildlife Service (Service) offers 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 adequately describes the fish and wildlife resources in the project area and potential impacts to those resources that would be associated with project implementation. The project area consists of open water and marsh which provide high quality habitat for a multitude of fish and wildlife species.

Specific Comments

Page ES-v – WVA is the acronym for Wetland Value Assessment.

Page 3, Paragraph 3 – It is indicated that the project area encompasses 331 acres. This project area acreage does not correspond to the original WVA (317 acres) or the recently prepared revised draft WVA (309 acres).

We understand that the revised draft WVA is currently under interagency review. Upon finalization, figures from that WVA should be utilized to report the project area size, acres created/nourished, net acres protected/created, etc.

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Page 6, Paragraph 3, Last sentence – This sentence should refer to the Naomi Siphon Diversion (BA-03) project and not the Naomi Outfall Management Project.

Page 6, Paragraph 6 – If information (e.g., the marsh loss rate for the project area) from the project WVA is cited, then that document should be referenced.

Page 8, Table 1 – This table indicates that only 34 acres of marsh would exist in the project area at one year after action. However, the original and draft revised WVA both indicate that considerably more marsh would exist at Year 1.

Page 9, Paragraph 2 – This paragraph indicates that fill Area 1 is 256 acres. That is not consistent with Table 3 on page 14.

Page 14, Paragraph 1 – This paragraph leads the reader to believe that the marsh fill would remain at a healthy marsh elevation (near +1.5 ft NAVD88) over the 20-year project life. However, project design information presented as part of the 95% design review, indicates that the marsh platform will ultimately settle to an elevation of +0.5 ft NAVD88 by Year 20.

Page 37, Paragraph 5 – It is indicated that the Preferred Alternative would bury 34 acres of marsh during construction. According to the project WVA, approximately 103 acres would be buried during construction of the marsh platform. Additional acreage would be buried by the ridge creation feature.

Page 42, Table 10 – Average annual habitat units cannot be combined as presented in this table. Average annual habitat units for emergent marsh and open water are mathematically combined in a formula which applies a weighting factor to provide greater consideration to emergent marsh benefits. A total of 121 net average annual habitat units are reported as the benefits for this project, while this table indicates 125 AAHUs would be realized.

Page 46, Paragraph 5 – We concur with your determination that the proposed project is not likely to adversely affect the endangered pallid sturgeon. No further endangered species consultation will be required for this project unless there are changes in the scope or location of the project, or project construction has not been initiated within one year. If the scope or location of the proposed project changes, or if the project has not been initiated within one year, follow-up consultation should be accomplished with this office prior to making expenditures for construction, because our threatened and endangered species information is updated annually.

Page 51, Paragraph 4 – Dedicated dredging of the Mississippi River is not being planned through the Dedicated Dredging on the Barataria Basin Landbridge Project (BA-36). That project has been completed and utilized a local borrow site.

The Service appreciates the opportunity to comment on this draft EA. If you have any questions regarding our comments, please contact Kevin Roy at (337) 291-3120.

Sincerely,

James F. Boggs
Supervisor
Louisiana Field Office

cc: EPA, Dallas, TX
NMFS, Baton Rouge, LA
USACE, New Orleans, LA
NRCS, Alexandria, LA
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Office of Coastal Protection and Restoration, Baton Rouge, LA

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

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November 9, 2010 F/SER46/RS:jk
225/389-0508

Dr. John Foret
National Marine Fisheries Service
Southeast Fisheries Science Center
646 Cajundome Boulevard
Lafayette, Louisiana 70506

Dear Dr. Foret:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the draft Environmental Assessment (EA) for the Bayou Dupont Marsh and Ridge Creation (BA-48) project located in Jefferson Parish, Louisiana. This project was authorized for engineering and design activities under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) with NMFS serving as the lead federal agency. Pursuant to our Findings with the CWPPRA agencies, the National Environmental Policy Act document serves as initiation of coordination of an Essential Fish Habitat Assessment with NMFS.

NMFS has reviewed the draft EA and offers the following comments:

General Comments

The final EA should reflect the most current available information regarding the magnitude of potential impacts and benefits. Specifically, the draft EA reports out-dated and occasionally conflicting information. The results of the updated Wetland Value Assessment should be incorporated into the final document.

Specific Comments

Page 2, paragraph 2. The document states that the marsh will "achieve a settled elevation of +1.5 feet NAVD88." We recommend that the document clearly reflect the anticipated time to reach this settled elevation. This information also should be provided at other appropriate locations in the document (e.g., page 8, paragraph 5; page 14, paragraph 1)

Page 2, paragraphs 3 and 4. Two different quantities of fill material are referenced in this section. The document should be revised to clarify the amount of dredged material that would be required for project construction.

Page 5, paragraph 1. The last sentence of this paragraph appears to include a typographical error. We recommend this be corrected.

Page 5, paragraphs 2-5. This section includes a detailed description of CWPPRA's annual planning process. We are unsure that this information is pertinent to the EA and recommend this section be deleted.

Page 6, paragraph 6. This section of the document states that there "were no measurable changes in the Bayou Dupont Marsh and Ridge Creation Project area between 1990 and 2000" and then continues by providing a wetland loss rate of -1.7%/year. These two statements appear contradictory and may be confusing. We recommend the document be revised to provide a clearer sense of wetland loss history in the project vicinity, and also that a period of record be stated for the reported loss rate. Finally, this paragraph also states that without action, it is anticipated that 34 acres of wetlands would be lost within the project area; we recommend this statement be confirmed and corrected, if needed.

Page 8, Table 1. The table indicates that it is projected that 34 acres of marsh would exist within the project area in one year without action. We recommend that this and similar information in the table and throughout the document be confirmed.

Page 31, Table 6. Some of the information contained in this table is inconsistent with data presented elsewhere in the document. For example, Table 6 states that 2,146,200 cubic yards of material would be placed in the marsh fill area while Table 3 indicates that 1,746,970 cy is the proposed marsh fill volume. Additionally, Table 6 is incomplete and missing information regarding total dredge time, construction duration, etc.

Page 37, paragraph 1. This section of the document states that pipeline sections would be welded together. We recommend this requirement be confirmed and if needed, that the document be revised.

Page 37, paragraph 5. This section of the document suggests that the preferred alternative would provide storm surge and salinity reduction benefits. We recommend this statement be deleted unless there is supporting information.

Page 38, paragraph 1. The EA indicates that the proposed marsh fill elevation considers multiple factors included sea level rise and subsidence. We note that relative sea level rise was not considered in the settlement analysis and we recommend that the document be revised to correctly state that the proposed construction elevation is based on settlement and compaction of the in-situ and placed materials only.

Page 38, paragraph 4. This section of the document also discusses storm surge protection benefits. We recommend this discussion be deleted unless surge reduction analyses have been conducted for the proposed project.

Page 38, paragraph 5. This section of the EA discusses potential impacts associated with Alternative 3 (Lake/Bay borrow areas) and states that this alternative may result in some

impacts to interior marshes. We are uncertain as to the cause of such potential impacts because the Alternative 3 borrow areas are described as located in open water areas. Additionally, this paragraph states that sediment volumes may be insufficient; if inadequate material is available from the Pen, then Alternative 3 is not technically feasible. Finally, this section also states that erosion and subsidence would be greater for Alternative 3 than for Alternatives 1 and 2. We recommend that this statement be clarified to indicate that settlement of the placed material would likely be greater for the fine-grained lake bottom material than the predominantly sand material considered under Alternatives 1 and 2.

Page 40, paragraph 3. The Alternative 3 borrow area location is described as "interior marsh;" we recommend this statement be revised to more accurately characterize the location of the Pen borrow area.

Page 41, paragraph 2. The document indicates that Alternative 2 would result in inferior performance to Alternative 3 due to susceptibility to storm surge and erosion. We recommend this statement be clarified.

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

Sincerely,

for Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

c:
FWS, Lafayette, Clark
EPA, Dallas, McCormick
NRCS, Paul
NOD, Holden
OCPR, Bahlinger
F/SER46, Swafford
F/SER4, Dale
Files

SCOTT A. ANGELLE
LIEUTENANT GOVERNOR

State of Louisiana

OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT

PAM BREAUX
SECRETARY

6 January 2011

Ms. Cecelia Linder
CWPPRA Program Manager
NOAA Fisheries
SSMC #3, F/HC3, Rm 15861
1315 East West Hwy.
Silver Spring, MD 20910

Re: Draft Report
La Division of Archaeology Report No. 22-3675
Phase II Excavations at the Bayou Dupont II Site (16JE11), Jefferson Parish, Louisiana

Dear Ms Linder:

We acknowledge receipt of your letter dated 23 December 2010 and two copies of the above referenced report. We have completed our review of this report and have only one comment to offer. Please include a statement indicating where the artifacts and associated records will be curated.

We concur that site 16JE11 is eligible for nomination to the National Register of Historic Places. We further concur that if the site can be avoided during the project, including efforts to minimize boat traffic along the bayou during construction, that no historic properties will be affected by this project.

We look forward to receiving two bound copies of the final report, along with a pdf of the report. If you have any questions, please contact Chip McGimsey at the Division of Archaeology by email at cmcgimsey@crt.state.la.us or by phone at 225-219-4598.

Sincerely,

Phil Boggan
Deputy State Historic Preservation Officer

PB:crm

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
SEFC/Estuarine Habitats & Coastal Fisheries Center
646 Cajundome Boulevard
Lafayette, Louisiana 70506

March 4, 2011

Mr. Kirk Rhinehart
State of Louisiana
Office of Coastal Protection and Restoration
P.O. Box 44027
Capitol Station
Baton Rouge, LA 70804-4027

Dear Mr. Rhinehart,

Enclosed is a final version of the Environmental Assessment of Bayou Dupont Marsh and Ridge Creation Project (BA-48) for your records.

Sincerely,

John D. Foret

John D. Foret, PhD
NOAA Fisheries
Ecologist

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
SEFC/Estuarine Habitats & Coastal Fisheries Center
646 Cajundome Boulevard
Lafayette, Louisiana 70506

March 4, 2011

Mr. Thomas A. Holden
Deputy District Engineer
U.S. Army Corps of Engineers
Attn: CELMN-PD
P.O. Box 60267
New Orleans, LA 70160-0267

Dear Mr. Holden,

Enclosed is a final version of the Environmental Assessment of Bayou Dupont Marsh and Ridge Creation Project (BA-48) for your records.

Sincerely,

John D. Foret

John D. Foret, PhD
NOAA Fisheries
Ecologist

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March 4, 2011

Mr. Darryl Clark
U.S. Fish and Wildlife Service
646 CajunDome Blvd.
Suite 400
Lafayette, LA 70506

Dear Mr. Clark,

Enclosed is a final draft version of the Environmental Assessment (EA) of Bayou Dupont Marsh and Ridge Creation Project (BA-48) for your records. We appreciate your review and comments we received on a letter dated November 16, 2010.

We have addressed the comments in your letter in this final EA. We respond specifically to the comments you provided for the following locations:

Page 3, paragraph 3- The final EA was updated with the latest Wetland Value Assessment (WVA) information. The project areas you were looking for were from the WVA models. For NEPA documentation the total area of influence is considered, therefore the project area presented is that of the construction footprint which may be larger than the WVA footprint allows credit for by containing access routes and buffer zones.

Page 37, paragraph 5 – The final EA was updated with the latest WVA, which states there are 95 acres at TY0, to be in initially impacted with recuperation of a net of 187 acres by TY5.

Sincerely,

John D. Foret

John D. Foret, PhD
NOAA Fisheries
Ecologist

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March 4, 2011

Mr. Britt Paul
USDA NRCS
3737 Government Street
Alexandria, Louisiana 71302

Dear Mr. Paul,

Enclosed is a final version of the Environmental Assessment of Bayou Dupont Marsh and Ridge Creation Project (BA-48) for your records.

Sincerely,

John D. Foret

John D. Foret, PhD
NOAA Fisheries
Ecologist

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Lafayette, Louisiana 70506

March 4, 2011

Ms. Karen McCormick
Environmental Protection Agency, Region 6
Water Quality Protection Division (6WQ-EC)
1445 Ross Avenue
Dallas, TX 75202-2733

Dear Ms. McCormick,

Enclosed is a final Environmental Assessment of Bayou Dupont Marsh and Ridge Creation Project (BA-48). We appreciate your review and comments we received on the letter dated November 10, 2010.

Your primary concerns were of the discrepancy of the pipeline corridor location with that on the 95% design figures. The discrepancy was due to changes made after the draft EA was released. The final version correctly identifies the location that is on the 95% design report. Other updates to the final EA include changes to the project area to reflect the cultural resources that will be avoided during construction and inclusion of updated Wetland Value Assessment information.

You specifically requested information about maintaining the hydrologic connectivity of the BA-39 boundary. The design team is in the process of better defining the pipeline corridor and placement, and, no matter the eventual alignment, our intent is to minimize impacts as suggested. We are investigating several options including placement of the lines in existing canals and open water areas (sinking as you mentioned), rather than placement on any mechanically dredged dike. If any dikes or berms are created, we intend to ensure that they do not create a hydrologic barrier to BA-39 and will consider the use of gapping and degrading if needed. We will continue to work with EPA staff to best address the needs of both of these project areas.

Information on the native vegetation species plantings was added as suggested. These plantings target the ridge and brackish marsh habitats and are commonly found at the elevations proposed.

Replies:
Executive Summary
Paragraph 1

The statement "Native vegetation would be planted after construction to help stabilize the rebuilt marsh habitat" was changed per comment to "Native marsh and ridge vegetation would be planted after construction to help stabilize the rebuilt marsh habitat."

Paragraph 4

Per the comment, we added "Borrow for the ridge creation would come from in situ material available adjacent to, but not within, Bayou Dupont. Riverine borrow would be used primarily to nourish and re-establish marsh and supplement the ridge feature."

Paragraph 6

Species were referenced as "Areas of newly created marsh would be planted with vegetation, cordgrass (*Spartina* spp.) or similar, if local vegetation does not colonize soon after construction to stabilize soils." We do not feel a list is necessary in this section.

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Introduction and remainder of EA sections
Paragraph 1 and Figure 1
Changed as previously mentioned
Section 1.2, Paragraph 3
It is correct that cost-effectiveness is only one of the measures used to evaluate projects. We have corrected the statement " … to ensure that effective projects move forward for design and ultimate construction."
Section 1.4.1 Paragraph 1 and 2
We have clarified the goals as stated below. While the ridge feature will be created with in situ materials, that borrow will then be filled with renewable sediments.

- "Create a ridge along a portion of the southwestern edge of Bayou Dupont using in situ materials
- Create, and nourish marshes south of the created ridge using renewable materials."

Vegetation was clarified with " Native intertidal marsh and ridge vegetation would be planted after construction to help stabilize the rebuilt marsh habitat."

Section 2.2.2 Paragraph 2
Crown width was for clarification.
Species examples were added as suggested and a statement of clarification added to the section at paragraph 5 "Planting plans depend on final site conditions and species availability. The species to be planted are therefore subject to change."
Figure 2
This has been updated as previously mentioned.
Section 2.2.3 Paragraph 1 and 2
Crown width and "similar to Alternative 1" were added.
Section 4.0
We have stated in section 4.5.1.1 " The Mississippi River Sediment Delivery System-Bayou Dupont (BA-39) finished construction in Spring 2010 and protects marshes adjacent to the preferred alternative of this EA. The proposed dredge pipeline corridor in this project's preferred alternative follows the perimeter of the BA-39 project area. The pipeline would be placed in a manner to avoid or minimize impacts to the hydrology of the BA-39 area such that they would be temporary and minor."
Table 7
We changed the alternative impacts changed to include DO "(1) increased turbidity and decreased dissolved oxygen…"
Section 4.1.1 Paragraph 3
Rewritten as recommended: "Not all material dredged is retained for use in the disposal area, as loss of sediments occurs at the dredge site and fill site. The proposed alternative would create dikes with mechanical dredges prior to pumping in hydraulically dredged material for the marsh creation to confine material until it settles and dewaters. The physical characteristics of the borrow material and fill area determine

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losses. For example, fine silts are more likely to be lost since they more easily suspended in water (slurry) than heavier materials. The proposed alternative would involve mostly heavier materials (sand) and minimize losses."

Section 4.2.4 Preferred Alternative

Dissolved oxygen was added in Paragraph 1 and 2. Sentence rewritten as suggested.

Section 4.3.1

Because impacts to hydrology would be minimized or avoided such that they would be temporary and minor at BA-39, we do not anticipate impacts to the vegetation there as a result.

Section 4.3.2 Preferred Alternative

Dissolved oxygen was added in the second paragraph.

Sincerely,

John D. Foret

John D. Foret, PhD
NOAA Fisheries
Ecologist

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March 4, 2011

Mr. Richard Hartman
U.S. Department of Commerce
NOAA/NMFS
Southeast Fisheries Science Center
Baton Rouge Office of Habitat Conservation
LSU
South Stadium Road
Military Science Building, Room 266
Baton Rouge, LA 70803

Dear Mr. Hartman,

Enclosed is a final Environmental Assessment of Bayou Dupont Marsh and Ridge Creation Project (BA-48). We appreciate your review and comments we received on the letter dated November 9, 2010.

A Wetland Value Assessment (WVA) was being conducted during preparation of the EA and not finalized until the draft EA was released. The results of the updated WVA are incorporated into this final EA. Other updates to the final EA include changes to the project area to reflect the cultural resources that will be avoided during construction and a change in the pipeline corridor.

Specifically:

Page 2, paragraph 2

The time of settlement was added as suggested. "The marsh construction elevation for all design alternatives is +3.0 North American Vertical Datum (NAVD88) to achieve a settled elevation at +1.3 ft NAVD88 in the first five years and settle to within the intertidal zone (0.5 to 0.9 ft NAVD88) over the twenty-year project life."

Page 2, paragraphs 3 and 4.

Paragraph 4 was corrected for clarity, "Construction of the preferred alternative (Alternative 1) would include 2,620,455 cubic yards (cy) (2,003,482 m^3) of hydraulically dredged Mississippi River sediment and 240,218 cy (107,204 m^3) of manually dredged in situ material."

Page 5, paragraph 1.

We corrected the phrase.

Paragraphs 2-5 are suggested for inclusion by the NMFS NEPA Coordinator to show the involvement of the public and government in project during planning, as well as indicate what the potential range of alternatives under consideration is.

Page 6, paragraph 6.

We have added the recent land loss used for the WVA. The 34 acres projected to be lost

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were from a Wetland Value Assessment that has been updated.

Page 8, table 1

This was updated with new WVA information.

Page 31, Table 6

This table was updated.

Page 37, paragraph 1

This pipeline sentence was deleted.

Paragraph 5

Agreed, sentence deleted.

Page 38, paragraph 1

This was revised for settlement considerations.

Paragraph 4

Revised as suggested.

Paragraph 5

This was revised as suggested, "The fine-grained interior lake borrow material would likely settle more than the sand containing material of Alternatives 1 and 2. Therefore, this alternative would produce long-term benefits less than Alternatives 1 and 2 but greater than the no-action alternative."

Page 40, paragraph 3

A reference to the Pen was inserted to clarify.

Page 41, paragraph 2

The statement was clarified as suggested, "While more marsh area would initially be created with this alternative, the marsh would be more susceptible to erosion due to having more fine-grained rather than sandy materials that would likely decrease the amount of marsh by 20 years after construction compared to the preferred alternative."

Sincerely,

John D. Foret, PhD
NOAA Fisheries
Ecologist

Enclosure

BOBBY JINDAL
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

January 24, 2011

Richard Hartman
Chief, Baton Rouge Office
NOAA Fisheries
c/o Louisiana State University
Baton Rouge, Louisiana 70803-7535

RE: **C20100273,** Coastal Zone Consistency
NMFS
Direct Federal Action
Bayou Dupont Marsh and Ridge Creation CWPPRA Project BA-48, **Jefferson Parish, Louisiana**

Dear Dr. Hartman:

The above proposed project has been reviewed for consistency with the approved Louisiana Coastal Resource Program (LCRP) as required by Section 307 of the Coastal Zone Management Act of 1972, as amended. The project, as represented in this application, is consistent with the LCRP.

If you have any questions concerning this determination please contact Brian Marcks of the Consistency Section at (225)342-7939 or 1-800-267-4019.

Sincerely,

Karl L Mog for

Gregory J. DuCote
Administrator
Interagency Affairs/Field Services Division

GJD/JH/bgm

cc: David Butler, LDWF
Pete Serio, NOD-COE
Frank Cole, CMD/FI
Kristi Cantu, OCPR
Jason Smith, Jefferson Parish