OYSTER BAYOU MARSH RESTORATION
ENVIRONMENTAL ASSESSMENT
Fed No. CS-59
Cameron Parish, Louisiana

Prepared by National Marine Fisheries Service

DRAFT

March 2015

CONTENTS

Section **Page**

CONTENTS II
ACRONYMS III
UNITS OF MEASURE III
EXECUTIVE SUMMARY 0
1 INTRODUCTION 1
1.1 Purpose and Need 2
1.2 Project Location 2
1.3 CWPPRA Process 3
1.4 Environmental Setting 4
2 PROPOSED ACTION AND ALTERNATIVES 6
2.1 Alternatives Considered but Eliminated 6
2.2 Alternatives Considered in Detail 7
3 AFFECTED ENVIRONMENT AND CONSEQUENCES 10
3.1 Physical Environment 12
3.2 Biological Environment 17
3.3 Cultural Resources 25
3.4 Other Considerations 27
4 CONCLUSIONS 29
5 PREPARERS 30
6 PERSONS / AGENCIES CONSULTED 30
7 DISTRIBUTION LIST 30
8 LITERATURE CITED 32
APPENDIX A- ENVIRONMENTAL LAWS AND REGULATIONS 35
APPENDIX B- SUPPORTING DOCUMENTATION 37
Coastal Master Plan For Southwest Louisiana 37
Land use 38
APPENDIX C- CORRESPONDENCE 39
NOAA Protected Resources Concurrence 39
LDWF Natural Heritage Program 47
USFWS Concurrence 48
SHPO Concurrence 49
EFH Concurrence 50
Summary of Comments 53

ACRONYMS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPRA	Louisiana Coastal Protection and Restoration Authority
CRMS	Coastwide Reference Monitoring System
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection, and Restoration Act
CZMA	Coastal Zone Management Act
DO	Dissolved Oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
GMFMC	Gulf of Mexico Fisheries Management Council
HTRW	Hazardous, Toxic, and Radioactive Waste
LCWCRTF	Louisiana Coastal Wetlands Conservation and Restoration Task Force
LDEQ	Louisiana Department of Environmental Quality
LDWF	Louisiana Department of Wildlife and Fisheries
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
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
SAV	Submerged aquatic vegetation
SHPO	State Historic Preservation Office
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service, U.S. Department of Interior
WCRA	Wetlands Conservation and Restoration Authority
WRI	World Resources Institute
WVA	Wetland Value Assessment

UNITS OF MEASURE

cm	centimeters
ft	feet
m	meter
yr	year

EXECUTIVE SUMMARY

Project: Oyster Bayou Marsh Restoration (CS-59)

Sponsor: National Marine Fisheries Service and Louisiana Coastal Protection and Restoration Authority

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Project Size: Approximately 809 acres of shallow open water and marsh.

Location: In Cameron Parish, Louisiana west of the Calcasieu Ship Channel approximately 4 miles west of Cameron, Louisiana.

Need: Hydrological alterations, drought stress, saltwater intrusion and hurricane induced land loss have resulted in interspersion of marsh and coalescence of interior lakes. The large open water areas increase continued conversion of marsh to open water, a less valuable fish and wildlife habitat, due to wave/wake erosion.

Purpose: Support the objectives of the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) by creating marsh, and nourishing existing marsh.

Proposal: Construct approximately 17,550 ft (200 acres) of terraces and 605 acres of marsh to reduce wave erosion of created and existing marsh and create saline marsh habitat. Create 9,490 linear feet of trenasses (minor waterways), and three 4.5-acre ponds.

Public Participation:
State resource agencies, federal resource agencies, and local government coordinated throughout project development as described in section 1.2. The draft Environmental Assessment (EA) is available for public review at the Cameron Parish Public Library in Cameron, Louisiana, and online (http://www.habitat.noaa.gov/pdf/oyster_CS_59_draft_environmental_assessment.pdf). We published a notice of the draft EA in the Advocate (State newspaper) and the Cameron Parish Pilot (local newspaper) in January 2015. The notice and any comments received on the draft will be included in this EA.

Summary of statement and conclusions:
Long-term benefits to Louisiana coastal resources without substantial long-term adverse environmental impacts are expected of the preferred alternative. Construction-related adverse impacts are considered minor and insubstantial because they are temporary or reversible. Benefits are moderate and sustained. This conclusion is based on a review of relevant literature; site-specific data; project-specific engineering reports related to biological, physical and cultural resources; and experience gained through more than a decade of coastal restoration in Louisiana. An increase to fisheries habitat is expected to have social and economic benefits for recreational and commercial fishing. Also, the project would increase protection of adjacent marsh in the area to be restored.

Potential adverse impacts: None

Issues to be resolved: None

1 INTRODUCTION

The proposed project (**Oyster Bayou Marsh Restoration, CS-59**) is authorized under the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) of 1990 (16 United States Code [U.S.C.] §777c, 3951-3956), which stipulates that five federal agencies and the State of Louisiana jointly develop and implement a plan to reduce the loss of coastal wetlands in Louisiana (16 U.S.C. §3952 (b) (2)). The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (Fisheries Service), Department of Commerce is the federal sponsor responsible for project oversight, including National Environmental Policy Act (NEPA) compliance. The Louisiana Coastal Protection and Restoration Authority (CPRA) is the non-federal local project sponsor. Other federal agencies that make up the CWPPRA Task Force selected this project through a publicly vetted process for engineering and design (Louisiana Coastal Wetlands Conservation and Restoration Task Force [LCWCRTF] 2011).

For NOAA and CPRA to request funds and authorization to construct this project, the CWPPRA standard operating procedures require an Environmental Assessment (EA) at this time. The EA provides information for the decision of whether or not to fund and authorize this project, including the proposed project and its alternatives, and to determine whether the proposed re-establishment of marsh features have the potential for significant impacts. This EA discloses information on and analyzes the direct, indirect, and cumulative impacts on the human environment likely to result from the Oyster Bayou Marsh Restoration Project proposed project and the alternatives. It was prepared in compliance with the NEPA of 1969 and Council on Environmental Quality (CEQ) regulations for implementation of NEPA (Title 40 *Code of Federal Regulations* [CFR] Parts 1500 through 1508 [CEQ 1992]). Significant sources used to consider environmental impacts are:

- Environmental Impact Statement (EIS) for the CWPPRA program (LCWCRTF 1993).
- Louisiana Coastal Area Ecosystem Restoration Study (LCA) EIS (U.S. Army Corps of Engineers (USACE) 2004).
- Wetland Value Assessment (WVA, NOAA Fisheries Service)
- Engineering design analyses, wave modeling, and associated data and surveys (Thompson 2014, and Thompson and Borne 2014)
- State coastal plans (LCWCRTF and WCRA 1998), (OCPR 2012)
- Regional studies (USDA 1994) (Louisiana Department of Wildlife and Fisheries (LDWF) 2011).
- Coast 2050 Plan (LCWCRTF and Wetlands Conservation and Restoration Authority (WCRA) 1998)
- and other restoration efforts in coastal (LCWCRTF 2011 and OCPR 2012)

The CWPPRA EIS and LCA EIS provide general information on the need for the proposed project, the affected environment, and the environmental consequences.

The CWPPRA WVA evaluates wetland impacts through a quantitative, habitat-based assessment model developed to estimate anticipated environmental benefits. The WVA 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 a combination of experience with previous projects, construction plans, models, and biological and engineering experience of the assessment team.

The engineering design analyses evaluate the cost efficiency and feasibility of components to achieve project goals. The design process includes surveying the proposed project area, testing soils for type and strength, determining options for access and staging of work, and proposed feature longevity. The CWPPRA program operating principles stipulate that, during engineering and design, reports are required

at 30% and 95% completion. The reports are circulated, and meetings are held at which the CWPPRA participating agencies, landowners, and other interested parties are presented with the design process to date, and provided opportunity to comment at that time. The 30% and 95% design meetings occurred in July and October of 2014.

1.1 Purpose and Need

1.1.1 Purpose

The purpose of the proposed project is to support the coastal restoration objectives of CWPPRA by re-establishing marsh in the project area using offshore sediment. After construction, native saline marsh would be planted to help stabilize the rebuilt marsh habitat. Specific objectives are below, and proposed alternatives meet or exceed these goals.

- Create 510 acres of saline marsh and nourish approximately 90 acres of existing saline marsh through pipeline sediment delivery.
- Protect 18 acres of existing marsh projected to be lost in 20 years without action and reduce wave/wake erosion by constructing about 14,140 linear feet (ft) of terraces.

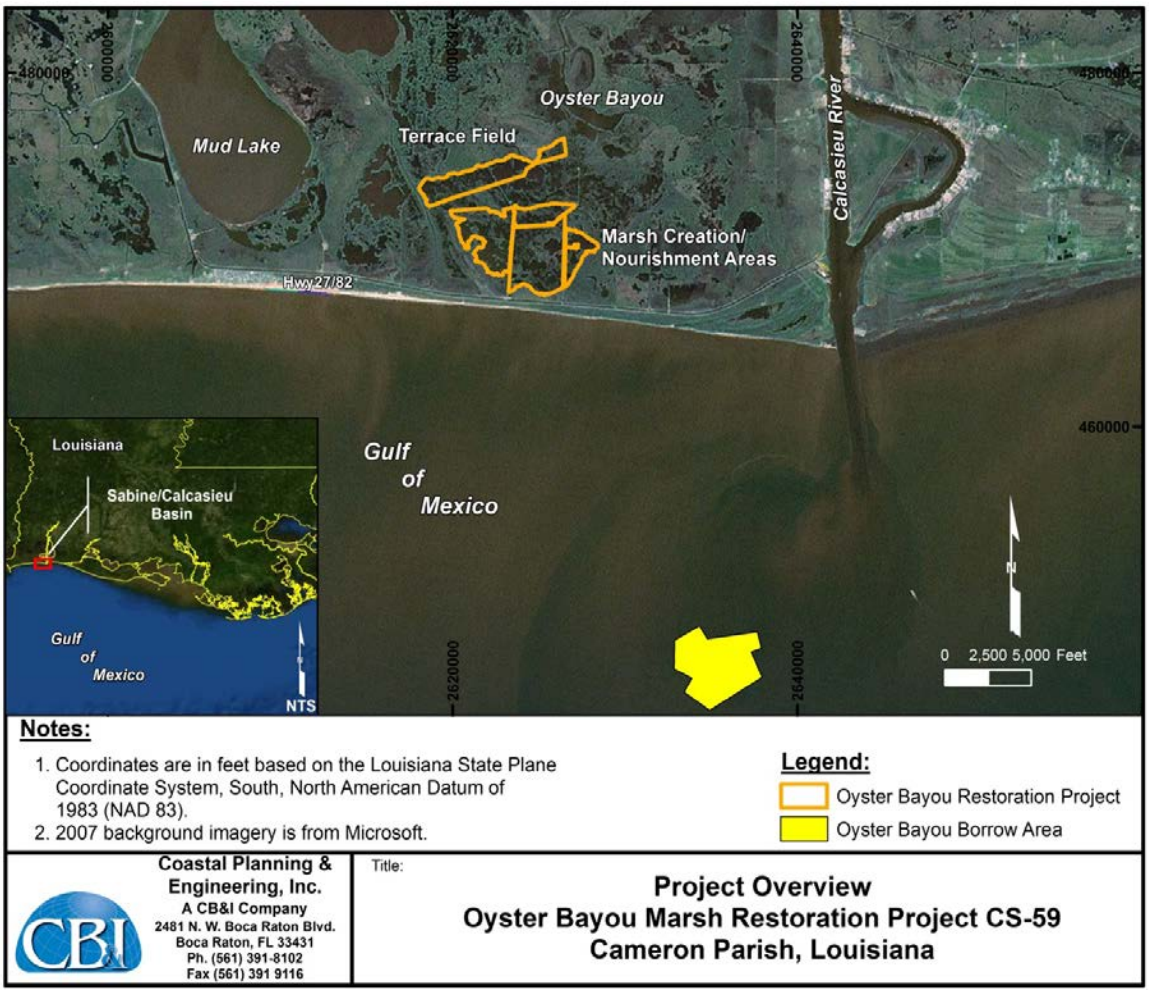
1.1.2 Need

The proposed project is needed to re-establish the structural integrity and value of the marsh as habitat. A healthy coastal marsh has value as rearing habitat for shellfish and finfish; habitat for waterfowl, wading birds, small mammals, and numerous amphibians and reptiles; reducing storm surge to interior land; and helping maintain water quality. Louisiana's coastal wetlands, such as the proposed project area, are essential to sustain renewable fishery resources integral to the local, state, and national economies. Of the 1.7 billion pounds of fisheries landings reported for the Gulf Coast in 2011, more than 73% were caught in Louisiana (NOAA 2012). Marshes provide nursery, foraging, and spawning habitat for numerous marine and estuarine species of commercial and recreational importance.

1.2 Project Location

The proposed project is located in Cameron Parish, Louisiana west of the Calcasieu Ship Channel approximately 4 miles west of Cameron, Louisiana (Figure 1). Three miles west of the proposed project area is Holly Beach, Louisiana that was populated prior to hurricanes of 2005. The proposed project area encompasses approximately 809 acres of saline marsh and open water (2007 Survey, Sasser and others 2014). The borrow area and pipeline corridor proposed for this project are located offshore in the Gulf of Mexico. The proposed project area is in Calcasieu/Sabin Basin Region 4 of the Coast 2050 Restoration Plan (Mud Lake mapping unit; LCWCRTF and Wetlands Conservation and Restoration Authority [WCRA] 1998, 1999) and the Louisiana Coastal Area Restoration Plan (USACE 2004).

FIGURE 1. PROPOSED PROJECT LOCATION



1.3 CWPPRA Process

The CWPPRA project selection process takes several months to complete, involves extensive public involvement and review by federal and state agencies, and narrows the field of potential projects down to approximately four a year that are approved to enter the formal engineering and design process. As a result of this process, the field of available alternatives under consideration for a project generally includes those alternatives that would meet project goals developed during the engineering and design process and that take place within the general proposed project area.

During the engineering and design process, 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 Regional Planning Teams across the coast convene to solicit project nominations 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 nominated project contains conceptual project features, approximate construction costs, and anticipated benefits to wetland resources. The nominated projects are screened and pared down to 20 nominees at a public voting meeting. Each federal agency represented in the CWPPRA program, the State, and each coastal parish participates in voting.

Interagency and academic working groups then evaluate the conceptual project features for cost and project-associated wetland benefits for feasibility and appropriateness to addressing the local land loss. The 20 nominee projects are then voted on by the program's federal agencies and the State 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 anticipated benefits are likely, and the project costs are within the funding constraints of the program. Certain project features are typically discounted during this preliminary design phase based on concerns about inferior performance, adverse impacts, technical infeasibility, 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.

1.4 Environmental Setting

The proposed project is part of the Chenier Plain of the southwest Louisiana coast, which developed 3,000 years ago (Gould and McFarlan, 1959) as mudflats prograded when the Mississippi River delivered sediment to the western edge of its delta complex. The geologically unique development of this area was recently described by McBride and others (2007). The unique features, cheniers, are shore-parallel ridges where historic marine processes concentrated sediments (Figure 2). These cheniers are less than 3 m (10 ft) above sea level and are the highest topographic features among thousands of acres of mudflat, marsh and natural "bayou" waterways.

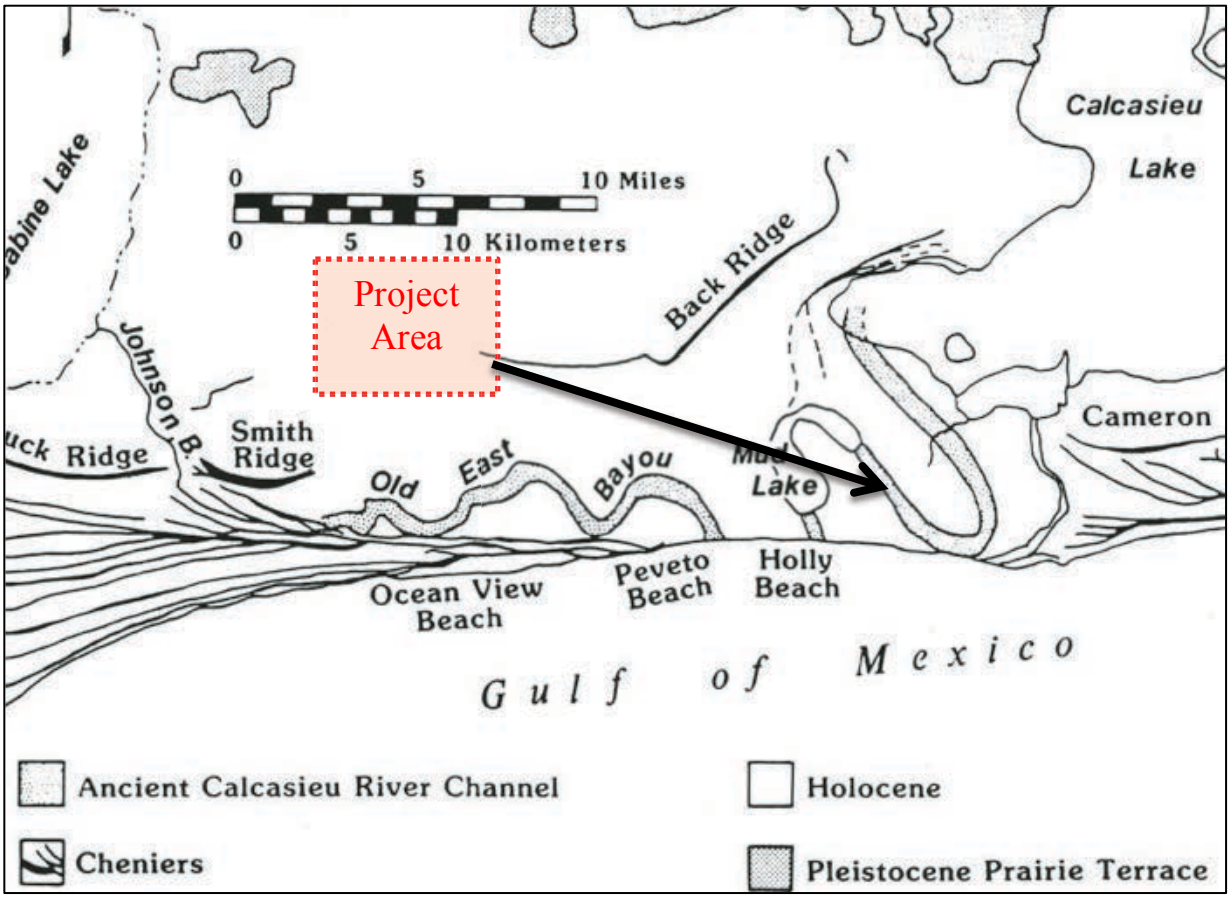
Generally, altered hydrology has increased saltwater intrusion to Cameron Parish. Coupled with drought and hurricane stresses, the marshes have deteriorated. The low marshes in the project area (near sea level) are frequently inundated with several feet of gulf water during hurricanes and tropical storms.

The area is predominantly marsh habitat, which in the 1940s included brackish, less saline, marsh. The brackish marsh has converted to saline marsh since, though some brackish marsh remains on the east side of the project area (Sasser and others 2014). Subsidence (2.1 to 3.5 feet/century), wind and wave erosion, and altered hydrology are historic causes of land loss (LCWCRTF and WCRA 1999) that continue to convert land to open water in the area (Figure 3). The local subsidence when combined with global sea level rise further exacerbates the conversion to open water (Boesch and others 1994).

In preparation of this assessment, previous studies of the area were consulted, which contain information on the environmental setting of the proposed project and referenced elsewhere in this analysis.

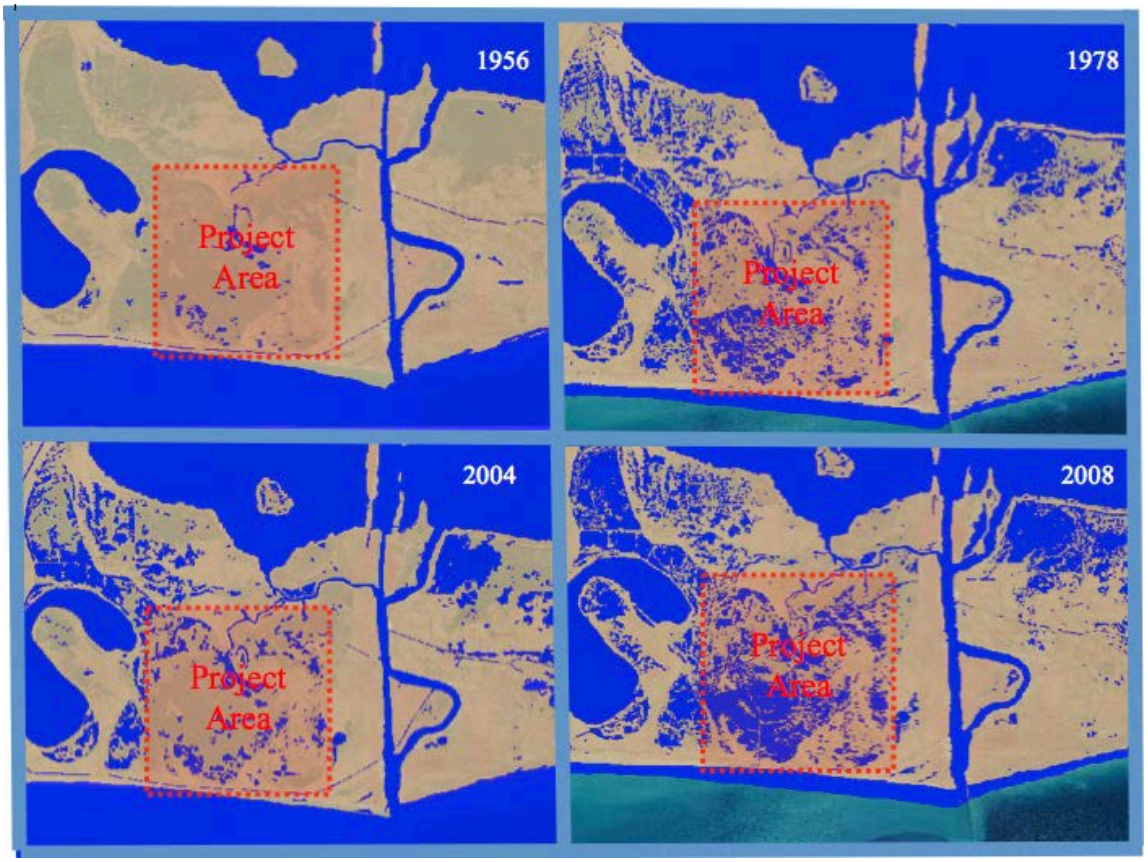
- The Hydrologic Investigation of the Chenier Plain (LDNR 2002) contains an overview of the chenier plain ecosystem, a general description of previous basin-scale characterizations, studies, and restoration plans, and specific characteristics and management issues of the Calcasieu-Sabine basin.
- The Calcasieu-Sabine River Basin (USDA 1994) report describes a cooperative resource planning effort developed among landowners, land users, volunteers, local units of government and local, state and federal agencies that includes the Calcasieu Basin.
- An EA for beach nourishment along the shores south of the proposed project area provides relevant analysis, as the project is similar to the proposed project in location and offshore sediment transport (Providence Engineering and Environmental Group, LLC 2012).

FIGURE 2. GEOLOGIC SETTING OF PROPOSED PROJECT AREA



Source: Penland and Suter 1989

FIGURE 3. AREA LAND LOSS FROM 1956 TO 2008 LAND/WATER IMAGES



Source: USGS

2 PROPOSED ACTION AND ALTERNATIVES

2.1 Alternatives Considered but Eliminated

Through the CWPPRA process, it was determined that re-establishment of the marsh was the appropriate approach to restoration. Alternatives available to achieve this goal focus on protecting existing marsh, adding sediment for elevation and nutrient enrichment of existing marsh, and establishing new marsh using borrow sediments of the surrounding bay area. 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 modeling to determine what project features are likely to be the most cost effective. Project features are refined 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 while still meeting the project purpose and need. Project features are typically vetted to landowners and the public before the project moves into Phase 1, so that untenable features are eliminated from the evaluation process prior to investment of significant resources in data collection and detailed design.

For the Oyster Bayou Project Area, both interior marsh losses and shoreline losses were explored. Using USGS imagery from 1984-2011 interior loss rates and shoreline erosion were compared. Shoreline loss rates were low; therefore, features to abate shoreline erosion were no longer considered in this project (NOAA Fisheries Service 2011).

Similar project concepts were previously considered for the general area, but were not selected for development. A variety of options to address the needs of the area were discussed among resource managers and aided the selection of the currently proposed project. Opinions of agency representatives and public on these alternatives not-considered-in-detail and the alternatives considered aided the proposal of alternative 2, the preferred alternative.

2.2 Alternatives Considered in Detail

To meet the immediate need of the area, the build alternatives were designed based on results of geotechnical reports, and topographic, bathymetric, and magnetometer surveys. All build alternatives consider using gulf borrow sources and have similar elevations of marsh and terrace (Table 1).

Scientific studies and monitoring have been conducted on marsh creation/ terracing projects and evidence exists that open-water areas can be filled to create marsh with this method. The successes of marsh creation/ terracing projects are apparent, as the method has been adopted by numerous restoration projects being constructed by the state, CWPPRA, Ducks Unlimited/NAWCA, Coastal Impact Assistance Program, NOAA Community-based Restoration Program, and as compensatory mitigation. Therefore, marsh creation and terracing options were pursued to meet the goals of the project.

TABLE 1. FEATURE DIFFERENCES OF ALTERNATIVES CONSIDERED

Alternative	Features	Net acres of marsh projected after 20 years
No action	No features created, 130 acres marsh existing	112, a loss of 18 acres
Alternative 1	300 acres marsh created, 100 acres marsh nourished, 10 acres of terrace created, 10 – 25 acres of ridge habitat created	307
Alternative 2- Preferred	605 acres marsh created, 200 acres of terraced marsh created, and 18 acres protected; no ridge habitat created	473+ acres

*All numbers are approximations from estimates in Thompson and Borne 2014, NOAA Fisheries Service 2011, candidate fact sheets, and subsequent wetland value assessments and project design documents.

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 project. Evaluation of the no-action alternative is required by CEQ regulations.

2.2.2 Alternative 1 – Ridge, Terrace, and Marsh Creation

This alternative includes ridge restoration, terrace creation, and marsh creation. The alternative is similar to an alternative nominated in 2011 (Figure 4). The nomination included the cleanout of a pass but the project was completed by the parish prior so is not included as a feature in this alternative. A key feature is to rebuild the ridge of Mud Pass.

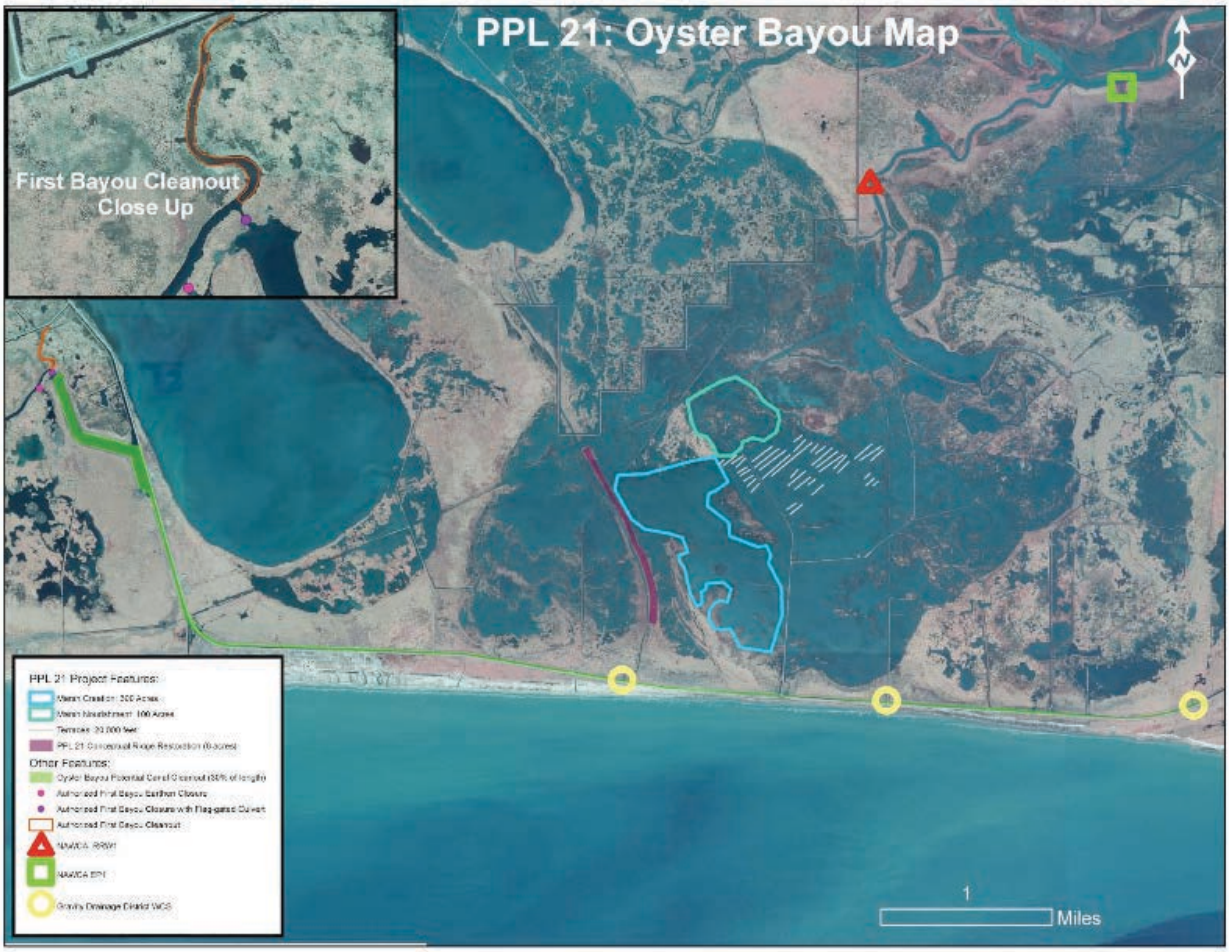
Ridge Mud Pass would be dredged by marsh buggy to minimize intrusion by equipment and a relatively low ridge (+4 ft NAVD 88) would be constructed. The conceptual ridge is 10 acres, but may be scalable up to 25 acres and would support a scrub/shrub community.

Marsh Sediment would be mined from offshore and placed to create 300 acres of saline marsh. Approximately 100 acres of marsh may be nourished. Disposal would be semi-confined. Marsh creation via dedicated dredging of sediment would be the primary technique with terraces as a supplemental feature. Material would be placed to +2.5 feet NAVD 88 and expected to remain in the intertidal range for the duration of the project (20 years). Retaining dikes would be constructed to +3.5 feet NAVD 88

elevation and a 5 ft crown width to contain the fill. Sediment needed for the fill would be mined approximately 1.5 miles offshore in the Gulf of Mexico.

Terrace Twenty thousand (20,000) feet of terraces would be constructed. Terrace construction would add between 10 and 25 additional acres of marsh creation. Typical terrace construction would occur with a crown width averaging 15 ft, side slopes of 1:5, and a settled height of +3.5 ft NAVD88.

FIGURE 4. ALTERNATIVE 1 – RIDGE, TERRACE, AND MARSH CREATION



Source: Technical Committee Nominee Fact Sheet, 2011

2.2.3 Preferred - Alternative 2 – Terrace and Marsh Creation

As described below, the alternative consists of building marsh and terraces east of Mud Pass (Figure 1). Marsh would be created utilizing offshore borrow sediments, while terrace would be constructed using local material. The design optimized existing marsh for containment, thus shortening the length of containment dikes needed. A permanent concrete pipe (per permit consultation with Louisiana Department of Transportation and Development) would be installed underneath highway LA 27/82 to facilitate sediment delivery for this and future projects in the vicinity.

Terrace The terrace construction would be approximately 17,550 linear ft in length, with a crown width averaging 15 ft, side slopes of 1:5, and a settled height of +3.5 ft NAVD88. The terraces would produce approximately 200 acres of emergent marsh. Each terrace would be ~450 ft in total length and comprised of 3 segments, and constructed with adjacent material borrowed from shallow open waters at a minimum

15 ft distance and maximum 11 ft borrow depth. The placements of the terraces would reduce wave fetch between terraces and along existing marsh shoreline.

Marsh Approximately 3,307,600 cubic yards of borrow sediments would be hydraulically dredged and transported via pipeline to the creation/nourishment locations. The placement area would be filled via a 4-cell design, to avoid filling an existing canal and best utilize existing sediment retention features. Approximately 605 acres of marsh would be created. Material would be placed to +2.5 feet NAVD 88 and expected to remain in the intertidal range for the duration of the project (20 years). Temporary dikes would be constructed to +3.5 feet NAVD 88 elevation and a 5 ft crown width to contain the fill. Sediment needed for the fill would be mined approximately 1.5 miles offshore in the Gulf of Mexico (Figure 1). Project features include the pre-excavation of tidal creeks (9,490 linear feet) and ponds (~14 acres total at 3 locations).

Plantings After initial settlement of marsh creation sediments, half the created (~303 acres) marsh would be planted with plugs of smooth cordgrass (*Spartina alterniflora* cv. Vermilion) or saline marsh type species appropriate to the area. The constructed terrace acres would be vegetated along the crown and side slopes with one row each of saline marsh type species.

Water Features Small water features, called tidal creeks and ponds, would be excavated prior to pumping fill material in the marsh creation areas. Differential settlement would be sufficient to recreate interior habitat access areas over time. Excavation would be a 10 ft width and 2.5 ft depth for the tidal creeks. Ponds would range from 4 to 5 acres with low containment dikes and existing marsh shoreline. "Placement of the dredged material from tidal creek excavation will be placed at least 15 feet away from the toe of the tidal creek but will not be defined by the construction template (Thompson 2014)".

3 AFFECTED ENVIRONMENT AND CONSEQUENCES

Effects of alternatives were designated as having *no impact*, *no significant impact (minor* or *moderate*), or *significant impact*. Consideration was given to both length of time and severity of the impact. *Minor impacts* are those that may be measurable but not result in adverse or beneficial effects to the human environment; these are short-term and reversible. *Moderate* impacts may have longer-term adverse or beneficial effects that have a measurable change to the identified environment, and thus warrant consideration of revision of the project component causing the impact. *Significant* impacts can be either harmful or beneficial to the natural and physical environment, and/or the relationship of people with those environments, and would require preparation of an EIS. The qualitative assessment is based on reference material and professional judgment. A quantitative assessment is included when sufficient data are available to do so. Table 2 presents a summary of environmental impacts associated with the no-action and build alternatives. Table 3 presents avoidance and minimization measures of the preferred alternative.

TABLE 2. SUMMARY OF ENVIRONMENTAL IMPACTS OF ALTERNATIVES

Resource	No Action	Alternative 1	Alternative 2 (Preferred)
Geology, Soils & Topography	long-term, direct, moderate to significant adverse from loss of soils	long-term, indirect, moderate benefit from marsh creation	long-term, indirect, moderate benefit fewer adverse impacts than alternative 1
Climate & Air Quality	long-term, indirect, minor adverse for CO_2 cycle due to marsh loss	long-term, direct, minor benefits from carbon sequestration short-term, direct, minor adverse from machinery emissions	long-term, direct, minor benefits greater than other alternatives short-term, direct, minor adverse greater than other alternatives
Water	long-term, indirect, moderate adverse from turbidity from conversion to open water	long-term, indirect, minor benefit from nutrient removal/water clarity short-term, direct, minor to moderate adverse from dredging-induced turbidity	same as alternative 1
Vegetation	long-term, direct, moderate adverse from conversion to open water	long-term, direct, minor benefit from increases in elevation and diversity short-term, direct, minor adverse from sediment burial	greater benefit than other alternatives from 100+ acres more marsh in 20 yrs same adverse as alternative 1
Aquatic & Benthic Habitats	long-term, direct, minor benefit from conversion to open water, and long-term, direct, adverse from marine disturbance	long-term, indirect, minor benefit short-term, local, direct, minor to moderate adverse from burial or sediment disturbance	same as alternative 1
Essential Fish Habitat & Fisheries	long-term, direct, moderate adverse from conversion of marsh to open water	long-term, direct and indirect, moderate benefits short-term, direct and indirect, adverse related to construction	same as alternative 1

Resource	No Action	Alternative 1	Alternative 2 (Preferred)
Marine Mammals	long-term, indirect, minor adverse from habitat related declines in forage species	long-term, indirect, moderate benefit from increased longevity and quality of habitat for forage species short-term, indirect, minor adverse from displacement in the borrow area	greater benefit than other alternatives from 100+ acres more marsh in 20 yr greater adverse than other alternatives from 2-4 months longer construction
Migratory Birds	long-term, indirect, minor adverse from reduced habitat quality and quantity	long-term, indirect, minor benefit from increased diversity and longevity of habitat short-term, direct, minor adverse impact from displacement	similar (not substantially different) from alternative 1
Wildlife	long-term, indirect, moderate adverse from reduced habitat quality and quantity	long-term, direct, moderate benefit from increased diversity and longevity of habitat short-term, local, direct, minor adverse from displacement	similar to alternative 1
Threatened & Endangered Species	long-term, indirect, moderate adverse impacts from prey habitat declines	long-term, moderate, indirect benefits to listed species may result from increasing the quality of forage species	same as alternative 1
Historic, Prehistoric & Native American	none	none	none
Socioeconomics	long-term, direct, moderate adverse from habitat decline	short-term, direct, moderate benefits from job and fisheries habitat creation short-term, direct, minor adverse impact through disruption	similar to alternative 1
Land Use & Infrastructure	long-term, indirect, minor adverse from increased exposure to storms and erosion	long-term, direct and indirect, minor benefits from protection short-term, direct and indirect, minor adverse from construction disruption	same as alternative 1
Hazardous, Toxic, & Radioactive Waste	long-term, indirect, minor adverse impacts due to increased exposure to oil and gas infrastructure to exposure	long-term, indirect, minor benefit due to reducing exposure of adjacent oil and gas resources to erosion and storms	same as alternative 1

TABLE 3. AVOIDANCE AND MINIMIZATION MEASURES OF THE PREFERRED ALTERNATIVE

Resource	Potential Avoidance and Minimization Measures
Geology, Soil & Topography	None
Climate & Air Quality	None
Water	Retention to maximize settling of turbidity-causing flocculants
Vegetation	Care will be taken and measures included in the construction contracts to increase awareness to rare plants and excessive disruption to existing vegetation by heavy machinery.
Aquatic & Benthic Habitats	A Turbidity Control Plan, and designated dewatering water control structures are contract provisions.
Essential Fish Habitat & Fisheries	None
Marine Mammals	Workboats would be instructed to maintain a distance of 300 ft should any manatee or dolphin be seen, and a distance of 150 ft from sea turtles, as safety permits.
Migratory Birds	Coordination with USFWS to avoid construction during nesting season.
Wildlife	Care will be taken and measures included in the construction contracts to increase awareness to wildlife and potential sources of disruption.
Threatened & Endangered Species	Measures will be included in construction contracts detailing avoidance of takings of threatened and endangered species.
Historic, Prehistoric & Native American	None
Socioeconomics	None
Land Use & Infrastructure	Contract provisions will include plans to keep one lane open, and to open both lanes as soon as practicable if an evacuation route is needed. Highway alteration would be completed outside hurricane season.
Hazardous, Toxic & Radioactive Waste	Contract provisions will require pre-construction magnetometer surveys to avoid potential oil and gas pipeline interactions and construction plans include offsets from identified pipeline areas.

3.1 Physical Environment

3.1.1 Geology, Soils, and Topography

The proposed project area lies among cheniers, or relic beaches, and natural levees that are unique geologic features. The ridges are shore parallel rises in elevation as much as 10 feet or as little as a few inches that are valuable to a diversity of wildlife. In concern for these features, the state of Louisiana conducted a study of the habitat, which provides further information about the features history, development, and importance (LDNR 2009).

The soils underlying the proposed marsh creation and terracing area consist of Creole mucky clay, and Banker muck (Soil Survey Staff 2013). These soils are unsuitable for urban or agricultural use. Soil surveys specific to the proposed project were conducted by Ardaman and Associates, and CB&I as provided in Thompson and Borne 2014. The borrow area consists of soft clay with trace of organic soils, and is located approximately 1.5 miles from the center of the marsh fill area (Figure 1).

A Coastwide Reference Monitoring System (CRMS) station is located in the proposed project area (site 0655), which is representative of the area conditions. Soil information from 2007-2012, with the exception of 2010, is summarized here (CRMS 2013). Elevation at the site is 1.13 ft NAVD88 in Bancker

Muck soils. Sediment cores in 2007 indicate low organics in the upper cm increasing with depth up to 43% organics at 20 cm.

Elevation changes since 2007 average a rate of 0.2 cm/yr less than the projected sea level rise, meaning that the natural soil formation through primary productivity is not enough to keep up with sea level rise, subsidence, and coastal storms. The recent conversion of marsh to open water is evident by the 1 km area around the monitoring station that is 42% water, 34% land, and 23% flooded land. In 2006 and prior years, land was approximately 80% of that area.

Impacts of No Action Under the no-action alternative, material from the borrow areas could be used for other restoration projects in the area; sediment sources have long been recognized as a limited resource (Galliano and van Beek 1973), the source location and quality had been identified for use in this and other restoration plans (Providence Engineering and Environmental Group, LLC, 2012), and is within range of other coastal areas of need (OCPR 2012), all of which make the borrow for future restoration. However, there are no funded plans for this borrow site. Long-term, direct, moderate to significant adverse impacts could be expected. With no action, the existing marsh would continue to erode in storm conditions. Without terracing and marsh creation, waves from wind and tide would erode the area, moving sediments around, and undercutting existing vegetation. This would continue until all the marsh vegetation dies leaving only shallow open water and increased exposure to gulf waters. Natural ridges to the north and south of the project area would be increasingly exposed to erosion.

Impacts of Alternative 1 Long-term, indirect, moderate benefits to this resource would result as vegetation colonizes the recreated emergent areas. The created habitat would reduce wave energy and allow establishment of vegetation on terraces and protected marshes, reduce turbidity of the water, reduce the wind-induced marsh loss, and possibly allow increases in submerged aquatic vegetation. The proposed elevation increase would reduce vegetation stress caused by subsidence, and placed sediments would increase nutrient availability to plants. An increase in plant productivity and subsequent increases in organic material in the plant soils would be expected.

Short-term, direct, minor adverse effects would result from the burial of current marsh habitat, because remnants of marsh exist in the area. This impact would be temporary for some marsh, as long-term, direct benefits of recreating more marsh is the project goal. However, some existing marsh would be converted to ridge in the reconstruction of the natural levee, resulting in long-term, minor, direct impacts to the marsh. Those impacts would be adverse for species dependent on the marsh habitat, and beneficial to those reliant on the ridge habitat, as discussed in other sections.

The dredged material used for the terraces would consist of naturally occurring material to the area. Native vegetative plantings would be used to stabilize soil, reduce resuspension of recently deposited sediment, and encourage sedimentation and colonization.

Impacts of Preferred - Alternative 2 The long-term, indirect, moderate beneficial impacts are similar to the build alternative 1. The adverse impacts to the marsh would be decreased in comparison to the build alternative 1, because the affect to marsh would be temporary rather than a long-term conversion to ridge habitat. Less area of soil would be disturbed because this alternative includes fewer terraces, while increasing the amount of marsh area to be created. With more marsh, more carbon would be sequestered in the global carbon cycle. Assuming 491 acres (net acres after 20 years) of wetland would be created and an average rate of 6.4 metric tons of carbon per acre per year, an additional 3,142.4 metric tons of carbon sequestered each year with this alternative.

3.1.2 Climate and Air Quality

The subtropical climate of coastal Louisiana is characterized by long, hot summers and, 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, respectively. In a typical year, more than 60 inches 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.

Hurricanes and tropical storms typically occur over the study area between June and November. On average, since 1871, a tropical storm or hurricane is expected somewhere within the state of Louisiana every 0.7 years; hurricanes make landfall about every 2.8 years (Roth 1998). Historic data from the National Hurricane Center dataset on tropical cyclones (including tropical depressions, tropical storms, and hurricanes) along the Louisiana coast from 1899 to 2007 indicates a total of 63 storms, of which 49 were Category 3 or less.

Louisiana air quality is good, having "attainment" status according to the National Ambient Air Quality Standards. Air quality monitoring throughout the state exceeds the monitoring required, however, the Louisiana Department of Environmental Quality (LDEQ) does not have air quality monitoring sites in the parish (LDEQ 2013). In Cameron Parish, offshore breezes mix and freshen the air. Frequent precipitation prevents accumulation of particulates. The American Lung Association and other air quality sources do not report on the parish air quality. Sources of air emissions in the parish are mainly associated with industries to the west at Port of Sabine Pass, Texas; oil and gas industry; commercial vessel traffic; and recreational fishing.

Wetlands, such as those of the proposed project area, are more valuable than other ecosystem types as carbon sinks due to high carbon sequestration and negligible methane emissions (Choi and Wang 2004). Average soil carbon accumulation in estuarine emergent wetlands is 6.4 metric tons of carbon per acre per year, and has been reported as high as 42.7 metric tons per acre per year at Sabine National Wildlife Refuge near the project area (Bryant and Chabreck 1998; Engle 2011). The latter is roughly equivalent to the annual carbon emissions per person in Louisiana (WRI 2013; total greenhouse gas emissions, 44.1 metric tons per year). A review of the process and amounts of carbon sequestration in Gulf of Mexico wetlands was considered in this analysis (Engle 2011).

Impacts of No Action The no-action alternative would not substantially affect the climate or weather, and would not result in any changes to existing air quality in the area. Air quality would not be impacted by the volatizing of organic materials, nor emissions from dredging equipment from the proposed build alternatives. However, air quality would have some long-term, indirect, minor adverse impacts from the reduction of 18 acres of marsh over 20 years reducing the ability of the project area to extract carbon from the air during photosynthetic processes of the marsh plants. The areas ability to sequester atmospheric carbon would continue to decline due to the projected 18 acres of wetland loss. Assuming the average carbon sequestration rate of 6.4 metric tons of carbon per acre per year, this decline would be -115.2 metric tons of carbon per year.

Impacts of Build Alternatives Neither the no-action alternative nor any of the build alternatives would substantially affect the climate or weather. Differences between the emissions of the build alternatives are unquantifiable. Emissions from the dredged material and the machinery are considered in this analysis. Anderson and Barkdoll (2009) summarize impacts of dredging to air quality and list steps that have been taken to reduce environmental impacts from activities such as that proposed in the build alternatives. Increases in marsh area would increase the ability of the area to hold carbon, which is a significant contributor to global climate change. Benefits of carbon sequestration of the build alternatives are negligible compared to the need for carbon sequestration, but contribute to cumulative beneficial impacts

of restoring marsh. The Louisiana Department of Environmental Quality was consulted in analysis (LDEQ 2013 and Appendix C).

Short-term, direct, minor adverse impacts to air quality from construction 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 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 after a time. The impact to human health would be negligible because the proposed project area is remote from any residential area. In the long term, air quality in the area is expected to be unchanged.

Dredging is required to attain the necessary amounts of sediment for marsh creation. Because 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, any short-term, direct, minor adverse impacts from dredge material and machine operation would be negated by the long-term, direct, minor beneficial impacts.

Alternative 2 creates more marsh than the other alternatives, therefore more carbon would be sequestered in the global carbon cycle and therefore have the greatest beneficial impact. Carbon sequestration with alternative 1 would be increased by the creation of approximately 300 acres of wetland and nourishment of 100 acres. Assuming the average rate of 6.4 metric tons of carbon per acre per year, an additional 1,920 metric tons of carbon would be sequestered each year with alternative 1 than with no action. However, the 491 acres of wetland that would be created and 90 acres nourished with alternative 2, equates to 3,142 metric tons of carbon sequestration each year with this alternative.

3.1.3 Water Resources

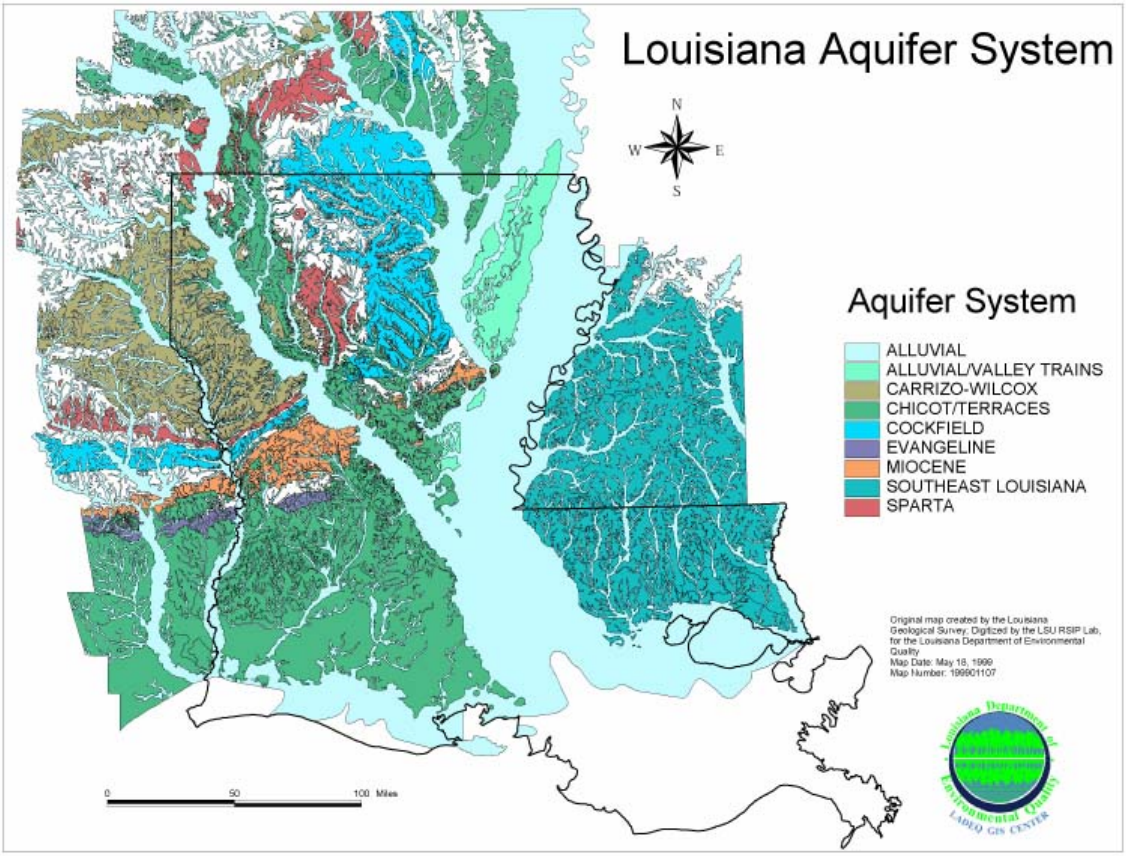
The U.S. Environmental Protection Agency (EPA) has authority through Section 1424(e) of the Safe Drinking Water Act of 1974 to review federally financed projects to determine their potential for contaminating sole source aquifers. There is no underground water source/aquifer for the proposed project area (Figure 5); Chicot Aquifer is a few miles east of the proposed project location. Chicot Aquifer has high concentrations of chloride and is being impacted by freshwater withdraws for industry and agriculture. Saltwater encroachment from Gulf of Mexico is also occurring from the saltwater wedge that underlies the proposed project area and extends from 5 to 40 miles north of the Gulf of Mexico shoreline (LDNR 2002).

The proposed project is within the Calcasieu River Basin LDEQ subsegment 030401. The project area is "fully supporting the designated use" of swimming, boating, fishing, and oyster propagation (LDEQ 2012). The core indicators used to support the determination for each use is based on the following standards:

- Primary contact (swimming): fecal coliform, temperature, and metals and toxic substances
- Secondary contact (boating): fecal coliform, and metals and toxic substances
- Fish and Wildlife propagation (fishing): DO ambient and continuous, temperature, pH, chloride, sulfate, total dissolved solids, turbidity, toxic substances, metals
- Oyster propagation: fecal coliform

Precipitation and tide are the primary factors that affect surface water in the proposed marsh creation area. Low dissolved oxygen (DO) waters occur offshore of coastal Louisiana periodically due to Mississippi River discharge (Osterman and others 2008) and may occur after storm events in inland water bodies as a result of the decomposition of debris deposited in the water bodies.

FIGURE 5. LOUISIANA AQUIFER SYSTEM



Impacts of No Action The no-action alternative would not directly affect local water quality. Long-term, indirect, moderate adverse impacts would result from increased turbidity of the water from land erosion, and a decrease in the nutrient uptake of area marshes.

Impacts of Build Alternatives Impacts on water quality between the build alternatives would not be measurably different. Short-term, direct, minor adverse impacts associated with the dredging required for implementation of the preferred alternative include: (1) increased turbidity and decreased dissolved oxygen in the water column at the dredge sites (dredge plume) and fill sites; (2) potential decreased dissolved oxygen in the water column at the borrow area due to increased water depth (>5 meters); (3) possible exhumation of buried debris; and (4) discharges from the dredge vessel. 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 borrow area are normally high as a result of coastal processes.

Long-term, indirect, minor benefits to water quality would result from the ability of created marsh to remove nitrates and phosphate. Construction of terraces is expected to reduce turbidity in adjacent water bodies by lessening the amount of wind generated water turbulence. Beneficial impacts to water quality

are likely to result from the ability of terraces to trap sediments and decrease shoreline-erosion (Steyer and others 1993) thereby reducing turbidity, and increase submerged aquatics (Rozas and Minello 2001, Cannaday 2006) that trap sediments and consume nitrates and phosphates.

3.2 Biological Environment

3.2.1 Vegetation Resources

Coastal Louisiana contains an estimated 40 percent of the vegetated estuarine wetlands in the contiguous United States (USACE 2004). The 809-acre project area is marsh and open water. The marsh was all brackish in 2001 and prior according to USGS surveys, and has been increasingly becoming saline. Saline marsh is frequently dominated by saltmeadow cordgrass, and saltgrass *(Distichlis spicata).*

The CRMS station in the project area reports 63% saltgrass in 2013 and recent decreases in both total plant cover and floristic quality. The majority of the project area vegetation is likely to be saltmeadow cordgrass.

Rare plants that may occur in Cameron Parish are mostly of freshmarsh, dune, or prairie habitats, and would not occur in the project area. The LDWF Natural Heritage Program lists rare plant species and their associated habitat, threats, and recommended practices. None are reported to occur in the project area (Appendix C).

Impacts of No Action With no action, continued erosion and subsidence are expected to occur, resulting in losses to vegetative resources of marsh, ridge, and beach habitats. With time, the losses would be irreversible in any practical sense, as the area would convert to open water in the foreseeable future.

Impacts of Alternative 1 The alternative would exert long-term, direct, minor benefits on vegetative communities of the area by adding elevation to marshes. This would offset some subsidence, increase vegetative productivity, and decrease conversion of remaining marshes to open water for 20 years. The increase in elevation would be beneficial to vegetative communities by 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.

Increases of SAV in terraced shallow water have been reported to be 3.5 times more abundant than SAV in unterraced shallow open water (Cannaday 2006), therefore an increase in SAV would be expected. Creation of the terraces and ridge would allow vegetation to colonize and stabilize the terrace sediments, while protecting marsh vegetation from waves that erode their soils. The three components of ridge, terrace and marsh provide suitable habitat for a diverse vegetative assembly from shrubs, grasses, aquatic plants, and possibly trees.

Implementing this alternative would unavoidably have short-term, direct, minor adverse impacts to the existing marsh, and shallow open water areas and their associated vegetative communities. The purpose of this alternative is to create marsh and ridge where it has been lost. Some marsh (on the scale of tens of acres) would be adversely impacted by burial during construction of the marsh (on the scale of hundreds of acres).

Impacts of Preferred - Alternative 2 The impacts would be similar to the build alternative 1. Without the ridge construction, plant diversity may be less for the area than in build alternative 1, but the terraces and containment dikes of this alternative could naturally vegetate and provide similar plant diversity. A greater amount of marsh would be created, increasing the long-term, direct, minor benefits compared to build alternative 1 and would further delay erosion of the existing marsh that would be lost with no action. The larger area of substrate for marsh vegetation is the most beneficial alternative for this area

because the marsh loss has been substantial for this area, as shown in the photographs since 1959 (Figure 3).

3.2.2 Benthic Habitats

The project area is primarily shallow (<1 ft) open-water and benthic habitat as recorded in 155 water depths taken in May 2011 (NOAA Fisheries Service 2011). The borrow area is benthic habitat under open marine water column. Benthic habitats near marsh support bacteria, fungi, microalgae, meiofauna, and microfauna, such as mollusks, polychaetes, decapods, and nematodes (Day and others 1989). The benthic community supports higher levels of the food chain, such as shrimp and demersal fish (Conner and Day 1987). 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.

Oyster, which are a significant resource as benthic organisms that create reef habitat, filter water, a commercial and recreational resource, are not located in the affect area.

Impacts of No Action The benthic area would continue to increase as marsh converts to open water, increasing the quantity of habitat and thus a long-term, direct, minor benefit to the aquatic and benthic habitat. However, the area would become more exposed to marine processes and disruption from storm events either by resuspension or movement of sediments and the associated infauna that would have a long-term, direct, minor adverse impact on the quality of the habitat.

Impacts of Alternative 1 Long-term, indirect, minor benefits would be expected in surrounding areas from improved water quality resulting from reduced turbidity and increased primary productivity. The created marsh would contribute to detritus and decrease turbidity with the build alternatives. Short-term, local, direct, minor to moderate adverse impacts to aquatic and benthic resources would occur from the direct disturbance or burial of sediment and associated organisms during dredging. Other direct, adverse impacts could include entrapment and likely death of slow-moving organisms and polychaetes during dredging, and smothering of benthic organisms in the deposition sites. Mobile invertebrates would be expected to vacate the proposed project area during construction and return after construction is complete. Organisms that do not move out of the area would likely be injured by suffocation from suspended sediments. Dredging would change substrate topography, causing a temporary redistribution of organisms in the immediate vicinity.

Benthic organisms would likely re-colonize 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). 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 DO conditions that would impact fisheries and aquatic biota in the borrow and placement areas given the patterns of water flow over the borrow sites and the shallow elevation of placement area.

Impacts of Preferred - Alternative 2 Minor to moderate adverse impacts to aquatic and benthic resources would be similar to alternative 1. While more benthic organisms would be impacted from the larger area of deposition, greater borrow amount needed, and longer period of entrapment, there would be less adverse impact to the channel that would be dredged for ridge creation in alternative 1.

3.2.3 Essential Fish Habitat (EFH)

The proposed project area contains EFH as designated by the Gulf of Mexico Fishery 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 soft bottom, SAV, and nearshore waters (GMFMC 2005). Table 4 lists the EFH by life stage for federally managed and highly migratory species at the proposed project and borrow areas.

In the Calcasieu/ Sabine Basin, the estuarine-dependent assemblage, including white and brown shrimp, has shown decreasing trends over the last 10 to 20 years (LCWCRTF and WCRA 1999). These species migrate through tidal passes during their post-larval life stage and depend on the estuarine environment for survival and reproduction. Shrimp are prey species for other federally managed fish and crustaceans (GMFMC 1998).

TABLE 4. ESSENTIAL FISH HABITAT IN THE PROJECT AREA FOR FISHERY SPECIES MANAGED BY THE GULF OF MEXICO FISHERY MANAGEMENT COUNCIL AND HIGHLY MIGRATORY SPECIES MANAGED BY THE NATIONAL MARINE FISHERY SERVICE.

Common Name	Life Stage System M=marine, E=estuarine	Essential Fish Habitat
Brown shrimp	juvenile E	marsh, SAV, soft bottom
	adults M	nearshore and estuarine soft bottom
White shrimp	eggs/larval	nearshore soft bottom
	juvenile E	marsh, estuarine soft bottom
	adult M	nearshore soft bottom
Red drum	larvae/postlarvae E	marsh, SAV, estuarine soft bottom
	juvenile M/E	marsh, SAV, estuarine soft bottom
	adults M/E	marsh, SAV, estuarine soft bottom
Gray snapper	adult M/E	estuarine marsh, soft bottom nearshore soft bottom
Lane snapper	postlarvae M/E	estuarine sav, nearshore soft bottom
	juvenile M/E	estuarine sav, nearshore soft bottom
Red snapper	juvenile M	nearshore soft bottom
Scalloped hammerhead	neonate M	nearshore waters to 30 fathoms
Blacktipped shark	neonate M	all nearshore waters
	juvenile M	all nearshore waters
	adult M	all nearshore waters
Atlantic sharpnose shark	neonate M	all nearshore waters
	adult M	all nearshore waters

Source: National Marine Fisheries Service, EFH consultation (Appendix C).

Wetlands and water bottoms in the project area provide nursery and foraging habitat supportive of a variety of economically important marine fishery species such as Atlantic croaker, black drum, blue crab, Gulf menhaden, spotted seatrout, sand seatrout, southern flounder, and striped mullet. Some of these species serve as prey for these, other fish species managed under the Magnuson-Stevens Act by the GMFMC (e.g., snappers), and highly migratory species managed by NOAA Fisheries Service (e.g., sharks).

Impacts of No Action The variety and quality of EFH associated with estuarine areas are expected to continue to decrease as the remaining marsh converts to open-water. Open-water EFH that is already plentiful in the area would increase.

Impacts of Alternative 1 Long-term, direct and indirect, moderate benefits of the build alternatives would result from re-establishing marsh, improving estuarine-related EFH. Marsh and marsh edge habitat, aided by vegetative plantings, would increase post-construction vegetation. Detrital material, formed by the breakdown of emergent vegetation, would contribute to the aquatic food web of the surrounding ecosystem. Decreases in wind erosion would protect estuarine soft bottoms around the proposed project area. Thus, the preferred alternative would restore more productive habitats supportive of brown shrimp, white shrimp, gray snapper, and red drum.

Short-term, unavoidable, direct and indirect, adverse impacts to habitats supportive of various life stages of the listed species (Table 4) would occur during the construction phase of the proposed project as marsh is filled and created, and near shore borrow areas excavated. Potential impacts to EFH include movement of prey species away from the construction areas, smothering of benthos, interruption of feeding or spawning by some species, and other effects on behavioral patterns. No significant adverse impacts on EFH are expected. Post-construction long-term benefits of increased quality and quantity of the marsh would be greater than the short-term adverse impacts. Turbidity would return to ambient conditions post-construction in marsh and nearshore habitats, and improve in terrace-protected waters.

Impacts of Preferred - Alternative 2 Long-term, direct and indirect, moderate benefits and short-term, unavoidable, direct and indirect, moderate adverse impacts are similar to alternative 1. More productive marsh is expected than with the other alternatives. The adverse impacts may be greater due to the potentially longer time to construct and greater habitat area disturbed. However, the net benefit after 20 years is expected to result in more than 100 acres more marsh than with other alternatives (Table 1).

3.2.4 Marine Fishery Resources

A wide variety of estuarine-dependent fishery species found in the Calcasieu/Sabine Basin (LCWCRTF and WCRA 1999) are of national economic importance. Most 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, and return to the open gulf as subadults or adults.

Population trends and projections for the estuarine-dependent species: red drum, black drum, spotted seatrout, Gulf menhaden, southern flounder, white shrimp, brown shrimp, blue crab are listed as having a decreasing trend, and projected to continue to decline toward the year 2050 (LCWCRTF and WCRA 1998).

Impacts of No Action Abundant open-water fisheries habitat is available in coastal Louisiana and increasing. The increase in open-water fisheries habitat comes at the expense of submerged vegetation and emergent fisheries habitats, which are less common and more vulnerable to disturbance than open-water habitat. The quality of fish habitat is expected to decrease as remaining marsh converts to open water reducing the nursery function of the area for estuarine-dependent species.

Impacts of Alternative 1 Short-term, local, direct, minor adverse impacts to fishery resources would occur during construction from dredging and placement of sediments. Dredging would directly move benthic organisms that live in the sediment and indirectly entrap the slow-moving organisms and polychaetes of the borrow areas. In the placement area, smothering of benthic organisms, and sessile fish and invertebrate species would occur. Mobile aquatic animals would move during construction and return

after construction completes. Short-term moderate to severe effects on fish eggs and larvae in the immediate area may occur. 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.

Long-term, direct and indirect, moderate beneficial impacts would result from the increase in marsh habitat providing nursery for estuarine-dependent fisheries that would decline with the no-action alternative. Access to the marsh habitat would be maintained after construction through dike gapping.

Impacts of Preferred - Alternative 2 Impacts are the same as alternative 1. Both alternatives increase habitat diversity by disturbing sediments and temporarily adversely impacting turbidity with long-term benefits expected through increased fishery nursery area. Short-term moderate to severe effects on fish eggs and larvae in the immediate area may occur. Dredging would directly move benthic organisms that live in the sediment and indirectly entrap the slow-moving organisms and polychaetes of the borrow areas. In the placement area, smothering of benthic organisms, and sessile fish and invertebrate species would occur, and dredged sites would be rapidly colonized by opportunistic infauna (EPA 2003).
The long-term, direct and indirect, moderate beneficial impacts would be similar to alternative 1, from increasing marsh habitat that provides nursery for estuarine-dependent fisheries. Dike gapping would be utilized, if needed, to maintain fisheries access.

3.2.5 Marine Mammal Resources

Marine mammals that occur in Louisiana waters include the blue, sei, finback and humpback whales, several species of dolphin, and the endangered West Indian manatee. NOAA Protected Resources division reports that whales occur in nearshore waters of Louisiana, defined as waters 0 to 650 ft in depth, rarely at depths less than 25 ft. The borrow area is at a depth of less than 25 ft and whale are unlikely to occur, so are not further discussed. West Indian manatees may be found in Louisiana coastal waters, as discussed in the Threatened and Endangered Species section (3.2.8). Dolphins are common along the shore and should be expected to occur in surface waters in the borrow area. Dolphin follow schooling fishes, such as menhaden that are prey, and seek food and refuge in interior bay waters.

Impacts of No Action With no action, the marsh used by marine mammal forage species, such as small fish, would decline resulting in long-term, indirect, minor adverse impacts.

Impacts of Alternative 1 Dolphin and their prey species may be temporarily displaced to other similar habitat, so short-term, indirect, minor adverse impacts may be associated with the build alternatives. In the long-term, indirect, moderate benefits would result from increasing the quantity and longevity of prey nursery grounds and refuges.

Impacts of Preferred - Alternative 2 Dolphin and prey species could be temporarily displaced to other similar habitat, so short-term, indirect, minor adverse impacts may be associated with this alternative. Due to the larger size, and thus potentially longer construction, this alternative may have slightly more adverse impacts than alternative 1. Long-term, indirect, moderate benefits would result from increasing the quantity and longevity of prey nursery grounds and refuges. The larger area of prey habitat (100+ acres) created would provide potentially greater beneficial impacts than alternative 1. The construction time would be 2 to 4 months longer than with alternative 1. Contractors would be instructed to watch for marine mammals. Should any manatee or dolphin be seen, any workboats in the area would be instructed to cease work until the marine animal is over 500 ft away.

3.2.6 Migratory Bird Resources

Waterbirds were specifically considered pursuant to the Migratory Bird Treaty Act. No colonies of colonial-nesting waterbirds have been observed in the proposed project area but could occur. This resource consists of heron, egret, night-heron, ibis, roseate spoonbill, anhinga, and/or cormorant. Woody vegetation is used for roosting and shallow water used as forage habitat.

Impacts of No Action With no action, the marsh used by migratory birds and their forage species would decline, and no ridge habitat would be constructed for roosting birds. Long-term, indirect, minor adverse impacts would be related to habitat quality and quantity reduction.

Impacts of Alternative 1 No migratory birds are known to nest in the area, as it is primarily open water. Short-term, direct, minor adverse impact would result from the displacement of foraging birds. Long-term, indirect, minor benefits after construction would result from increased habitat diversity and longevity of the foraging marsh and creation of roosting habitat.

Impacts of Preferred - Alternative 2 The proposed project has been developed with coordination and input from the USFWS. Foragers would be temporarily displaced to an abundance of nearby foraging habitat the same as with alternative 1. Therefore, short-term, direct, minor adverse impacts would be the same as for alternative 1. Long-term, indirect, minor benefits related to new habitat diversity, and longevity of the foraging marsh are the same as alternative 1. Roosting habitat would not be created with this alternative, but greater foraging habitat would be created.

Although no nesting colonies are known to occur within the project area at this time, if colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants are observed, all activities within 1,000 ft of the nesting colony should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present). Because the anticipated construction duration is in excess of eight months and some construction activities may occur during the nesting season, time-of-year restrictions may not be practicable. Accordingly an abatement plan to ensure that birds do no nest at the time of project construction will be developed in consultation with the USFWS if required to address potential nesting.

The disturbance of construction activities is likely to prevent colonies from selecting the area for nesting once activities have commenced. Long-term, direct and indirect, moderate benefits would occur by creating nesting areas for colonial waterbirds once vegetation becomes established, and increasing the quantity and quality of foraging area.

3.2.7 Wildlife Resources

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).

Approximately 735 species of birds, finfish, shellfish, reptiles, amphibians, and mammals spend all or part of their life cycle in the estuaries of coastal Louisiana (USACE 2004). Table 5 lists the wildlife species and/or species groups prominent (LCWCRTF and WCRA 1998) within coastal Louisiana along with the habitat function, status, trend, and projection surrounding the project area. While species that frequent woody or freshwater habitats may be listed as occurring in the surrounding geographic area, the proposed project area does not contain habitat supportive of such species. The area is within the Mississippi Flyway, and birds from central and northern North America start to converge in the fall. Waterfowl populations in the area have declined as marsh converts to open water (LCWCRTF and

WCRA 1999). The proposed project area is not known by the State Natural Heritage Program to have any rare, endangered, or otherwise significant animal species (Appendix C).

TABLE 5. AVIAN AND OTHER POPULATION FUNCTIONAL GROUPS STATUS AND TRENDS

1988 Habitat		Open Water	Brackish Marsh
	% of area	34	62
Brown Pelican	Function	Wintering area	.
	Status	Low numbers	Not historically present (NH)
	Trend/Proj.	Increasing/Increasing	.
Bald Eagle	Status	NH	NH
Wading Birds	Function	.	Multiple functions
	Status	NH	High numbers
	Trend/Proj.	.	Steady/Decreasing
Shorebirds	Function	.	Multiple functions
	Status	NH	High numbers
	Trend/Proj.	.	Steady/Decreasing
Dabbling Ducks and Diving Ducks	Function	Wintering area	Wintering area
	Status	Moderate numbers	Moderate numbers
	Trend/Proj.	Increasing/Steady	Increasing/Steady
Geese	Function	Wintering area	Wintering area
	Status	Low numbers	Low numbers
	Trend/Proj.	Increasing/Steady	Increasing/Steady
Raptors	Function	.	Multiple functions
	Status	NH	Low numbers
	Trend/Proj.	.	Steady/Decreasing
Rails, Coots, and Gallinules	Function	Wintering area	Wintering area
	Status	Low numbers	Low numbers
	Trend/Proj.	Steady/Steady	Steady/Steady
Other Marsh/OW Residents	Function	Multiple functions	Multiple functions
	Status	Moderate numbers	High numbers
	Trend/Proj.	Steady/Steady	Steady/Decreasing
Other Marsh/OW Migrants	Status	NH	NH

Furbearers	Nutria	Function	Multiple functions	Multiple functions
		Status	Low numbers	Low numbers
		Trend/Proj.	Steady/Steady	Steady/Steady
	Muskrat and Mink, Otter, Raccoon	Function	Multiple functions	Multiple functions
		Status	Low numbers	Moderate numbers
		Trend/Proj.	Steady/Steady	Steady/Steady
Game	Rabbits and Deer	Function	.	Multiple functions
		Status	NH	Low numbers
		Trend/Proj.	.	Steady/Steady
	Squirrels	Status	NH	NH
Reptiles	American Alligator	Function	Multiple functions	Multiple functions
		Status	Low numbers	Low numbers

*Projection (Proj.), Function, Status, and Trends for Mud Lake unit (LCWCRTF and WCRA 1998) NH indicates groups not historically present.

3.2.8 Threatened and Endangered Species

Coordination under the Endangered Species Act has been completed as required (Appendix C). Loggerhead, Kemp's ridley, hawksbill, leatherback, and green sea turtles occur in Louisiana. Marine turtle strandings have increased since 2010 along the northern Gulf of Mexico and are generally found to be Kemp's ridley. The majority of the strandings are Kemp's ridley in spring and summer.

Green sea turtles may be in the borrow area while migrating between their nesting and foraging sites in Florida and Texas. Major threats to sea turtles in the U.S. include destruction and alteration of nesting and foraging habitats; incidental capture in commercial and recreational fisheries; marine debris; and vessel strikes. They feed on phytoplankton, zooplankton, SAV, and small fish or crab. Kemp's ridley nest in Mexico and immature individuals are believed to stay in shallow, warm, nearshore waters in the northern Gulf of Mexico. They forage for crabs, mollusks, shrimp, and small fish. Loggerhead sea turtles occur in coastal and marine areas along the margins of the Atlantic, Pacific, and Indian Oceans. Their major threats are direct take, incidental capture in fisheries, and loss of habitat. The loggerhead turtle is the most abundant species of U.S. sea turtles and have a complex life history that is highly migratory. No sea turtle nesting is known to occur in the vicinity of the project.

Gulf sturgeon and smalltooth sawfish may occur near the project area or borrow areas. Gulf sturgeons utilize rivers in the summer and marine waters in the winter. They do not have designated critical habitat occurring in the project area. The smalltooth sawfish favors warm, estuarine, shallow waters over mud or sand such as those of the proposed project area and historically occurred along the coast from Texas to North Carolina. However, range of the species has decreased and currently only includes areas of Florida. No critical habitat is designated for this species in Louisiana and sightings in Louisiana are very rare (Wiley and Simpfendorfer 2010), so the species is not further considered.

Threatened or endangered marine mammals are not known to occur near the project, but those that occur in Louisiana are the Blue, Sei, Sperm, and Fin whales and the West Indian manatee.

The West Indian manatee may be found in lakes Pontchartrain and Maurepas (approximately 200 miles east of the proposed project area), and the Louisiana coastal waters. West Indian manatees are not known to travel into interior marshes, such as the proposed marsh creation area, are highly unlikely to occur. Young males are known to migrate along nearshore waters of Louisiana, but sightings are rare and unlikely, so these are not further discussed.

Impacts of No Action Without action existing marsh that is habitat for the sea turtle and marine mammal forage species, such as species of shrimp and fish, would continue to be lost. Long-term, indirect, moderate adverse impacts would result from no action.

Impacts of Build Alternatives The build alternatives are not substantially different as they pertain to impacts to this resource. The leatherback sea turtle, hawksbill sea turtle, Gulf sturgeon, smalltooth sawfish, and endangered whales are not likely to be adversely affected, because they do not commonly occur in the project area. We do not expect these species to be adversely affected from this project and do not discuss them further. Placement of dredged material is unlikely to adversely affect threatened and endangered species. Manatees rarely occur in coastal Louisiana during the warmer months and are unlikely to occur in the project area. Green sea turtles are unlikely to be impacted by construction activities at the borrow area, where they could occur, because hopper dredges would not be used for project construction. No critical habitat or known sea turtle nesting sites occur in the project area.

Avoidance measures would be a condition of contract, including all attempts to keep a distance no less than 150 ft from sea turtles/ small cetaceans, and 300 ft from dolphin or manatee, if sighted.

Both USFWS and NOAA Protected Resources (Appendix C) have concurred that the proposed project is not likely to adversely affect federally-listed threatened or endangered species or associated critical habitat. Long-term, moderate, indirect benefits to listed species may result from increasing the quality of forage species habitat and quantity of refuge area.

3.3 Cultural Resources

3.3.1 Historic, Prehistoric and Native American

This section considers both terrestrial and submerged cultural resources. There are no known terrestrial or submerged cultural resources in this location. A cultural resources report prepared for a pipeline constructed north of the proposed project was consulted (Fulmer and Norton 2006), and the State Division of Archaeology records were reviewed April 14, 2014 in preparation of this EA. A magnetometer survey was conducted in 2013 to establish the presence of exclusion zones around any potential under water shipwrecks, submerged hazards, or any other features that would affect future borrow area delineation or dredging activities (Thompson and Borne 2014).

Impacts of No Action The identified potential submerged cultural resources in the borrow area would not be affected. No other resources have been identified in the area.

Impacts of Build Alternatives Dredging will primarily be located where previous settlements, therefore artifacts, are unlikely. Hydraulic dredging of open water bay areas and mechanical dredging in shallow open waters that were marsh within recent history would be used. The only elevations that would support settlements, and therefore have potential artifacts are where the proposed project would lay a pipeline to convey dredge materials. Fulmer and Norton 2006 reported no sites along this coastal area in a Phase I visual and shovel-test survey. No resources are likely to be affected by these actions, because these would not have been elevations suitable for habitation, major waterways, nor the banks of shorelines.

3.3.2 Socioeconomics (Income and Environmental Justice)

The population of Cameron Parish is 6,702 (U.S. Census 2010). Table 6 provides population/poverty data for Cameron Parish, and Louisiana. This data is considered because population is one standard for the number of humans impacted, and population by race, and poverty level are standards in considering environmental justice. Industries providing the majority of employment are agriculture, forestry, fishing and hunting, and mining (16.6%); educational, health and social services (16.2%); construction (11.2%); and retail trade (10.2%).

TABLE 6. POPULATIONS OF LOUISIANA, CAMERON PARISH, AND CAMERON

Topic	Louisiana*	Cameron Parish*	Cameron CDP**
Total Population	4,601,893	6,702	409
White	63.8%	96%	94.1%
Black or African American	32.4%	2.3%	2.7%
American Indian and Alaska Native	0.7%	0.6%	3%
Asian	1.6%	0.2%	0.5%
Native Hawaiian and Other Pacific Islander	0.1%	0%	0%
Persons of Hispanic or Latin Origin	4.4%	2.8%	2.5%
2007-2011 percent persons below poverty level	18.4%	9.5%	not available

*U.S. Census 2012 estimates and ** U.S. Census 2010 (U.S. Census 2013).

Impacts of No Action As the remaining marsh is lost to open water and mud flats deepen, the benefit of the area as shrimp habitat declines. Loss of shrimp leads to loss of income in the region because marsh habitats provide essential nursery function to shrimp. Fisheries related activities would decline with a result of long-term, direct, moderate adverse impacts.

Impacts of Alternative 1 This alternative would have a short-term, direct, minor adverse impact through disruption of localized fishing during construction. Short-term, direct, moderate benefits through local job creation would result from construction activities. Long-term, indirect, moderate benefits would result from increasing shrimp habitat, and recreational and fishing value of the area.

Impacts of Preferred - Alternative 2 All impacts would be similar to the preferred alternative. The marsh habitat in the area that supports shrimp, a major component of the commercial and recreational fishing economy, may not last as long as it would with a ridge feature; however, there would be more marsh habitat created than with alternative 1.

3.3.3 Land Use and Infrastructure

The area is remote, with primarily recreational and oil and gas field use. There are two pipelines that run through the area. Highway LA 27/82 parallels the coast (Appendix B). The highway is a State scenic highway, called the Creole Nature Trail and a hurricane evacuation route. There are no towns or permanent residences on the property to be restored. The marshes and bayous of Cameron Parish are used for recreation, such as hunting, fishing, and birding. Several duck blinds are in the proposed marsh creation area, signifying the importance of the area in recreation. Gulf waters of borrow and access areas are for shallow-draft vessels and not located within the navigation channel. The State of Louisiana has no leased or oyster production areas in Cameron Parish.

Impacts of No Action Conversion of the proposed project area to open water increases exposure of active and inactive pipelines posing threats to human safety, and decreases the commercial and recreational value of the area. Increased storm surges would erode nearby land and increase structural damages from storms. Therefore, long-term, direct, moderate adverse impacts are expected with no action.

Impacts of Alternative 1 Long-term, direct and indirect, minor benefits would result from the terrace and marsh acting as a land buffer from waves during storms, with added support for birding activities. Wave erosion would decrease for surrounding land, pipelines, and infrastructure. Short-term, reversible, direct and indirect, minor adverse impacts on recreational use and highway use would occur during construction. Recreation may be interrupted by displacement of targeted hunting, fishing, and birding species. After construction, recreational value would increase from the added habitat. Highway use would be disturbed during the 1-week installation of the permanent pipeline. The two-lane highway will be reduced to one for this period. The work would be conducted outside of peak hurricane season and "if a storm enters the Gulf, both lanes of highway LA 27/82 will be reopened to facilitate evacuations. Adequate warning lighting will be required during nighttime hours, and flaggers will be utilized during the day (Thompson 2014)."

Impacts of Preferred - Alternative 2 Impacts to land use/ recreation would be similar to alternative 1. Recreational uses would not be prevented because tidal creeks and ponds would be located within the marsh creation area. Location of the proposed project considered impacts to highway LA 27/82. Sediment delivery lines would be placed under the highway and thus there would only be a minor (7 day) disruption of traffic flow. The equipment used is not expected to adversely impact the scenic nature of the Creole Nature Trail, as activity would be in the distance and rarely visible.

3.3.4 Hazardous, Toxic, and Radioactive Wastes

CB&I were contracted to conduct an HTRW survey of the area for hazardous, toxic, and radioactive waste (HTRW) verification. The report listed a 55-gallon plastic drum containing an unknown liquid, and a large empty storage tank. The area has a history of oilfield industrial activity, but no standing structures remain. CB&I visually inspected the structures listed here for evidence of HTRW; service pads, two marked below-ground pipelines, one submerged pipeline, one aboveground pipeline, and three valve locations containing various valves and piping. No oily waste, former oil pits, stressed vegetation, or surface staining were observed at these locations. The report stated that one of the oil field valves appeared to be in service and associated with TARGA Midstream Services pipeline. The landowners informed NOAA that they have since had the plastic drum and empty storage tank removed.

Impacts of No Action Long-term, indirect, minor adverse impacts due to increased exposure of oil and gas infrastructure

Impacts of Build Alternatives Care would be taken during construction activities to avoid impacts to the existing oil and gas infrastructure within the project area. The state of Louisiana, whom would contract out construction of the project, specifies contract conditions that minimize adverse impacts. These provisions include conducting magnetometer surveys to verify submerged oil and gas pipelines, and identifying any potential hazards. Other contract provisions include avoidance or remediation of on-site contaminant release from machinery and specification of no work zones near pipelines. The build alternatives do not differ in HTRW considerations. Long-term, indirect, minor benefits may result from reducing exposure of oil and gas infrastructure to erosion and storms.

3.4 Other Considerations

3.4.1 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 reversible adverse impacts to some environmental resources, but an overall cumulative moderate benefits to the environmental resources.

Coastal Louisiana, including the project area, has been greatly impacted by natural subsidence (Reed and Yuill 2009), levees, hurricanes, and oil and gas infrastructure. Recent events, such as hurricanes or oil spills, contribute to the loss of habitat but are largely indiscernible from other impacts. No direct or indirect impacts from the 2010 Deep Water Horizon oil spill are known for this area. Currently, land loss is at an average rate of an acre every 38 minutes. If the current rate of loss is not slowed by the year 2040, an additional 800,000 acres of wetlands will convert to open water.

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 exceed the summed values of the individual projects. Similar wetland restoration projects in the area would operate synergistically with the proposed alternative to enhance the structural and functional integrity of the ecosystem, improve primary productivity rates, and thereby improve the overall environmental resources. The nearest projects for restoration listed by the state database involve shoreline protection, marsh management, and hydrologic restoration within the last 20 years: East Mud Lake Marsh Management, Holly Beach Sand Management, Holly Beach Shoreline Protection, Cameron Creole Plugs, Cameron-Creole Maintenance, Replacement of Control Structures, Cameron-Creole Structure Automation, Calcasieu Ship Channel Salinity Controls, and Cameron Parish Shoreline Restoration. Environmental benefits from these project types address the suite of environmental threats along this area of coast. In recognition that the environmental needs are varied in type and differ by location, the state of Louisiana

developed a 2012 Coastal Master Plan For Southwest Louisiana as a way to prioritize restoration projects. The proposed project is consistent with this coastwide planning (Appendix B).

Physical cumulative impacts are related to mining borrow sediments. The effect of borrowing from offshore sources has been evaluated and determined to have no adverse cumulative impact (Thompson 2014). Cumulative impacts would result from the removal of marine benthic organisms, and the potential to increase erosion of nearby shorelines by changing wave climate. There is no difference in the cumulative and direct/indirect impacts for this project. Offshore borrow sites disruptions from the proposed and other past, current, and future activities are separated by time and space, thus allowing the recolonization of benthic organisms. Thompson (2014) summarizes the review and lack of adverse impact expected of wave climate on the nearby shoreline. Separation in time and space also reduced any potential cumulative impact with other actions for wave climate. Therefore, no adverse cumulative impacts are expected.

The cumulative impact of the proposed project on air and water quality would not differ substantially from the effects of the alternatives considered individually, as similar impact producing events would not co-occur in space or time. The cumulative beneficial impact to water quality would be a long-term increase in quality as a result of reduced turbidity, decrease nitrogen and phosphorus, thereby reducing low DO within the terraced areas.

Biological cumulative impacts would be similar to the direct and indirect impacts of the alternatives described previously. All build alternatives would work with existing projects to enhance habitat for fish, wildlife, vegetation, and EFH. Cumulatively, all build alternatives would increase benefits to the area by decreasing land loss rates. No cumulative adverse impacts are anticipated. The permanent placement of a sediment pipeline under the highway in the preferred alternative provides the opportunity for greater benefits in the future.

Cultural cumulative impacts would result from synergy of the build 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 build alternatives are similar to previous projects in the area that have had no adverse cultural impacts. No adverse cumulative impacts would be expected.

3.4.2 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 above, 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 project's 20-year maintenance. The State of Louisiana, whom administers contracts for plantings, uses only plantings authorized for release. This ensures appropriate (noninvasive) species and cultivars are provided.

3.4.3 Coordination

Coordination in development of the proposed project, its alternatives and 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. Prior to initiating the draft EA, a solicitation of views was sent to those listed in the distribution section. Comments received are summarized in Appendix C. A draft EA was circulated to participating restoration agencies and made available to the

public. The preferred alternative is not expected to cause adverse environmental impacts that would require compensatory mitigation.

3.4.4 Compliance with Laws and Regulations

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 available in Appendix A. Relevant correspondence is provided in Appendix C and the status in Table 7. The project manager would ensure that there is coordination among these programs where possible and that project implementation and monitoring comply with all applicable laws and regulations.

TABLE 7. STATUS OF LAW AND REGULATION COMPLIANCE

Law or Regulation	Status
Archeological & Historic Preservation Act of 1974	Completed as per SHPO letter 4-29-13
Clean Air Act of 1970	Coordinated with LDEQ 5-16-13
Clean Water Act	Pending, Permit application to USACE for section 404 is being prepared concurrent with the completion of this EA
Coastal Zone Management Act of Louisiana Executive Order 11998, Floodplain Management	Completed per letter of 8-1-2012
Endangered Species Act of 1973	Coordination complete with USFWS 4-2-2013 and NOAA 2-6-2015
Executive Order 11990, Protection of Wetlands	Coordinated with Floodplain Administration of Cameron Parish and FEMA
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations & Low-Income Populations	In compliance, assessed with this EA
Fish & Wildlife Coordination Act	Coordination with USFWS for ESA 4-30-13, and as a CWPPRA participating agency
Magnuson-Stevens Fishery Conservation & Management Act	Coordination with NOAA Fisheries completed 12-8-14
Migratory Bird Treaty Act of 1918	Coordinated with USFWS
National Environmental Policy Act of 1969	In Process with this EA draft
National Historic Preservation Act of 1966	Completed as per coordination with SHPO 4-29-13

4 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 slow or reverse the loss of marshes, Louisiana's healthy and highly productive coastal ecosystem would not be maintained.

This EA discloses information on the direct, indirect, and cumulative impacts on the human environment likely to result from the Oyster Bayou Restoration Project. It has disclosed long-term beneficial impacts on the coastal resources of south Louisiana and does not anticipate any substantial long-term adverse environmental impacts. Construction-related adverse impacts are considered minor, as they are temporary or reversible. This EA predicts beneficial impacts that would be minor. This effects analysis is based on a 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 anticipated to have long-term beneficial impacts on the local economy and culture as it relates to recreational and commercial fishing. In addition, the preferred alternative would result in increased protection of adjacent marsh in the area to be restored. NOAA Fisheries Service will review, evaluate and consider the information in this EA to determine whether to issue a Finding of No Significant Impact (FONSI) for the proposed project.

5 PREPARERS

This EA was prepared by biologists Joy Merino, Cecelia Linder, and John Foret Ph.D. of NOAA Fisheries Service.

6 PERSONS / AGENCIES CONSULTED

References in the literature cited and the following persons / agencies were consulted in the preparation of this EA.

- Amity Bass, National Heritage Program Coordinator, LDWF
- Amy Powell, USACE Solicitation of Views Manager
- Beth Altazan-Dixon, Louisiana Department of Environmental Quality
- Beth Bourgeois, NOAA port agent, personal communication
- Dana Masters, Cultural Director, Jena Band of Choctaw Indians
- James Welsh, Louisiana Commissioner of Conservation
- Jeff Weller, US Fish and Wildlife Service
- Michael Bechdol, EPA Sole Source Aquifer Program Coordinator
- Pam Breaux, Louisiana State Historic Preservation Officer
- Pam Lightfoot, Floodplain Management, Department of Transportation and Development
- Yuanda Zhu, Louisiana Office of Public Health

7 DISTRIBUTION LIST

This EA will be distributed for comment to agencies of the CWPPRA Task Force and resource agencies as listed below. A minimum 30-day comment period will be provided. A draft EA will be available for public review. A final EA will be made available to the public at http://www.lacoast.gov along with other public records for the project. The EA was distributed to:

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

Bren Haas Deputy Chief- Studies & Environmental Branch, Coastal Protection and Restoration Authority. 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 Section Chief Environmental Protection Agency, Region 6 Marine and Coastal Protection Division (6WQ-EC). 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
Dana Masters Cultural Director, Jena Band of Choctaw Indians P.O. Box 14 Jena, Louisiana 71342-0014 (requested information on the area in letter received October 10, 2013).

A solicitation of comments on the proposed project was conducted by mailing letters to the following listed entities prior to this analysis. Comments received are summarized in Appendix C and considered in analysis and project design. Full letters of reply are available in the project files maintained by the NOAA Fisheries Service.

8th Coast Guard District Commander
Cameron Parish Civil Defense
Cameron Parish Police Jury
Cameron Parish School Board
Cameron Parish Sheriff
Chitimacha Tribe
Choctaw Nation of Oklahoma
Coalition to Restore Coastal Louisiana
Coushatta Tribe of Louisiana
Department of Health and Hospitals Chief Sanitarian and Division of Environmental Health
Department of Public Safety Highway Safety Commission
Department of the Army Technical Support
Department of the Army, Galveston District Corps of Engineers
Department of Wildlife & Fisheries Louisiana Natural Heritage Program
Department of Agriculture and Forestry - Office of Soil & Water Conservation and Office of Forestry
Department of Culture Recreation & Tourism/Division of Archaeology and Office of State Parks
Department of Economic Development Office of Business Development
Division of Administration State Land Office and State Planning Office
Environmental Protection Agency Source Water Protection and Federal Activities
Federal Transit Administration Region 6
Federal Emergency Management Agency Region VI
Flood Plain Administrator, Cameron Parish Police Jury
Floodplain Management Program District 64
Gulf coast soil and water conservation District of Louisiana
Imperial Calcasieu Regional Planning and Development
Inter-Tribal Council of Louisiana, Inc.
Jena Band of Choctaw Indians
Lake Charles Harbor and Terminal
Louisiana Department of Environmental Quality Beth Altazan-Dixon, Office of the Secretary
Louisiana House of Representatives District 47 Bob Hensgens
Louisiana Senate District 25 Dan Blade Morrish
Louisiana Department of Natural Resources Office of Conservation, Office of Mineral Resources, and Coastal Management Division
Louisiana Forestry Association
Louisiana Good Roads Association

Louisiana State Police, Troop D
Louisiana State University Sea Grant Legal Advisory Service
Mississippi Band of Choctaw Indians
Natural Resources Conservation Service
Office of Civil Defense Jefferson Davis Parish
Office of Indian Affairs
Seminole Nation of Oklahoma
South Central Planning and Development Commission
South Louisiana Economic Council
Tunica - Biloxi Tribe of Louisiana
U.S. Geological Survey
U.S. House of Representatives; District 1 - Steve Scalise, District 2 - Cedric Richmond, District 3 - Charles Boustany, Jr. MD, District 4 - John Fleming, MD, District 5 - Rodney Alexander, District 6 - Bill Cassidy, MD
U.S. National Park Service
U.S. Senate - David Vitter and Mary Landrieu

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Gulf of Mexico, Reef Fish Fishery of the Gulf of Mexico, Coastal Migratory Pelagic Resources (Mackerel) in the Gulf of Mexico and South Atlantic; Stone Crab Fishery of the Gulf of Mexico; Spiny Lobster Fishery of the Gulf of Mexico; Coral and Coral Reefs of the Gulf of Mexico. GMFMC, Tampa, FL.

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APPENDIX A- ENVIRONMENTAL LAWS AND REGULATIONS

The proposed project is compliant or in the process of compliance with the following laws and regulations.
A current status of compliance in provided in the attached EA.

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.

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.

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.

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.

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, NOAA Fisheries Service 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.

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

Executive Order 11998, Floodplain Management Executive Order 11998, Floodplain Management, requires each agency (including military departments) to determine whether any action undertaken would occur in a floodplain. The Federal Emergency Management Agency provides Flood Insurance Rate Maps (FIRM) for more than 19,000 communities in the country as part of the Flood Insurance Studies the agency completes. In addition to the 100-year floodplain, which is the area of the community with a 1 percent chance of flooding in any given year, the FIRM also illustrates coastal high hazard areas, the floodway, and the 500-year floodplain, which is the area of the community with a 0.2 percent chance of flooding in any given year.

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.

Fish and Wildlife Coordination Act The Fish and Wildlife Coordination Act requires agencies to consult with the USFWS, NOAA Fisheries Service, and appropriate state agencies, prior to modification of any stream or other body of water, to ensure conservation of wildlife resources. Compliance with the FWCA is integrated into the USACE interagency review process under Section 404 of the CWA as well as through the NEPA review process.

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, NOAA Fisheries Service 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.

Marine Mammal Protection Act of 1972 (MMPA) All marine mammals are protected under the MMPA. With its' amendments, it prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters.

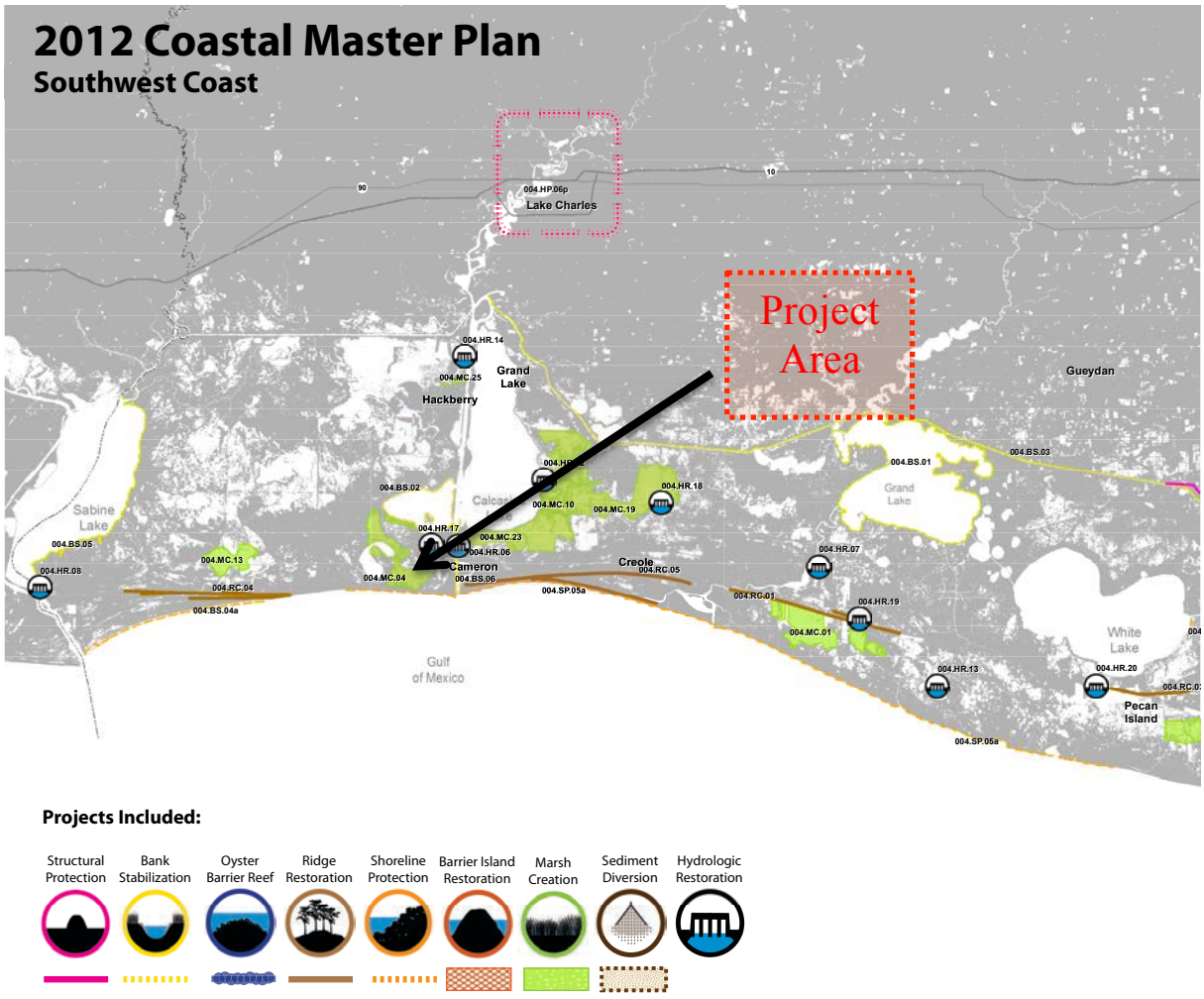
Migratory Bird Treaty Act of 1918 (MBTA) The MBTA requires the protection of all migratory bird species and protection of ecosystems of special importance to migratory birds against detrimental alteration, pollution, and other environmental degradation. Coordination under MBTA is generally incorporated into Section 404 of the CWA, NEPA, or other federal permit, license or review requirements.

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.

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.

APPENDIX B- SUPPORTING DOCUMENTATION

Coastal Master Plan For Southwest Louisiana



Land use

TO SULPHUR
Ellender Bridge
To Lake C
INTRACOASTAL WATERWAY
Sabine River
Black Bayou
Turners Bay
Old Settlement
Salt Ditch
Black Lake
Texaco Cut
Hackberry
Kelsa Bayou
Big Lake
CAMERON
Hebert's Marina
Commissary Point
TEXAS
Project Area
Sabine National Wildlife Refuge
Hog Island Gully
Long Point
CALCASIEU LAKE
Wetland Walkway
Blue Goose Trail
9 Mile Cut
Port Arthur, TX
SABINE LAKE
West Core Canal
West Cove
Rabbit Island
Wash out
Old Jetties
T-Boy's Ditch
Mud Lake
Ferry
Cameron
Courthouse
South Ca Memorial
To Port Arthur, TX
USEWAY
Johnson Bayou
Peveto Woods Bird Sanctuary
Holly Beach
Break Waters
Jetty Boat Launch & Fishing Pier
Calcasieu Pass
Jetties
Sabine Pass, TX
Sabine Pass Lighthouse
GULF OF MEXICO
LEGEND
Roads and highways
All waterways, lakes, ICW
Creole Nature Trail
Wildlife Refuges
Nature Walks
Fishing Hot Spots
Boat Launch
Crabbing Hot Spots
Beaches
Birding Hot Spots
Public Restrooms
Food
Fuel
Hospital
Lodging
RV Campgrounds

APPENDIX C- CORRESPONDENCE

NOAA Protected Resources Concurrence

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

F/SER31:NB

John Foret, Ph.D.
National Marine Fisheries Service
SEFC/Estuarine Habitats and Coastal Fisheries Center
646 Cajundome Boulevard
Lafayette, Louisiana 70506

Ref.: NMFS, 2 Restoration Projects, Cameron and Vermilion Parishes, Louisiana

	Project Name	Parish	NMFS Tracking Number
1	Rockefeller Refuge Gulf Shoreline Stabilization (ME-18)	Cameron and Vermilion	SER-2014-14934
2	Oyster Bayou Marsh Restoration (CS-59)	Cameron	SER-2014-14942

Dear Dr. Foret:

This document responds to 2 letters received on August 18 and August 20, 2014, for the above-referenced projects, requesting National Marine Fisheries Service (NMFS) concurrence with your project-effect determinations submitted pursuant to Section 7 of the Endangered Species Act (ESA). You determined that the proposed projects may affect, but are not likely to adversely affect, smalltooth sawfish, sea turtles (green, leatherback, loggerhead, Kemp's ridley, and hawksbill), whales (humpback, blue, fin, sei), and Gulf sturgeon. On September 5, 2014, we decided to batch these projects into a single consultation based on the similarity of the proposed activities. We requested additional information on September 16, 2014, and received it on September 17, 2014, the same day we initiated consultation. Our effects determinations are provided below. NMFS's findings on the projects' potential effects are based on the project descriptions in this response. Any changes to the proposed actions may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

Each project is described in detail below and locations are shown in Figures 1-3 following the project descriptions. The applicants will follow NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*, dated March 23, 2006 (enclosed).

1. The Rockefeller Refuge Gulf Shoreline Stabilization project is located at 29.636786°N, 92.778019°W, in the Gulf of Mexico, westward from Joseph's Harbor Canal (Figure 1). The applicant proposes to construct 3 miles of reef breakwater parallel to the shore along the -3.5 foot (ft)-deep contour, positioned approximately 150 ft offshore. The new breakwater will incorporate existing breakwaters and provide gaps in the breakwater every 1,500 ft for tidal flow and species movement. The goal is to reduce the current loss of marsh estimated at a loss of 46 ft per year of shoreline with a projected loss of 340 acres (ac) of saline marsh in the next 20 years, totaling 840 ac of loss in the next 50 years (see Figure 2). Reef sections

are constructed by placing geotextile fabrics, lightweight aggregate centers, and then stone to form a breakwater. The top of the breakwaters will initially be at an elevation of +3.5 ft and measure 20 ft wide, though some subsidence is expected. Work will be completed from a shallow-draft barge because equipment is not permitted to access land at this site. To accommodate the barge in shallow water, dredging of a temporary flotation channel parallel to the breakwater may be necessary; however, no channel was necessary for the breakwater test sections completed in 2007. A temporary floatation channel would be roughly 80 ft wide by 7 ft deep, which would require mechanically dredging approximately 30,000 cubic yards (yd^3) of material. The sediment would be stockpiled by side-casting seaward of the channel, and the flotation channel backfilled after project completion. Temporary signs would be used to mark the temporary flotation channel, whereas other permanent signs would be constructed within the breakwater. Benthic conditions are described as clay and shell with no known seagrass beds within the high-turbidity project area. Construction is anticipated to take 1.8 years to complete with all work completed during daylight hours.

2. The Oyster Bayou Marsh Restoration project is located within an onshore marsh at 29.790728°N, 93.408101°W with a borrow site at 29.713158°N, 93.368142°W, in the Gulf of Mexico, westward from Calcasieu River (Figure 3). The project would create approximately 600 ac of marsh, 200 ac of terraced marsh, and protect an additional 18 ac of marsh, with all restoration work occurring in the uplands. Approximately 3,723,000 yd^3 of borrow sediments would be hydraulically dredged from a 359-ac borrow area to between 10-15 ft deep and then pumped via pipeline to the upland locations. The borrow site is located approximately 3.5 miles offshore in the Gulf of Mexico in waters approximately 16-25 ft deep. Material will be placed to +2.5 ft, in upland areas that avoid filling an existing canal and will use temporary dikes and existing sediment retention features to maintain the sediments in the intertidal range for the duration of the project (20 years). The marsh and terraced areas will be planted with plugs of native marsh plant species. Work is expected to occur continuously for up to 6-18 months.

Figure 1. Image showing 6 of the project locations along the shoreline
(©2013 Google; Image Landsat; Data SIO, NOAA, U.S. Navy, NGA, GEBCO)

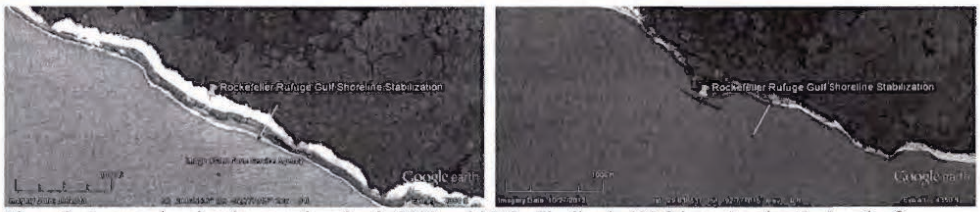


Figure 2. Images showing the same location in 2003 and 2012. The line is 400 ft long showing the length of erosion in that 10-year time frame (Image USDA Farm Service Agency and Image, ©2014 TerraMetrics)

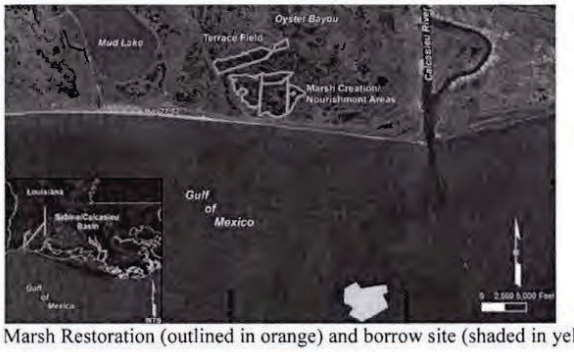


Figure 3. Oyster Bayou Marsh Restoration (outlined in orange) and borrow site (shaded in yellow). Image provided by applicant.

Three ESA-listed species of sea turtles (the endangered Kemp's ridley, the threatened loggerhead,[1] and the threatened/endangered green[2]), can be found in or near the action areas of the proposed projects and may be affected by the projects.

- We do not believe hawksbill or leatherback sea turtles will be present at the project sites or affected because of their very specific life history, sheltering, and foraging requirements, which are not met in or near the action areas. Hawksbills are associated with coral reefs while leatherbacks are a deepwater, pelagic species.

- You stated that the projects may affect smalltooth sawfish; however, smalltooth sawfish are only rarely found outside of the state of Florida; based on their known current range.[3] Because of their expected rarity in and near the proposed action areas, we believe that they will not be affected by these projects.

- You stated that the projects may affect Gulf sturgeon; however, these projects are outside of the known range for this species (68 FR 13370). Gulf sturgeon are not expected to occur west of the Mississippi River, therefore they will not be affected by these projects.

---

[1] Northwest Atlantic Ocean distinct population segment (DPS)
[2] Green turtles are listed as threatened except for the Florida and Pacific coast of Mexico breeding populations, which are listed as endangered.
[3] NMFS. 2009. Smalltooth Sawfish Recovery Plan, Silver Spring, MD.

- You stated that the projects may affect whales (humpback, blue, fin, sei); however, we believe the shallow water in the proposed project areas (3-25 ft) will not support large, deep-water whales. Therefore, these projects will not affect these whales.

- None of these projects are located within designated critical habitat and therefore it will not be affected.

We have identified the following potential effects to ESA listed species and concluded the species are not likely to be adversely affected:

1. Effects to sea turtles include the risk of injury from breakwater placement in 3-4 ft deep water, but the risk will be discountable due to the species' ability to move away from the project sites if disturbed. In addition, breakwater installation will cease temporarily if a sea turtle is spotted within 50 ft of the project, in compliance with NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions.*

2. Sea turtles may be adversely affected by being unable to use the sites for foraging and shelter due to avoidance of construction activities and related noise. These effects will be insignificant as these projects will not impact seagrasses, coral, or mangroves used for foraging or refuge habitat; and projects are located in open water areas that will not restrict movement of species in the area. The proposed projects may also result in increased turbidity; however, these effects will be insignificant. Project 1 is an area of high turbidity and will not be affected by a temporary increase in turbidity from this project and Project 2 is designed to incorporate natural turbidity barriers including dikes.

3. Effects to sea turtles include the risk of injury from contact with mechanical or hydraulic dredging equipment, which will be discountable. NMFS has previously determined in dredging Biological Opinions[4] that, while oceangoing hopper-type dredges may lethally entrain protected species, non-hopper type dredging methods (e.g., mechanical, clamshell, and bucket dredging as well as hydraulic [suction] cutterhead, pipeline, and sidecast dredging) are slower and unlikely to overtake or adversely affect them. The implementation of NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* will provide additional protection by requiring work to stop if a listed species is observed within 50 ft of operating machinery.

In summary, we concur with your determinations that the proposed actions are not likely to adversely affect sea turtles.

This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a

[4] NMFS. 2007. Revision 2 to the November 19, 2003, Gulf of Mexico Regional Biological Opinion to the U.S. Army Corps of Engineers on Hopper Dredging of Navigation Channels and Borrow Areas in the U.S. Gulf of Mexico. National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida. January 9, 2007. 15 pp.

manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional relevant information for your review. If you have any questions, please contact Nicole Bonine, Consultation Biologist, at (727) 824-5336 or by email at Nicole.Bonine@noaa.gov. Thank you for your continued cooperation in the conservation of ESA-listed species.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enc.: 1. *Sea Turtle and Smalltooth Sawfish Construction Conditions* (Revised March 23, 2006)
2. *PCTS Access and Additional Considerations for ESA Section 7 Consultations* (Revised June 11, 2013)

File: 1514-22.C

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

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

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

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

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

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

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

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

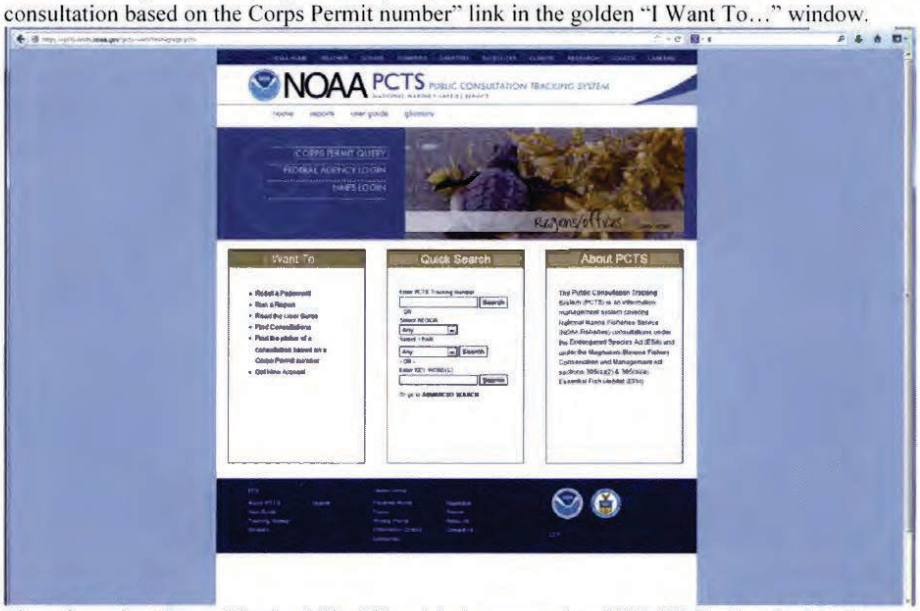
g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 6-11-2013)

Public Consultation Tracking System (PCTS) Guidance: PCTS is a Web-based query system at **https://pcts.nmfs.noaa.gov/** that allows all federal agencies (e.g., U.S. Army Corps of Engineers - USACE), project managers, permit applicants, consultants, and the general public to find the current status of NMFS's Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations which are being conducted (or have been completed) pursuant to ESA Section 7 and the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) Sections 305(b)2 and 305(b)(4). Basic information including access to documents is available to all.

The PCTS Home Page is shown below. For USACE-permitted projects, the easiest and quickest way to look up a project's status, or review completed ESA/EFH consultations, is to click on either the "Corps Permit Query" link (top left); or, below it, click the "Find the status of a consultation based on the Corps Permit number" link in the golden "I Want To..." window.



Then, from the "Corps District Office" list pick the appropriate USACE district. In the "Corps Permit #" box, type in the 9-digit USACE permit number identifier, with no hyphens or letters. Simply enter the year and the permit number, joined together, using preceding zeros if necessary after the year to obtain the necessary 9-digit (no more, no less) number. For example, the USACE Jacksonville District's issued permit number SAJ-2013-0235 (LP-CMW) must be typed in as 201300235 for PCTS to run a proper search and provide complete and accurate results. For querying permit applications submitted for ESA/EFH consultation by other USACE districts, the procedure is the same. For example, an inquiry on Mobile District's permit MVN201301412 is entered as 201301412 after selecting the Mobile District from the "Corps District Office" list. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov or (727) 551-5773.

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

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

LDWF Natural Heritage Program

BOBBY JINDAL
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

ROBERT J. BARHAM
SECRETARY
JIMMY L. ANTHONY
ASSISTANT SECRETARY

Date	June 13, 2013
Name	John Foret
Company	NOAA Fisheries Service
Street Address	646 Cajundome Blvd
City, State, Zip	Lafayette, La 70506
Project	Oyster Bayou Marsh Restoration (CS-59)
Project ID	2022013
Invoice Number	13061306

Personnel of the Habitat Section of the Coastal & Nongame Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

for Carolyn Micka
Amity Bass, Coordinator
Natural Heritage Program

P.O. BOX 98000 • BATON ROUGE, LOUISIANA 70898-9000 • PHONE (225) 765-2800
AN EQUAL OPPORTUNITY EMPLOYER

USFWS Concurrence

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

April 2, 2013

Jeffery Weller
U.S. Fish and Wildlife Service
646 Cajundome Blvd.
Lafayette, LA 70506

Dear Jeffery Weller,

The NOAA National Marine Fisheries Service is the federal sponsor of the *Oyster Bayou Marsh Restoration* (CS-59) in Calcasieu/Sabin Basin. As part of the preparation of the Environmental Assessment, in compliance with the National Environmental Policy Act, we ask the Service to provide a list of endangered, threatened, and proposed species and designated and proposed critical habitats that may occur in the project area, shown in the enclosed information.

This CS-59 project is being funded under the Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA), of which your agency is a cooperating partner. We appreciate your participation in identifying any concerns you have regarding fish and wildlife resources, including threatened and endangered species that may be affected by the proposed project.

The project location is saline marsh and open water, and is shown on the map provided. Our proposed action includes creating and nourishing marsh from nearby offshore sediments. We propose constructing terraces and marsh to reduce wave erosion to existing and created marsh, and increase SAV habitat suitability.

Please do not hesitate to call or write (337) 291-2107, john.foret@noaa.gov with any questions or concerns that this request raises.

Sincerely,

John Foret, PhD
NOAA NMFS

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
(✓) Will have no effect on those resources
( ) Is not likely to adversely affect those resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

April 30, 2013
Date

Acting Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service

SHPO Concurrence

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 20, 2013

Pam Breaux
State Historic Preservation Officer
Louisiana Office of Cultural Development
P.O. Box 44247
Baton Rouge LA 70804-44247

Dear Ms. Breaux,

The NOAA, National Marine Fisheries Service is considering construction of a terrace and marsh creation project in Calcasieu-Sabine Basin, Cameron Parish. We have prepared a cultural resources assessment for this activity (summarized here), as required under Section 106 of the National Historic Preservation Act of 1966, as amended. By transmittal of this letter and the attached cultural resource assessment, we request consultation with your office for cultural resources, and request a concurrence with our determination of effect.

The Oyster Bayou Marsh Restoration Project (CS-59) is funded under the Coastal Wetlands Planning, Protection and Restoration Act. The Area of Potential Effects (APE) is located in the Holly Beach Quadrangle. During a recent visit to your office, we found no records of identified sites in the APE, nor in the Holly Beach Quadrangle.

Our proposed action includes creating and nourishing marsh from offshore sediments. Potential impacts can occur from dredging that could unearth unknown sites. The dredging proposed for this project will primarily be located where previous settlements are unlikely, such as shallow open water and the Gulf of Mexico. Hydraulic dredging would be done in federal waters of the Gulf of Mexico, where the borrow site is currently under investigated and a report will be sent to you upon completion due in June of this year.

The area in the attached map is where mechanical dredging would occur in shallow open waters that were marsh within recent history. The only elevations that would have supported settlements, and therefore have potential artifacts are where the proposed project would lay a pipeline to convey dredge materials. PBS&J surveyed the coastal area here (Fulmer and Norton 2006, your report # 22-2822) and report no sites along this coastal area in a Phase I visual and shovel-test survey. We believe no additional investigation is necessary, because these would not have been elevations suitable for habitation, major waterways, nor the banks of shorelines. Our determination is that no resources are likely to be affected by our proposed actions.

Your comments/ concerns would be appreciated no later than May 1, 2013, and may be addressed to me.

Sincerely,

APR - 9 - 13

No known historic properties will be affected by this undertaking. This effect determination could change should new information come to our attention.

Pam Breaux 22 April 2013
Pam Breaux Date
State Historic Preservation Officer

EFH Concurrence

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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

December 4, 2014 F/SER46/RH:jk
225/389-0508

Dr. John D. Foret, Ph.D.
NOAA Fisheries Service/SEFSC
Estuarine Habitats and Coastal Fisheries Center
646 Cajundome Boulevard, Room 175
Lafayette, Louisiana 70506

Dear Dr. Foret:

NOAA's National Marine Fisheries Service (NMFS) has reviewed the draft Environmental Assessment (EA) for the Oyster Bayou Marsh Restoration (CS-59) project funded for engineering and design under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). This draft was transmitted for our review by electronic mail on November 25, 2014. Submittal of the draft EA for our review also was intended to initiate essential fish habitat (EFH) coordination requirements pursuant to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) and NMFS' findings with the CWPPRA program.

Staff of NMFS' Habitat Conservation Division have reviewed the draft EA and believe it to be well written and that impacts to resources of concern have generally been adequately evaluated and disclosed. However, we have the following comments to provide to ensure the final EA is improved over the draft version:

Page 8, Figure 7. This figure should be numbered Figure 4. As written the draft EA is missing figures 4, 5, 6, 8 and 9, while it has figures numbered 7 and 10. Figure numbering should be corrected and references to those figures in the text edited.

Page 9, Water Features. This paragraph describes the pre-dredging of trenasses and ponds for the creation of water features to improve the overall productivity and diversity of habitat within the project area. The paragraph does not describe where the material would be placed from the dredging of those features. The final EA should provide a description of where the material dredged from the creation of trenasses and marsh ponds would be placed.

Page 10, Table 2. SUMMARY OF ENVIRONMENTAL IMPACTS OF ALTERNATIVES. The summary for the resource of "water" in this table does not include short-term, direct minor impacts in the fill and adjacent areas caused by turbidity for Alternative 1 and 2. This table should be revised to include those impacts.

Page 13, Impacts of No Action. Wording in this paragraph suggests the borrow area would be dredged in the future without this project. Lacking an authorized and funded future use of this borrow site, this suggestion is speculative and we suggest it be deleted from the text.

Page 13, Impacts of Preferred – Alternative 2. This paragraph indicates the project would create 491 acres of marsh and estimates the tons of carbon sequestered each year based on that amount. According to previous sections of the document, project implementation would create 625 acres of wetlands (605 acres marsh creation area, 20 acres marsh terraces). The correct figures should be used or the discrepancy explained.

Page 18, Essential Fish Habitat (EFH). The fishery council responsible for designating EFH in the project area is the Gulf of Mexico Fishery Management Council (GMFMC). The first sentence should be edited to correctly cite the council.

Page 19, Table 4. ESSENTIAL FISH HABITAT OF PROPOSED PROJECT AND BORROW AREAS. This table is missing a number of federally managed fishery species for which EFH has been designated in either the project area and/or borrow site. In addition, EFH for stone crab has no longer been designated by the GMFMC in the project area. Table 4 should be replaced with the attached table and the text should be revised to reflect this information.

We appreciate the opportunity to review and comment on the draft EA. While revisions to the text have been recommended, we agree the project would be beneficial to EFH supportive of marine fishery resources and support its implementation. Given the benefit to EFH, we have no EFH Conservation Recommendation to provide. This completes the coordination requirements pursuant to the MSFCMA.

Sincerely,

Virginia M. Fay

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

c:
F/SER46, Swafford
F/SER4, Rolfes, Dale
Files

Enclosure

Table 4. Essential Fish Habitat in the project area for fishery species managed by the Gulf of Mexico Fishery Management Council and Highly Migratory Species managed by the National Marine Fishery Service

Common Name	Life Stage System (M=marine, E=estuarine)	Essential Fish Habitat
Brown Shrimp	Juvenile (E)	Marsh, SAV, soft bottom
	Adult (M/E)	Nearshore and estuarine soft bottom
White Shrimp	Eggs/Larval (M)	Nearshore soft bottom
	Juvenile (E)	Marsh, estuarine soft bottom
	Adult (M)	Nearshore soft bottom
Red Drum	Larval/Postlarval (E)	Marsh, SAV, estuarine soft bottom
	Juvenile (E/M)	Marsh, SAV, estuarine soft bottom
	Adults (E/M)	Marsh, SAV, estuarine soft bottom
Gray Snapper	Adult (E/M)	Estuarine marsh, soft bottom Nearshore soft bottom
Lane Snapper	Postlarval (E/M)	Estuarine SAV, nearshore softbottom
	Juvenile (E/M)	Estuarine SAV, soft bottom Nearshore soft bottom
Red Snapper	Juvenile (M)	Nearshore soft bottom
Scalloped Hammerhead	Neonate (M)	Nearshore waters to 30 fathoms
Blacktipped Shark	Neonate (M)	All nearshore waters
	Juvenile (M)	All nearshore waters
	Adult (M)	All nearshore waters
Atlantic Sharpnose Shark	Neonate (M)	All nearshore waters
	Adult (M)	All nearshore waters

Summary of Comments

- EPA "determined that the project, as proposed, should not have an adverse effect on the quality of the groundwater underlying the project site," located on the Chicot aquifer system.6-11-13 They also reviewed the draft EA and had no comment. 12-24-14
- Louisiana Office of Public Health has "no objection" and advises compliance with any applicable State Sanitary Code regulations such as Title 51, Public Health –Sanitary Code [to be included in the States contracting for project work] and Title 48, Public Health-General [not applicable]. 6-12-13
- FEMA Region VI "request that the Parish Floodplain Administrator be contacted [which has been done]…and be in compliance with EO11988 and EO11990 [as described in appendix A]."6-3-13
- Louisiana Department of Wildlife and Fisheries provide "no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries… if at any time Heritage tracked species are encountered within the project area, please contact the LNH Data Manager at 225-765-2643." 6-13-13
- Louisiana Office of Conservation indicate the SONRIS data website records "oil and/or gas wells located in the project area. The DNR water well database indicates that there are no registered water wells in the vicinity of the project area. However, it is possible that unregistered water wells may be located in the area…please contact Louisiana One Call at 1-800-272-3020 prior to commencing operations" involving pipelines and underground hazards [to be included in the States contracting for project work]. 6-26-13
- Louisiana Department of Transportation and Development provide a Flood Insurance Rate Map for Oyster Lake and Mud Pass, and require an "allowance for adequate flow of water and assurance that there will be no back up of water. There must be no instance of the creation of flooding where there was no flooding prior to construction." They request cleaning debris and keeping the surrounding area clear [as is a standard in State contracting and will be for project work], and that the Parish floodplain administrator is contacted [as has been done]. 7-2-13
- USACE "do not anticipate any adverse impacts to [USACE] projects" and advise on permitting.
- Jena Band of Choctaw Indians requests we provide "any information concerning the possibility of culturally significant areas. Recent history shows this area to be inundated and classified as marsh lands, [they] are interested in discovering how this area has changed over time." They have been added to the draft EA distribution that will provide the requested information. 10-10-13
- Louisiana State Police –Troop D requested Sgt. Adaway 337-491-2058 be contacted if we require input, as they do not see the need to do so on an open waterway project. Via email to J. Foret 6-5-13
- Natural Resource Conservation Service reviewed a draft of this EA and had no comment. 12-23-14

Filename: for public_3_13_15.docx
Folder: FileShare:Restoration:Documents: NMFS PROJECT FILES:L21-CS-59-Oyster Bayou:EA:drafts
Template: Macintosh HD:Users:joy.merino:Library:Application Support:Microsoft:Office:User Templates:Normal.dotm
Title: Oyster Bayou
Subject: LAF pre-draft
Author: Joy Merino
Keywords: cameron parish
Comments:
Creation Date: 3/13/15 9:19 AM
Change Number: 2
Last Saved On: 3/13/15 9:19 AM
Last Saved By: Joy Merino
Total Editing Time: 1 Minute
Last Printed On: 3/13/15 9:19 AM
As of Last Complete Printing
Number of Pages: 57
Number of Words: 18,230 (approx.)
Number of Characters: 103,914 (approx.)