

# **DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)**

## **SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT BAYOU SAUVAGE, TURTLE BAYOU & NEW ZYDECO RIDGE RESTORATION PROJECT SAINT TAMMANY AND ORLEANS PARISHES, LOUISIANA**

### **SEA # 546**

Description of the Action. The U.S. Army Corps of Engineers (USACE), New Orleans District (CEMVN), prepared Supplemental Environmental Assessment #546 (SEA #546) to present changes to the design of some of the projects in the recommended mitigation plan described in the Programmatic Individual Environmental Report 36, Supplement 1 (SIER 1) titled "Bayou Sauvage, Turtle Bayou and New Zydeco Ridge Restoration Projects, Saint Tammany and Orleans Parishes, LA". The Decision Record for SIER 1 was approved by the CEMVN Commander on October 20, 2015. This supplemental EA evaluates the potential impacts associated with implementation of the proposed changes to the Bayou Sauvage Flood Side Brackish Marsh (BSFS) and New Zydeco Ridge (NZR) restoration projects mitigating Lake Pontchartrain and Vicinity Hurricane Storm Damage Risk Reduction System (LPV HSDRRS) impacts to National Wildlife Refuge (NWR) lands and portions of the general impacts that did not occur on NWR lands.

The BSFS project approved in SIER 1 originally consisted of brackish marsh restoration at two sites, BSFS4 and BSFS5. The BSFS4 site, approximately 60 acres in size (18.4 AAHUs), has been removed from this project alternative since the site is no longer available for purchase and only the BSFS5 site would be constructed.

The proposed action would take the 18.4 AAHUs of outstanding mitigation that can no longer be accomplished at the BSFS4 site and expand the NZR Brackish Marsh restoration project approved in SIER 1 by approximately 60 acres. The NZR projects are located on the north shore of Lake Pontchartrain in the north east quadrant of the lake, northwest of U.S. Highway 90, and approximately 5 miles east of Slidell, Louisiana on the Big Branch NWR. The project area is bounded on the east by U.S Highway 90, on the North by U.S. Highway 190, on the west by Interstate 10, and on the south by Lake Pontchartrain. The NZR projects approved in SIER 1 consist of creating approximately 159 acres of BLH-Wet habitat and 160 acres of intermediate/brackish marsh habitat.

The proposed expansion of the NZR Brackish Marsh restoration project could be accomplished in two possible ways.

Design 1 expands the current design of the NZR Brackish Marsh restoration project by approximately 60 acres, making the total acreage for that project approximately 220 acres; it moves the approved NZR BLH-Wet footprint northward. This project alternative minimizes the increase in linear footage of retention dike required by maintaining the original outer perimeter dike and cross dike between the two habitat types. As such, the perimeter retention dike for the

brackish marsh project would only increase by 2,460 linear feet from the 10,165 linear feet of perimeter retention dike originally identified in SIER 1.

Design 2 maintains the alignment of the NZR BLH-Wet and Brackish Marsh layouts approved in SIER 1 and adds a 60 acre brackish marsh cell to the north of the BLH-Wet footprint. This design option would require an additional 4,500 linear feet of brackish marsh retention dike.

The earthen perimeter dike(s) around the marsh creation area(s) would be constructed to an elevation +4.0 feet NAVD88 with a five foot crown and 1V on 3H side slopes. The retention dike around the BLH-Wet creation area would be constructed to elevation +7.0 feet NAVD88 with a 5 foot crown and 1V on 3H side slopes. This varies from the original NZR design in which the retention dikes were to be constructed with a 1V on 4H side slope. Cross dikes between the marsh creation cell(s) and the BLH creation cell would be constructed to elevation +5.5 feet NAVD88 to allow effluent from the BLH cell to spill into the marsh creation cell(s). Spill boxes or weirs would be constructed at pre-determined locations within the retention dike to allow for effluent water release from within the marsh creation area(s). Borrow for dike construction would be obtained from the interior of the marsh/BLH creation footprints. Specifics on the interior borrow ditch design can be found in SIER 1. The marsh creation area(s) will initially be filled to an elevation of approximately +3.0 feet NAVD88 to ultimately reach a target marsh elevation ranging from +1.0 feet to +1.5 feet NAVD88.

The impacts associated with both Design 1 and Design 2 would be the same for each resource evaluated and therefore the impacts analyses will not distinguish between the two designs. The decision to use Design 1 or Design 2 will be based upon which stage of construction the NZR project approved in SIER 1 is in at the time the decision whether to proceed with a modified design is made. If a decision is made to implement the modified design at an earlier stage of construction, Design 1 would be chosen. If a decision is made to implement the modified design at a later stage of construction Design 2 would be chosen.

#### Borrow Site and Access Corridor

The original borrow site for NZR measured 289 acres and was broken into 2 primary (sites #1) and 2 secondary (sites #2) borrow areas due to differential lake bottom elevations. The primary and secondary borrow sites #1 are in deeper water (7 to 18 feet deep), thus a dredging depth of -20 feet NAVD88 is being used to obtain a suitable quantity of material. Primary and secondary borrow sites #2 are in shallower water (4 to 9 feet deep), therefore dredge depths vary with primary borrow site # 2 having a dredge depth of -18' NAVD88 and secondary borrow site #2 having a dredge depth of -16' NAVD88. The total anticipated amount of fill material being dredged from all 4 borrow sites was 3,600,000 cubic yards.

Due to the elimination of one of the Bayou Sauvage Flood Side Brackish Marsh features approved in SIER 1, the borrow site for the Bayou Sauvage/Turtle Bayou restoration areas would be downsized by 41 acres, shrinking that borrow area from its original size of 459 acres down to 418 acres. Together, the two borrow areas for the revised restoration actions would total 748 acres, the same total size as evaluated in SIER 1. Although the New Zydeco borrow site would expand by 41 acres, the design of the borrow site (depth, shape, slopes) would otherwise remain unchanged.

A different access corridor than what was approved in SIER 1 for the NZR projects, would be used from the lake to the NZR projects. Fill material for the creation of the BLH-Wet and marsh creation areas would still come from the same borrow site identified in SIER 1 located in Lake Pontchartrain approximately 2,700 feet offshore from Treasure Island, LA. Dredging of borrow would

still be conducted via hydraulic dredging, however a floating/submerged pipeline would be placed for approximately 6,900 feet from the borrow site to the shallow area near the shoreline north of the Rigolets channel. The submerged line would then continue east for approximately 4,600 feet within the shallow offshore waters along the lake shoreline to within close proximity of the Hwy 90 bridge structure. The access corridor width for all open water reaches is 500 feet and the Contractor would be required to maintain navigation access in this open water reach of access channel for recreational boaters. The access corridor would then turn north, following the west side of Hwy 90 for approximately 14,000 feet from Lake Pontchartrain to the project site. This reach of access corridor is confined to a 50 foot width as measured from the outer limit of the highway shoulder, except in the immediate vicinity of the Hwy 433 junction. From the junction, the access corridor diverts west for approximately 125 feet to avoid the highway intersection, where a 36 inch steel culvert would be installed to pass beneath Hwy 433 for the pipeline to pass under the road.

From the new culvert, the access corridor would transition back to within the 50 foot access corridor paralleling Hwy 90. The northern terminus of this portion of the access corridor is defined by an approximate 100 foot by 100 foot existing gravel parking area, which would be used for parking, pipeline unloading, staging of equipment, and a potential booster pump location. At this point, the pipeline access corridor turns west, widens to 100 feet, and runs over existing marsh for approximately 1,700 feet. A timber board road would be constructed along this reach of the access corridor to minimize damage to the existing marsh. Sand fill would be placed in the low areas of this portion of the access corridor prior to board road installation. The board road would be removed upon completion of the project. Upon board road removal, dressing and additional fill as required to ensure restoration of the area to pre-construction marsh elevations would occur. At the location where the timber board road ends at open water, the access corridor widens to 200 feet and continues for the final 1,500 feet to the marsh and BLH-Wet creation areas. The entire access corridor, from borrow pit to perimeter retention dike is approximately 29,000 feet in length. No additional access corridor is needed for the expansion. Should the northern expansion proceed as proposed, the pipeline would be routed through the current project footprint.

Factors Considered in Determination. This office has assessed the impacts of no action and the proposed action alternatives on important resources, including wildlife, threatened and endangered (T&E) species, aquatic resources/fisheries, water and sediment quality, essential fish habitat (EFH), recreational resources, cultural resources, wetlands, and air quality. For the proposed action, no significant adverse impacts were identified for any of these important resources. There would be a low probability of encountering HTRW in the proposed mitigation areas and borrow areas.

The proposed action may affect, but is not likely to adversely affect the Gulf Sturgeon, West Indian manatee, and the green, Kemp's Ridley, and loggerhead sea turtles and may affect, but is not likely to adversely affect Gulf Sturgeon Critical Habitat and is not likely to destroy or adversely modify it. Temporary impacts to aquatic resource, fisheries and water quality are anticipated.

The adverse impacts to EFH that would result from the proposed actions may affect, but should not adversely affect, managed species considering the small acreage utilized for borrow activities relative to the size of Lake Pontchartrain, plus the project would provide long-term benefit to the managed species by providing intertidal wetlands, a valuable type of essential fish habitat. The proposed modifications to the NZR Brackish Marsh project would convert an additional approximately 60 acres of shallow open water habitat and submerge aquatic vegetation to brackish marsh habitat. However, shallow open water is found in abundance throughout the LPV basin and this conversion would be offset by the creation of brackish marsh adjacent to the BLH-Wet creation area

No adverse effects on historic properties are anticipated. Recreational opportunities would be temporarily impacted during construction but are expected to improve in some areas once construction is complete. The overall habitat quality of the wetlands within the project area would be enhanced by the proposed creation of marsh and BLH habitat types. There would be a low probability of encountering HTRW in the proposed mitigation areas and borrow areas.

In a letter dated ##-##-####, USFWS confirmed that the proposed action is not likely to adversely affect any threatened or endangered species that may occur in the area. In a letter dated ##-##-####, the LDNR concurred with the determination that the proposed action is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program. LDEQ issued a State Water Quality Certification on ##-##-####. The Section 404(b)(1) was signed on ##-##-####. In a letter dated October 6, 2014, the Louisiana State Historic Preservation Officer concurred with a recommendation of no effect on historic properties. This office has concurred with, or resolved, all Fish and Wildlife Coordination Act recommendations contained in a letter from the U.S. Fish and Wildlife Service dated ##-##-####. CEMVN has concurred with, or resolved, all comments addressing essential fish habitat contained in a letter from the National Marine Fisheries Service dated ##-##-####.

Environmental Design Commitments. The following commitments are an integral part of the proposed action:

1. If the proposed action is changed significantly or is not implemented within one year, CEMVN will reinitiate coordination with the USFWS to ensure that the proposed action would not adversely affect any Federally-listed threatened or endangered species, or their critical habitat.
2. If any unrecorded cultural resources are determined to exist within the proposed project site, then work will not proceed in the area containing these cultural resources until a CEMVN staff archeologist has been notified and final coordination with the Louisiana State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officer has been completed.
3. All contract personnel associated with the project will be informed of the potential presence of the West Indian manatees and the need to avoid collisions with manatees. Standard manatee protection measures, found in section xx of SEA #546 will be implemented when construction activities take place in areas where manatees could occur.
4. In order to minimize the potential for impacts to Gulf sturgeon during construction of retention dikes, the bucket drop procedure, found in section xx of SEA #546, would be employed to encourage Gulf sturgeon in the vicinity of the construction activities to leave.

Public Involvement. The proposed action has been coordinated with appropriate federal, state, and local agencies and businesses, organizations, and individuals through distribution of SEA #546 on May 27, 2016 for their review and comment. There were no comments were received from the public. No agency comments were received during the review period. SEA #546 is attached hereto, incorporated herein by reference and made a part of this FONSI.

Conclusion. This office has assessed the potential environmental impacts of the proposed action and has determined that it would have beneficial environmental effects through the creation of wetlands habitats as discussed in SEA #546. Based on this assessment, which is attached hereto and made a part hereof, a review of the comments made on SEA #546, and the implementation

of the environmental design commitments listed above, a determination has been made that the proposed action would have no significant impact on the human environment. Therefore, an Environmental Impact Statement will not be prepared.

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Date

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RICHARD L. HANSEN  
Colonel, EN  
Commanding

**DRAFT  
ENVIRONMENTAL ASSESSMENT**

**PREPARED TO SUPPLEMENT:  
PROGRAMMATIC INDIVIDUAL ENVIRONMENTAL REPORT 36, SUPPLEMENT 1  
BAYOU SAUVAGE, TURTLE BAYOU & NEW ZYDECO RIDGE RESTORATION  
PROJECTS  
SAINT TAMMANY & ORLEANS PARISHES, LOUISIANA**

**SEA #546**

**2016**



**U.S. Army Corps of Engineers  
Mississippi Valley Division  
Regional Planning and Environment Division South  
New Orleans District**

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# DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

## BAYOU SAUVAGE, TURTLE BAYOU & NEW ZYDECO RIDGE RESTORATION PROJECTS SAINT TAMMANY & ORLEANS PARISHES, LOUISIANA

### 1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), has prepared this supplemental environmental assessment (EA) to present changes to the design of some of the projects in the recommended mitigation plan described in the Programmatic Individual Environmental Report 36, Supplement 1 (SIER 1) titled “Bayou Sauvage, Turtle Bayou and New Zydeco Ridge Restoration Projects, Saint Tammany and Orleans Parishes, LA”. The Decision Record for SIER 1 was approved by the CEMVN Commander on October 20, 2015. This supplemental EA evaluates the potential impacts associated with implementation of the proposed changes to the Bayou Sauvage Flood Side Brackish Marsh and New Zydeco Ridge restoration projects mitigating Lake Pontchartrain and Vicinity Hurricane Storm Damage Risk Reduction System (LPV HSDRRS) impacts to National Wildlife Refuge (NWR) lands and portions of the general impacts that did not occur on NWR lands. Both the PIER 36 and PIER 36, SIER 1 documents and their decision records are hereby incorporated by reference.

This supplemental EA (SEA) has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality’s Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation ER 200-2-2. This EA provides sufficient information on the potential adverse and beneficial environmental effects to allow the District Commander to make an informed decision on the appropriateness of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

#### PIER 36 LPV HSDRRS Approved Mitigation Plan

The approved LPV HSDRRS mitigation plan set forth in PIER 36 was comprised of both constructible and programmatic features (Table 1). The constructible features of the selected plan were approved for implementation while the programmatic features were recommended for further evaluation and design. Annual Average Habitat Units (AAHUs) translate the quality and quantity of the habitat impacted into units of measurement that also can be used to measure the habitat needed to compensate for those impacts. The same methodology used to assess the AAHU’s of impacted habitat is used to assess AAHU’s of replacement habitat.

**Table 1: PIER 36 Mitigation Plan Features**

	LPV Mitigation Plan	Design
<b>Constructible Features</b>	Mitigation Bank (BLH-Wet/Dry)	Mitigation bank credits from one or more banks to satisfy 93.85 AAHUs for BLH-wet/dry
	Mitigation Bank (Swamp)	Mitigation bank credits from one or more banks to satisfy 108.01 AAHUs for swamp
<b>Programmatic Features</b>	Milton Island Marsh Restoration (Non-Refuge Intermediate Marsh)	115 acres intermediate marsh; borrow – 55 acres, 800,000cy

	Bayou Sauvage Marsh Restoration (Non-Refuge/Refuge Brackish Marsh)	302 acres BLH-wet; 141.9 acres Intermediate Marsh; borrow – 300 acres, 2.6Mcy
	Bayou Sauvage Protected Side Refuge BLH-Wet/Intermediate Marsh Restoration	155.3 acres BLH-wet; 141.9 acres Intermediate Marsh; borrow – 300 acres, 2.6Mcy
	Fritchie Flood Side Refuge BLH-Wet Enhancement	51 acres of BLH-wet

In April of 2014, the CEMVN purchased sufficient mitigation bank credits to fully satisfy the general BLH and swamp mitigation requirements. On September 19, 2014, a tiered IER or TIER was approved recommending the construction of the Milton Island Marsh Restoration project, which is currently under construction.

### **SIER 1, Modification to the PIER 36 Approved Mitigation Plan**

Subsequent investigations after approval of the mitigation plan in PIER 36 revealed that several of the projects previously selected as the programmatic mitigation features for general and refuge impacts were not feasible due to high construction costs and/or real estate issues. Specifically, the following projects were originally considered feasible:

- Bayou Sauvage Protected Side Refuge BLH-Wet/Intermediate Marsh Restoration Project - Advanced engineering and design analysis produced significantly higher construction cost estimates than anticipated in earlier planning efforts.
- Bayou Sauvage Refuge Flood Side Marsh Restoration Project - Portions of the site as originally planned had poor soils and deep water conditions that resulted in significantly higher estimated construction costs.
- Fritchie Flood Side Bottomland Hardwood-Wet Project - This mitigation feature was intended to compensate for flood side BLH-wet impacts that occurred within the Bayou Sauvage NWR. The project would be located on private property and would require condemnation for use as a mitigation site. The U.S. Fish and Wildlife Service (USFWS), which operates the Bayou Sauvage NWR, expressed an unwillingness to accept property into the Refuge that was acquired by condemnation. As this mitigation feature would have been incorporated into the Refuge, the Service’s position rendered this option non-viable.

When the above projects were deemed infeasible in their original form, the CEMVN, in coordination with the interagency team and the non-federal sponsor (NFS) developed a total of eight additional options to consider as alternatives to provide the required mitigation (one of which, Bayou Sauvage, was a redesign of the original project). Analysis of these options occurred in SIER 1. The decision document for SIER 1 approved the following alternative projects for construction that would replace the projects listed above in the LPV HSDRRS Mitigation Plan:

- New Zydeco Ridge (NZR) BLH-Wet and Brackish Marsh – a 159 acre flood-side BLH restoration project with a 160 acre brackish marsh restoration component (to address SAV impacts from the BLH restoration and brackish marsh mitigation that can’t be completed at Bayou Sauvage) in the Fritchie Marsh area of the Big Branch NWR;
- Turtle Bayou Protected Side (TBPS) Intermediate Marsh – a 126 acre protected-side intermediate marsh restoration project at Turtle Bayou, north of the Bayou Sauvage NWR;

- Bayou Sauvage Flood Side Brackish Marsh (BSFS) – redesigned to be a 338 acre brackish marsh restoration and nourishment project on more interior land at Bayou Sauvage NWR. (58 acres in the northern portion identified as BSFS4 and 280 acres in the southern portion identified as BSFS5).

During the acquisition of lands necessary for implementation of the BSFS project, USACE determined that the obstacles to land acquisition for the BSFS4 parcel were too high. As a result, implementation of this feature is considered infeasible. Analysis of potential options to satisfy the mitigation requirement that can no longer be achieved at BSFS4, namely 18.4 AAHUs of brackish marsh impacts, is the subject of this supplement.

### **1.1 Purpose and Need for the Proposed Action**

The purpose of the proposed action is to compensate for 18.4 AAHUs of impacts to general brackish marsh habitat incurred during construction of the LPV HSDRRS improvements that could not be mitigated at the BSFS mitigation site. The proposed mitigation would replace the lost functions and services of the impacted habitat through restoration activities designed to create, increase, and/or improve the functions and services of brackish marsh at the planned mitigation site.

### **1.2 Authority for the Proposed Action**

The Flood Control Act of 1965 (P.L. [Public Law] 89-298, Title II, Sec. 204) authorized the LPV project stating “project for hurricane protection on Lake Pontchartrain, Louisiana ... substantially in accordance with the recommendations of the Chief of Engineers in House Document 231, Eighty-ninth Congress.” The original authorization for the LPV Project was amended by the Water Resources Development Acts (WRDA) of 1974 (P.L. 93-251, Title I, Sec. 92), 1986 (P.L. 99-662, Title VIII, Sec. 805), 1990 (P.L. 101-640, Sec. 116); 1992 (P.L. 102-580, Sec. 102), 1996 (P.L. 104-303, Sec. 325), 1999 (P.L. 106-53, Sec. 324), and 2000 (P.L. 106-541, Sec. 432); and Energy and Water Development Appropriations Acts of 1992 (PL 102-104, Title I, Construction, General), 1993 (PL 102-377, Title I, Construction, General), and 1994 (PL 103-126, Title I, Construction, General).

The Department of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act of 2006 (3rd Supplemental - PL 109-148, Chapter 3, Title II and Chapter 3, Title III of Public Law 110-252,) the Secretary of the Army was authorized to accelerate completion of the LPV project and restoration of project features to design elevations at 100 percent Federal cost.

Under the Flood Control and Coastal Emergencies (FC&CE) heading, of the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery of 2006 (4th Supplemental - PL 109-234, Title II, Chapter 3) and 6<sup>th</sup> Supplemental, Public Law 110-252, Title III, the Secretary of the Army was authorized to reinforce or replace existing floodwalls, where necessary, and armor critical elements.

Under the Construction heading of PL 109-234, Chapter 3, Title II, and PL 110-252, Chapter 3, Title III, the Secretary of the Army was authorized to raise levee heights where necessary and otherwise enhance LPV and other authorized projects in southeast Louisiana to provide the level of protection necessary to achieve the certification required for participation in the National Flood Insurance Program.

### **1.3 Prior Reports**

A number of studies and reports on water resources development in the proposed project areas have been prepared by the USACE, other Federal, state, and local agencies, universities, research institutes, and individuals. The most relevant report to the proposed action is SIER 1. It lists all pertinent previous reports and studies; that list is incorporated by reference.

### **1.4 Public Concerns**

The foremost public concerns are reducing risk of hurricane and storm damage for businesses and residences, and enhancing public safety during major storm events in the New Orleans metropolitan area. Compensatory mitigation for the impacts caused by construction of the HSDRRS is an integral feature of the HSDRRS. In the Lake Pontchartrain basin, the public has expressed a desire for sufficient funding to be allocated for the HSDRRS mitigation efforts and that the mitigation be completed in a timely manner.

### **1.5 Data Gaps and Uncertainties**

Because natural systems are complex and consist of an intricate web of variables that influence the existence and condition of other variables within the system, all restoration projects contain certain inherent uncertainties. The effects of tropical storms, increased sea level rise, and climate change on each project's performance are uncertain and are addressed through future projections based on existing information. All models used for this study rely on mathematical representations of current and future conditions to quantify and predict the future success and benefits of these mitigation projects. No model can account for all relevant variables in an evolving coastal system. Additionally, there is inherent risk in reducing complex natural systems to mathematic expressions driven by simplified interactions of key variables. As such, how the proposed projects will actually perform and the benefits that will result from their creation are a 'best guess' based on what we presently know about existing ecosystems and the results of already constructed restoration projects. Please see Section 2.7 of PIER 36 and Section 1.5 of SIER 1 for more information on data gaps and uncertainties that have the potential to affect these projects.

## **2. ALTERNATIVES**

### **2.1 Alternatives Development**

In order to ensure that HSDRSS impacts are adequately mitigated, a functional assessment model titled the Wetland Value Assessment Model (WVA) was utilized to predict the AAHUs lost from the HSDRRS construction impact against the AAHUs generated by the proposed mitigation projects. WVA model assumptions for the NZR Brackish Marsh project can be found in Appendix B of SIER 1.

This supplemental EA discusses design changes to the BSFS Brackish Marsh project approved in SIER 1 and evaluates the potential of satisfying the 18.4 AAHUs mitigation requirement that can no longer be accomplished by that project through expansion of the NZR Brackish Marsh project (also approved in SIER 1) or through the purchase of in-kind mitigation bank credits. Detailed descriptions of the currently approved BSFS Brackish Marsh and the NZR Brackish Marsh projects and the associated borrow for these projects can be found in Section 2.3 of the SIER 1. (Figure 1) Information detailing the proposed changes to these projects to address the loss of the BSFS4 portion of the BSFS Brackish Marsh project in SIER 1 are as follows:

## Changes to the Approved BSFS Brackish Marsh Project

The BSFS Brackish Marsh Project originally consisted of two sites, BSFS4 and BSFS5. The BSFS4 site, approximately 60 acres in size, has been removed from this project alternative since the site is no longer available for purchase. As such, only the BSFS5 site would be constructed. With the removal of the BSFS4 site, the needed borrow for this project alternative and the Turtle Bayou project alternative (to be constructed in concert with the BSFS5 site, see SIER 1) would be reduced by 41 acres (from 459 acres to 418 acres).

## Expansion of NZR Brackish Marsh Restoration Alternative

The 18.4 AAHUs of outstanding mitigation that can no longer be accomplished at BSFS4 would be moved to become a part of the NZR Brackish Marsh restoration project. The 18.4 AAHUs would require the expansion of the NZR Brackish Marsh project by approximately 60 acres, and could be accomplished in two possible ways.

Design 1: Expansion of the NZR Brackish Marsh Project by approximately 60 acres. (Figure 2),

or

Design 2: The addition of approximately 60 acres of brackish marsh north of the NZR BLH-Wet Project. (Figure 3)

Borrow for either of these design options would require the expansion of the approved NZR borrow site by approximately 41 acres (from 289 acres to 330 acres).

## Completion of Mitigation at a Mitigation Bank

Under this alternative, in-kind, in watershed, mitigation bank credits would be purchased to satisfy the outstanding 18.4 AAHUs of brackish marsh impacts unable to be satisfied at the BSFS4 site.

## **2.2 Proposed Action**

### **2.3.1 New Zydeco Ridge**

The NZR restoration expansion options are located on the north shore of Lake Pontchartrain in the north east quadrant of the lake, northwest of U.S. Highway 90, and approximately 5 miles east of Slidell, Louisiana on the Big Branch National Wildlife Refuge. The project area is bounded on the east by U.S Highway 90, on the North by U.S. Highway 190, on the west by Interstate 10, and on the south by Lake Pontchartrain. The approved NZR projects in SIER 1 consist of creating approximately 159 acres of BLH-Wet habitat and 160 acres of intermediate/brackish marsh habitat.

## Potential Project Expansion Layouts

Two designs were considered for satisfying the outstanding 18.4 AAHUs of brackish marsh impacts at the NZR location.

Design 1 expands the current design of the NZR Brackish Marsh restoration project by approximately 60 acres, making the total acreage for that project approximately 220 acres; it moves the approved NZR BLH-Wet footprint northward. This project alternative minimizes the increase in linear footage of retention dike required by maintaining the original outer perimeter dike and cross dike between

the two habitat types. As such, the perimeter retention dike for the brackish marsh project would only increase by 2,460 linear feet from the 10,165 linear feet of perimeter retention dike originally identified in SIER 1.

Design 2 maintains the alignment of the NZR BLH-Wet and Brackish Marsh layouts approved in SIER 1 and adds a 60 acre brackish marsh cell to the north of the BLH-Wet footprint. This design option would require an additional 4,500 linear feet of brackish marsh retention dike.

The earthen perimeter dike(s) around the marsh creation area(s) would be constructed to an elevation +4.0 feet NAVD88 with a five foot crown and 1V on 3H side slopes. (Figure 4) The retention dike around the BLH-Wet creation area would be constructed to elevation +7.0 feet NAVD88 with a 5 foot crown and 1V on 3H side slopes. This varies from the original NZR design in which the retention dikes were to be constructed with a 1V on 4H side slope. Cross dikes between the marsh creation cell(s) and the BLH creation cell would be constructed to elevation +5.5 feet NAVD88 to allow effluent from the BLH cell to spill into the marsh creation cell(s). Spill boxes or weirs would be constructed at pre-determined locations within the retention dike to allow for effluent water release from within the marsh creation area(s). Borrow for dike construction would be obtained from the interior of the marsh/BLH creation footprints. Specifics on the interior borrow ditch design can be found in SIER 1. The marsh creation area(s) will initially be filled to an elevation of approximately +3.0 feet NAVD88 to ultimately reach a target marsh elevation ranging from +1.0 feet to +1.5 feet NAVD88.

The impacts associated with both Design 1 and Design 2 would be the same for each resource evaluated and therefore the impacts analyses will not distinguish between the two designs. The decision to use Design 1 or Design 2 will be based upon which stage of construction the NZR project approved in SIER 1 is in at the time the decision whether to proceed with a modified design is made. If a decision is made to implement the modified design at an earlier stage of construction, Design 1 would be chosen. If a decision is made to implement the modified design at a later stage of construction Design 2 would be chosen.

### **2.3.2 Borrow Site and Access Corridor**

The original borrow site for NZR measured 289 acres and was broken into 2 primary (sites #1) and 2 secondary (sites #2) borrow areas due to differential lake bottom elevations. (Figure 5) The primary and secondary borrow sites #1 are in deeper water (7 to 18 feet deep), thus a dredging depth of -20 feet NAVD88 is being used to obtain a suitable quantity of material. Primary and secondary borrow sites #2 are in shallower water (4 to 9 feet deep), therefore dredge depths vary with primary borrow site # 2 having a dredge depth of -18' NAVD88 and secondary borrow site #2 having a dredge depth of -16' NAVD88. The total anticipated amount of fill material being dredged from all 4 borrow sites was 3,600,000 cubic yards.

The proposed 60 acres expansion of the brackish marsh creation footprint would require approximately 500,000 additional cubic yards of dredged material to construct. Applying a 30% oversize factor and converting to acres, this results in a need for approximately 41 additional acres of borrow footprint. The oversize factor is to assure adequate borrow amounts in case of contract overruns, and to account for unsuitable materials, unknown utilities, unidentified anomalies, and/or unsighted cultural finds within the borrow footprint. This factor matches that used to size the originally proposed borrow footprint. To provide this needed additional borrow material, the proposed borrow site would be expanded 200 feet in width along the south boundary and 300 feet along the west boundary resulting in a total increase in the borrow footprint to 3,000 feet by 4,800 feet (330 acres), which is an increase of 41 acres. The borrow footprint would remain divided into primary and secondary dredging regions; maintaining the restricting depths as previously described.

Due to the elimination of the BSFS4 feature, the borrow site for the Bayou Sauvage/Turtle Bayou restoration areas (Figure 1) would be downsized by 41 acres, shrinking that borrow area from its original size of 459 acres down to 418 acres. Together, the two borrow areas for the revised restoration actions would total 748 acres, the same total size as evaluated in SIER 1. Although the New Zydeco borrow site would expand by 41 acres (Figure 5), the design of the borrow site (depth, shape, slopes) would otherwise remain unchanged.

A different access corridor than what was approved in SIER 1 for the NZR projects, would be used from the lake to the NZR projects. (Compare Figure 1 to Figure 5.) Fill material for the creation of the BLH-Wet and marsh creation areas would still come from the same borrow site identified in SIER 1 located in Lake Pontchartrain approximately 2,700 feet offshore from Treasure Island, LA. Dredging of borrow would still be conducted via hydraulic dredging, however a floating/submerged pipeline would be placed for approximately 6,900 feet from the borrow site to the shallow area near the shoreline north of the Rigolets channel. The submerged line would then continue east for approximately 4,600 feet within the shallow offshore waters along the lake shoreline to within close proximity of the Hwy 90 bridge structure. The access corridor width for all open water reaches is 500 feet and the Contractor would be required to maintain navigation access in this open water reach of access channel for recreational boaters. The access corridor would then turn north, following the west side of Hwy 90 for approximately 14,000 feet from Lake Pontchartrain to the project site. This reach of access corridor is confined to a 50 foot width as measured from the outer limit of the highway shoulder, except in the immediate vicinity of the Hwy 433 junction. From the junction, the access corridor diverts west for approximately 125 feet to avoid the highway intersection, where a 36 inch steel culvert would be installed to pass beneath Hwy 433 for the pipeline to pass under the road.

From the new culvert, the access corridor would transition back to within the 50 foot access corridor paralleling Hwy 90. The northern terminus of this portion of the access corridor is defined by an approximate 100 foot by 100 foot existing gravel parking area, which would be used for parking, pipeline unloading, staging of equipment, and a potential booster pump location. At this point, the pipeline access corridor turns west, widens to 100 feet, and runs over existing marsh for approximately 1,700 feet. A timber board road would be constructed along this reach of the access corridor to minimize damage to the existing marsh. Sand fill would be placed in the low areas of this portion of the access corridor prior to board road installation. The board road would be removed upon completion of the project. Upon board road removal, dressing and additional fill as required to ensure restoration of the area to pre-construction marsh elevations would occur. At the location where the timber board road ends at open water, the access corridor widens to 200 feet and continues for the final 1,500 feet to the marsh and BLH-Wet creation areas. The entire access corridor, from borrow pit to perimeter retention dike is approximately 29,000 feet in length. No additional access corridor is needed for the expansion. Should the northern expansion proceed as proposed, the pipeline would be routed through the current project footprint.

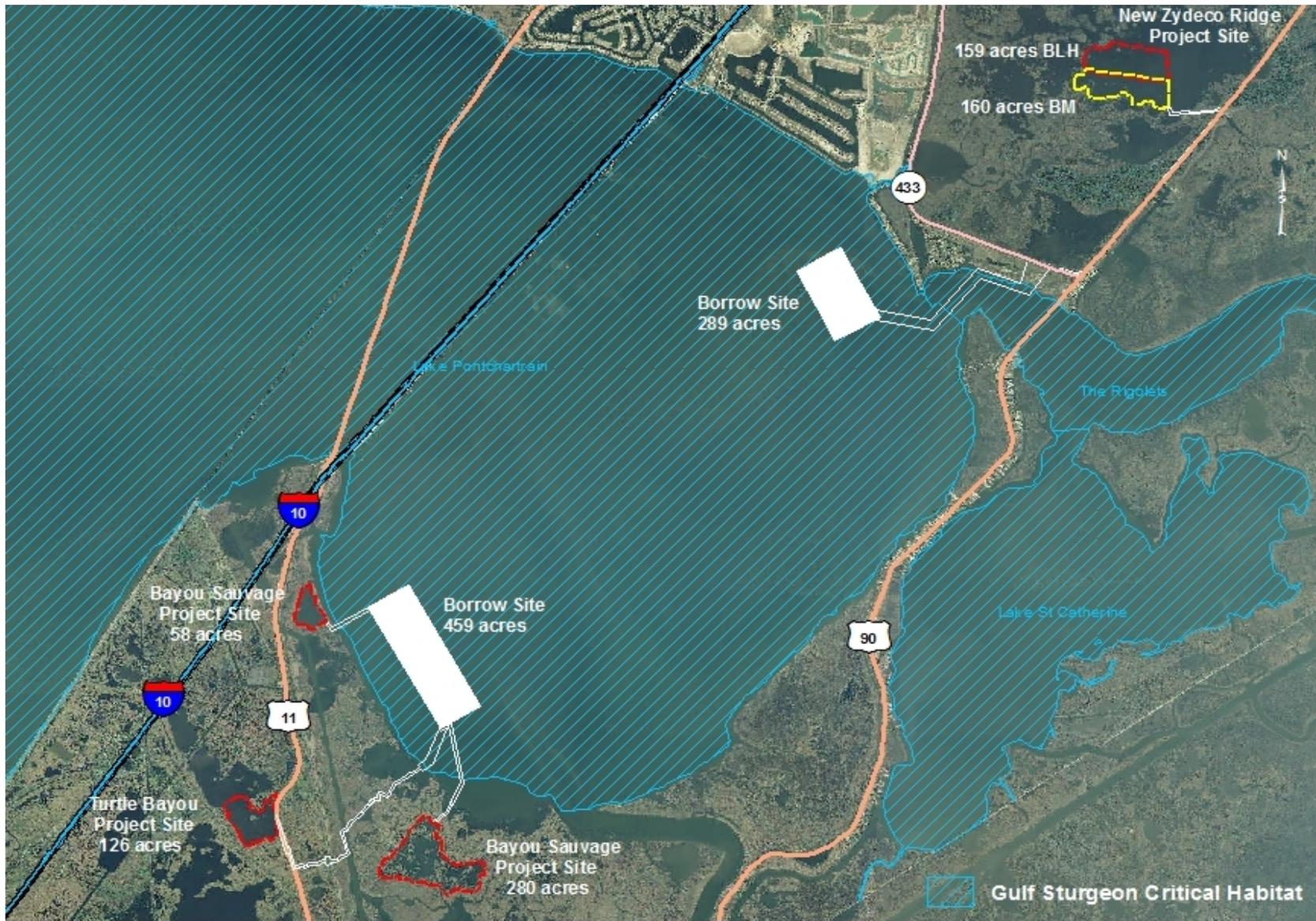


Figure 1: SIER 1 - Bayou Sauvage, Turtle Bayou and New Zydeco Ridge Project Features

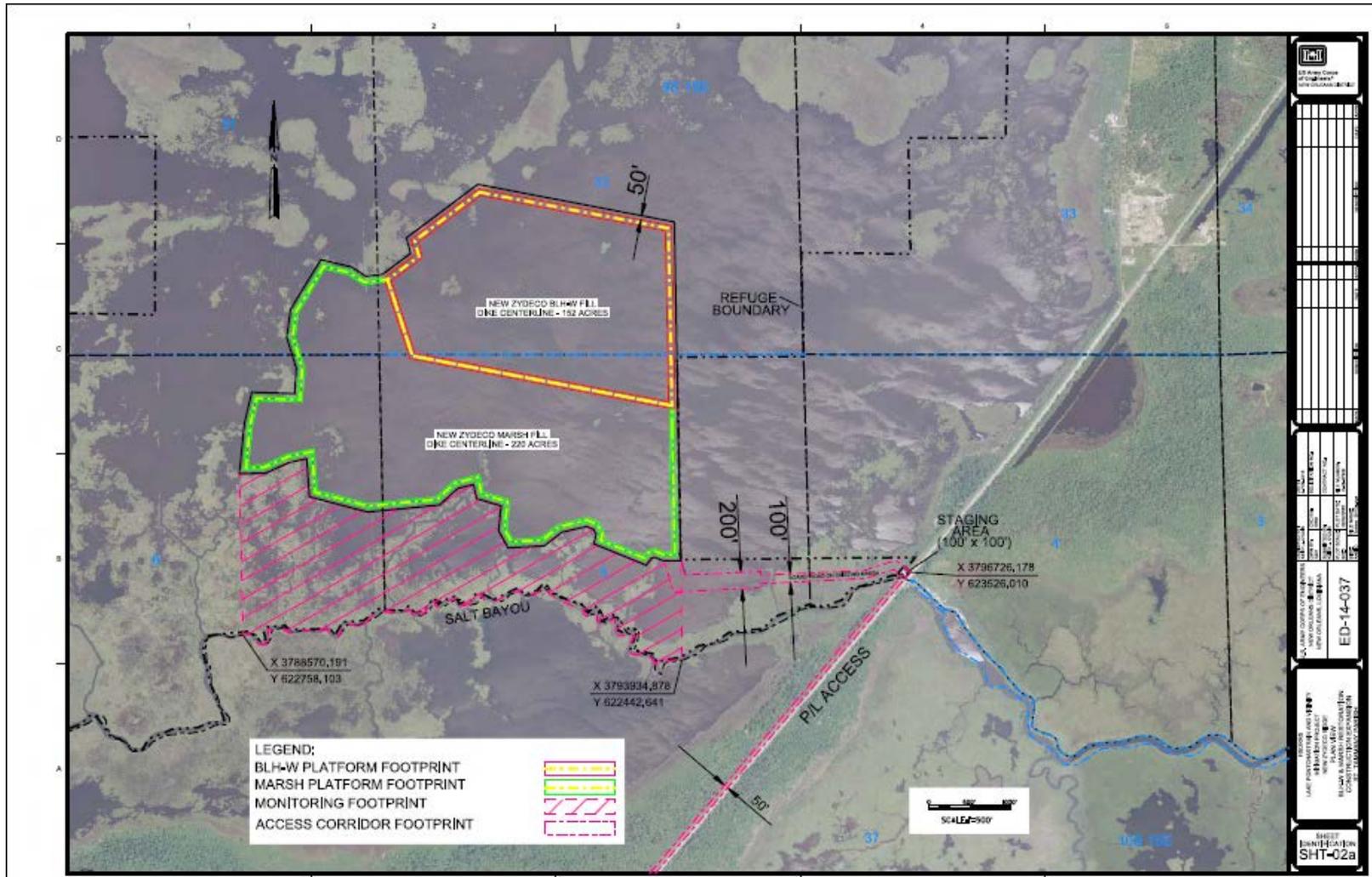


Figure 2: Design 1 Option

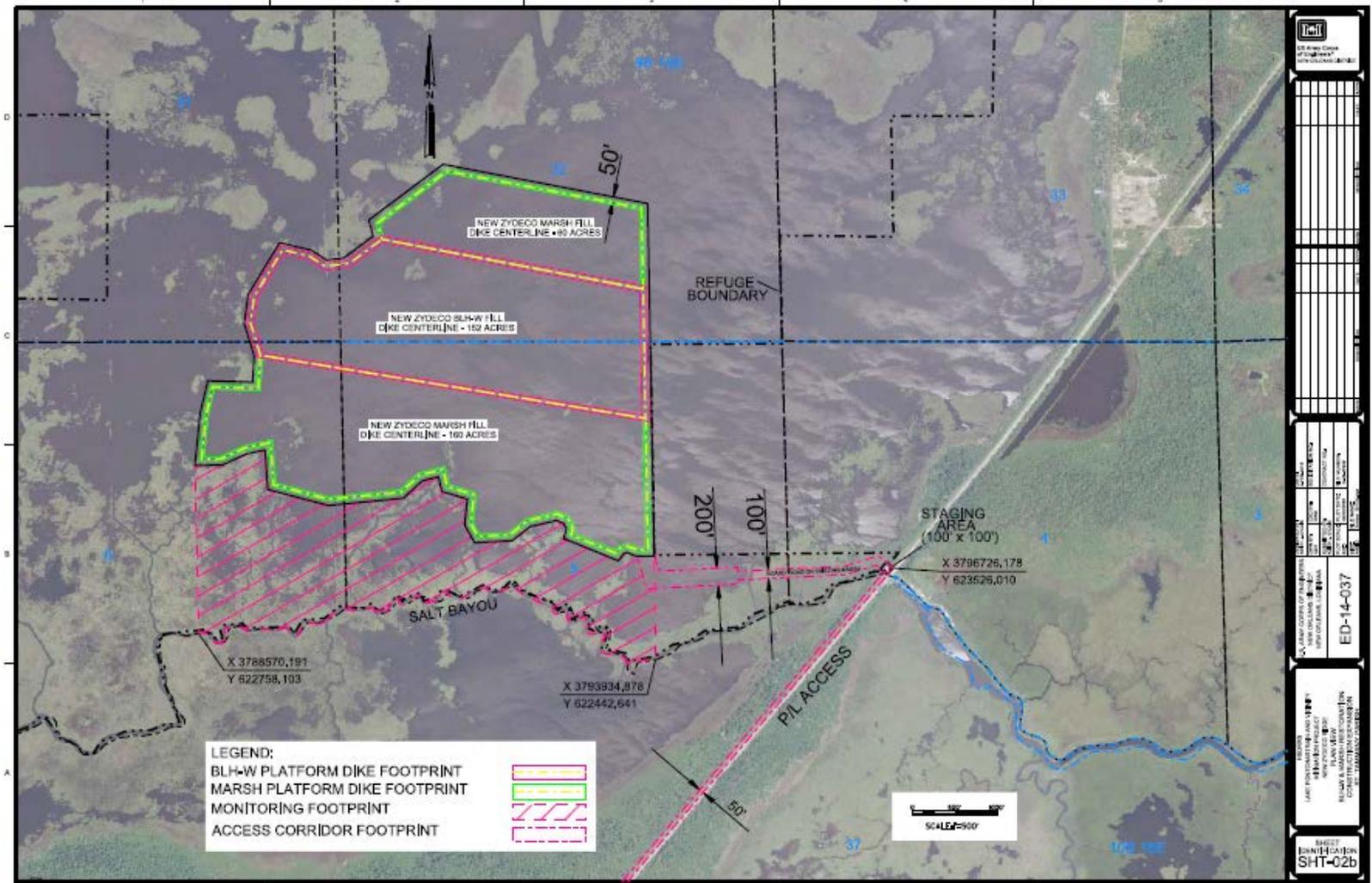


Figure 3: Design 2 Option

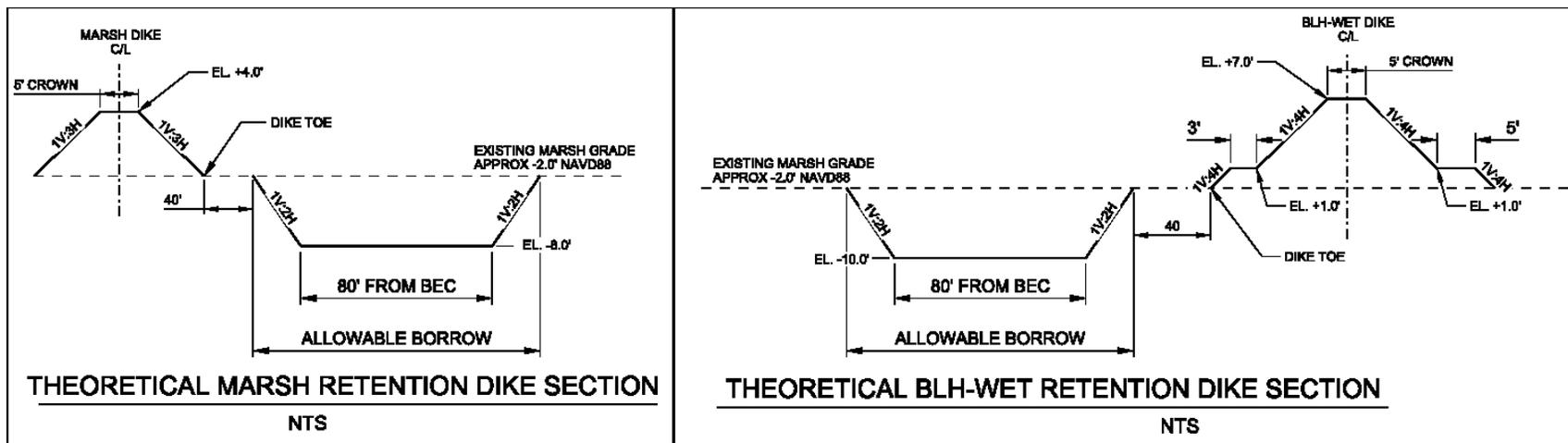


Figure 4: Retention Dike Cross Section

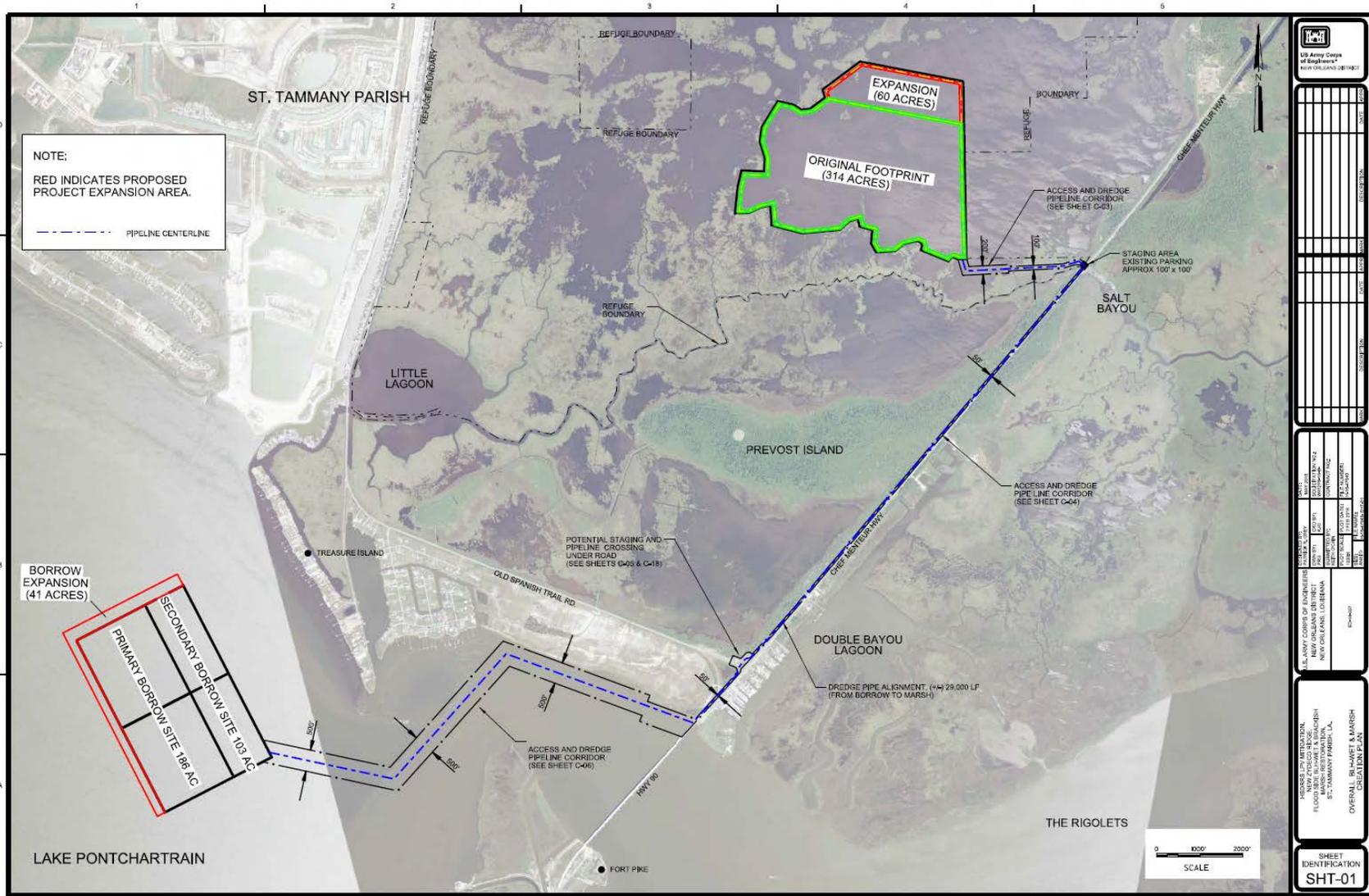


Figure 5: Borrow Location Expansion

## **2.4 Alternatives to the Proposed Action**

### **2.4.1 No Action Alternative**

NEPA requires that in analyzing alternatives to a proposed action, a Federal agency to consider an alternative of “No Action.” The No Action alternative evaluates the impacts associated with not implementing the proposed action and represents the Future without Project (FWOP) condition against which alternatives considered in detail are compared. The FWOP provides a baseline essential for impact assessment and alternative analysis. The No Action Alternative evaluated in this document is framed as the approved action in SIER 1; namely, under the No Action scenario, the BSFS4 portion of the Bayou Sauvage Marsh Restoration Project would be implemented. Because USACE has determined that the obstacles to acquisition of that site are too high, the BSFS4 feature is considered not implementable and therefore is not a reasonable alternative that should be selected. USACE is statutorily required to compensate for habitats impacted by construction of the HSDRRS. Consequently, for the purposes of this analysis, it is assumed that the USACE would comply with the laws requiring mitigation and if the mitigation cannot be completed at the BSFS4 site, that the mitigation requirement would be satisfied elsewhere in the watershed.

The No Action Alternative framed as USACE not undertaking the required mitigation for impacts caused by construction of the HSDRRS was evaluated in PIER 36. That analysis is incorporated by reference into this document.

The analysis for the No Action alternative considers previous, current, and reasonably foreseeable future projects, which could impact the resources evaluated herein and in the SIER. A discussion of and the location of these projects can be found in PIER 36, section 2.9.1, Appendix A, Figure 33, and Appendix B, tables 10-12.

### **2.4.2 Mitigation Banks and the State in Lieu Fee Program**

Following guidelines established in the Water Resources Development Act (WRDA) of 2007 Section 2036(c)(1) in carrying out a water resources project involving wetlands mitigation and impacts that occur within the service area of a mitigation bank, USACE, where appropriate, would first consider the use of the mitigation bank if the bank contains sufficient available credits to offset the impact and the bank is approved in accordance with the Federal guidance for the establishment, use, and operation of mitigation banks.

Mitigation banking instruments and the state In Lieu Fee Program Instrument (ILF) are binding agreements in which the mitigation bank or ILF is obligated to achieve and to monitor ecological success, to adaptively manage the site to ensure ecological success, and to provide financial assurances for such actions.

According to Implementation Guidance for WRDA 2007, Section 2036(c), Wetlands Mitigation, the purchase of mitigation credits for a water resources project relieves the Corps from responsibility for monitoring the mitigation measure and demonstrating that the mitigation measure is successful. Such activities would be conducted by the owner or operator of the mitigation bank or ILF Program.

If the USACE is unable to implement the expansion of the NZR Brackish Marsh project to account for brackish marsh impacts that cannot be mitigated at the Bayou Sauvage Flood Side Brackish Marsh restoration project (18.4 AAHUs), then the purchase of mitigation bank or ILF credits would be an option the USACE may pursue to complete the mitigation of the LPV HSDRRS general brackish marsh impacts. If that option is utilized, the same version of the WVA model as was used

to assess the impacts from constructing the HSDRRS would be run on the mitigation bank/ILF project to ensure that the assessment of the functions and services provided by the mitigation bank/ILF project matches the assessment of the lost functions and services at the impacted site.

### **3. AFFECTED ENVIRONMENT**

#### **3.1 Environmental Setting**

The LPV HSDRRS mitigation planning basin is bounded to the north by Interstate 12 from the Louisiana/Mississippi state line to the Mississippi River at Baton Rouge. From Baton Rouge, the boundary then proceeds south utilizing the centerline of the Mississippi River. The southern boundary is situated to exclude the barrier islands since the HSDRRS work did not impact the barrier islands.

Major features in the LPV Mitigation basin include: Lake Maurepas and its adjacent wetlands and swamps; Lake Pontchartrain and Lake Borgne, separated from one another by the East Orleans Landbridge but hydrologically linked through tidal passes at the Rigolets, Chef Menteur Pass, and the manmade IHNC; the Mississippi River; and the de-authorized Mississippi River Gulf Outlet.

The three restoration areas are located in the Lake Pontchartrain Basin. Bayou Sauvage Brackish Marsh and Turtle Bayou Protected Side Intermediate Marsh are located on the southern lobe and NZR projects are located on the Northshore. The lake is slightly brackish, with a silty to sandy bottom, and approximately 15 feet deep. Historically, the shorelines of the lake were bordered by cypress/tupelo gum swamps, fresh to intermediate marshes, and bands of bottomland hardwood forests bordering natural drainages and the lake rim in some areas. Currently, much of the lake's southern and northeastern shoreline is composed of urban and suburban development. The lake shoreline near the project areas is a mixture of low-density residential development and undeveloped wetlands, including second-growth swamp and bottomland hardwood forest, scrub/shrub wetlands and intermediate to brackish marshes. The general project area supports a wide variety of fish and wildlife resources, many of which are important to recreational and commercial fishermen and hunters.

Based on a site visit on April 9, 2014, the area is very shallow open water. The water bottoms at the project site appeared to be fairly firm, after penetrating a foot or so of softer materials. Design surveys of the project site verified that the shallow bottom water elevations range from approximately -1.25 feet to -2.5 feet NAVD88.

Based on boring and map data in the vicinity, it is estimated that the surface and shallow subsurface of the proposed site contains marsh deposits from 2 feet to 8 feet thick. Marsh deposits are characterized by very soft organic clays and clay with peat. Marsh deposits are thinner near the Pleistocene terraces and Prevost Island and thicken towards Lake Pontchartrain. Pleistocene deposits composed of stiff clays, silty clay, silt, and sands underlie the marsh deposits.

#### **3.2 Geomorphic and Physiographic Setting**

Most of the present landmass of southeast LA was formed by deltaic processes of the Mississippi River. Over the past 7,000 years, the Mississippi River deposited massive volumes of sediment in five deltaic complexes. The LPV Mitigation Basin lies within the Mississippi Delta Region comprised of three geomorphic regions, which are further divided into multiple smaller geomorphic areas.

The Pleistocene Terrace Region is the area north of Lakes Maurepas, Pontchartrain, and Borgne. This region is defined as the area north of the Mississippi River Deltaic Plain and the lowlands surrounding Lakes Pontchartrain and Maurepas.

The Marginal Deltaic Basin is comprised of the estuarine marshes and forested wetlands of Lakes Pontchartrain and Maurepas. This region includes some of the largest remaining tracts of forested wetlands in the Lower Mississippi River Valley. The Marginal Deltaic Basin is divided into the following eight geographic areas: Maurepas Swamp, Manchac Landbridge, Southwest Pontchartrain, Lake Pontchartrain, North Shore Marsh, Bayou Sauvage, East Orleans Landbridge, and Pearl River Mouth.

The Marginal Deltaic Basin lies within the LA Coastal Zone and is influenced by wetland loss, subsidence, saltwater intrusion, and shoreline erosion. USACE data indicates relative sea level rise in the region of less than 0.5 feet per century, but in many localized areas, the rate is greater. Shoreline erosion is taking place around the entire perimeter of Lakes Pontchartrain, Maurepas, and Borgne, except for sections where shoreline protection has been installed.

The Mississippi River Deltaic Plain lies south of the lakes. The salinity gradient within this region decreases from east (saltwater of the Gulf of Mexico) to west (fresher waters in the coastal plain) through the Pontchartrain Basin.

### **3.3 Climate**

The Lake Pontchartrain basin is located within a subtropical latitude. The climate is influenced by the many water surfaces of the nearby wetlands, rivers, lakes, streams, and the Gulf of Mexico. Throughout the year, these water areas modify relative humidity and temperature conditions, decreasing the range between the extremes. Summers are long and hot, with an average daily temperature of 82° Fahrenheit (°F), average daily maximum of 91°F, and high average humidity. Winters are influenced by cold, dry polar air masses moving southward from Canada, with an average daily temperature of 54°F and an average daily minimum of 44°F. Annual precipitation averages 54 inches.

### **3.4 Significant Resources**

This section contains a list of the significant resources located in and near the proposed action, and describes in detail those resources that would be impacted, directly or indirectly. Direct impacts are those that are caused by the action taken and occur at the same time and place (40 CFR §1508.8(a)). Indirect impacts are those that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR §1508.8(b)). A cumulative impact is defined as the “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR §1508.7).

The resources described in this section are those recognized as significant by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. (Table 2) Table 3 shows those significant resources found in and near the project area, and notes whether they would be impacted by the proposed alternative.

Resources that would not be impacted, or only negligibly impacted are not discussed in this document. Aesthetics is not addressed since the project locations are only visible from a small number of residences, and because the undeveloped nature of the project area would be preserved.

Noise is not addressed due to the undeveloped nature of the project areas and the distances between the project areas and the closest sensitive receptors, which in the case of the NZR project, are the residences located further than 1,000 feet to the north.

The potential for impacts to socioeconomic resources including environmental justice were also considered. There are no anticipated impacts to population, housing, or minority or low-income populated areas since the project area and surrounding lands are uninhabited, remote, and to a large degree occurs on a National Wildlife Refuge. Environmental justice concerns are not present due to the undeveloped nature of the area. Additionally, the only residences in the vicinity are indicative of high property values and are not primarily occupied by minorities or low income groups. There are no commercial/industrial properties, or public facilities within the project boundaries or in adjacent areas, and therefore no impacts to employment, businesses, industry, public facilities and services, community and regional growth, community cohesion, or property values are anticipated to occur with construction of this project. The proposed project does not require any agricultural or forestry land to be impacted or converted; therefore the requirements of the Farmland Protection Policy Act, Section 1541(b), do not apply. Most construction equipment and personnel would access the project areas via aquatic access resulting in no impacts to land-based transportation; although there would be minimal impact from the pipeline that would move dredge material from Lake Pontchartrain to the proposed project locations.

**Table 2: Relevant Resources and Their Institutional, Technical, and Public Importance**

Resource	Institutionally Important	Technically Important	Publicly Important
<b>Wildlife</b>	Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918	They are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.
<b>Threatened and Endangered Species</b>	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, EPA, LDWF, and LDNR cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.
<b>Aquatic Resources/Fisheries</b>	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1977, as amended; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968.	They are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.
<b>Water Quality</b>	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and Louisiana State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, EPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality and the national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.
<b>Essential Fish Habitat (EFH)</b>	Magnuson-Stevens Fishery Conservation and Management Act of 1996, Public Law 104-297	Federal and state agencies recognize the value of EFH. The Act states, EFH is "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."	Public places a high value on seafood and the recreational and commercial opportunities EFH provides.
<b>Recreation Resources</b>	Federal Water Project Recreation Act of 1965 as amended and Land and Water Conservation Fund Act of 1965 as amended	Provide high economic value of the local, state, and national economies.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana; and the large per-capita number of recreational boat registrations in Louisiana.
<b>Cultural Resources</b>	National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979	State and Federal agencies document and protect sites Based on their association or linkage to past events, to historically important persons, and to design and construction values; and for their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.

Resource	Institutionally Important	Technically Important	Publicly Important
<b>Wetlands</b>	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act.	Wetlands provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes.
<b>Air Quality</b>	Clean Air Act of 1963, Louisiana Environmental Quality Act of 1983.	State and Federal agencies recognize the status of ambient air quality in relation to the NAAQS.	Virtually all citizens express a desire for clean air.

**Table 3: Significant Resources In and Near the Project Area**

Significant Resource	Impacted	Not Impacted
Wildlife	X	
Threatened & Endangered Species	X	
Aquatic Resources	X	
Water Quality	X	
Essential Fish Habitat	X	
Recreation	X	
Cultural Resources <sup>1</sup>		X
Air Quality	X	
Noise		X
Aesthetics		X
Environmental Justice		X
Socioeconomic Resources		X
HTRW <sup>2</sup>		X
Wetlands	X	

<sup>1</sup>Although not impacted, cultural resources are addressed to comply with the National Historic Preservation Act.

<sup>2</sup>Hazardous, Toxic, and Radioactive Waste. Although the area has been determined to have a low probability of containing HTRW, it is assessed in this document to comply with USACE policy.

### 3.4.1 Wildlife

#### Existing Conditions

The coastal wetlands in the Pontchartrain Basin provide important and essential fish and wildlife habitats, especially transitional habitat between estuarine and marine environments, which are used for shelter, nesting, feeding, roosting, cover, nursery, and other life requirements. Emergent intermediate and brackish wetlands are typically used by many different wildlife species, including: seabirds; wading birds; shorebirds; dabbling and diving ducks; raptors; rails; coots and gallinules; nutria; muskrat; mink; river otter; and raccoon; rabbit; white-tailed deer; and American alligator (LCWCRTF & WCRA 1999). All of these species are likely to be found in or near the projects areas.

Open water habitats such as Lake Pontchartrain provide wintering and multiple use functions for brown pelicans, various seabirds, and other open water residents such as laughing gulls and least terns, and migrants such as lesser scaup and double crested cormorants (LCWCRTF & WCRA, 1999). Open water in the project areas provide suitable habitat for many of these species, especially dabbling ducks, coots, and gallinules, which feed primarily on submerged aquatic vegetation.

Bottlenose dolphins are protected under the Marine Mammal Protection Act of 1972, and are found in temperate and tropical waters around the world including Lake Pontchartrain. The lake appears to have a semi-resident population of dolphins that generally are found in the eastern side of the lake which has the higher salinity level. They likely feed on various estuarine fish and shellfish. It is highly unlikely that dolphins venture into the area proposed for wetland mitigation due to existing very shallow water and submerged aquatic vegetation.

### 3.4.2 Threatened, Endangered and Protected Species

#### Existing Conditions

Within St. Tammany Parish there are ten documented animal and one plant species under the jurisdiction of the USFWS and/or the National Marine Fisheries Service (NMFS), presently classified as endangered or threatened. (Table 4) Designated critical habitat for one of the animal species (Gulf sturgeon) is located within St. Tammany Parish. The USFWS and the NMFS share jurisdictional responsibility for sea turtles and Gulf sturgeon. Other species that were listed on the Endangered Species List, but have since then been de-listed because population levels have improved, are bald eagle and brown pelican. Currently, American alligators and shovelnose sturgeon are listed as threatened under the Similarity of Appearance clause in the Endangered Species Act (ESA) of 1973, as amended, but are not subject to ESA Section 7 consultation requirements.

Of the listed animal and plant species occurring in St. Tammany Parish, only the West Indian manatee; Gulf sturgeon; and Kemp's ridley, loggerhead, and green sea turtles are expected to potentially be found in the proposed borrow area in Lake Pontchartrain. It would be highly unlikely that any of the listed marine species would be found in the proposed marsh or BLH-Wet mitigation project areas due to very shallow water. All of these species are typically found in deeper water where they are able to maneuver and forage effectively.

**Table 4: Threatened and Endangered Species in St. Tammany Parish**

Species	Potentially in Project Areas	Status	Jurisdiction	
			USFWS	NFMS
West Indian Manatee ( <i>Trichechus manatus</i> )	X	E	X	
Red Cockaded Woodpecker ( <i>Picoides borealis</i> )		E	X	
Gopher Tortoise ( <i>Gopherus polyphemus</i> )		T	X	
Ringed Map Turtle ( <i>Graptemys oculifera</i> )		T	X	
Kemp's Ridley Sea Turtle ( <i>Lepidochelys kempii</i> )	X	E	X	X
Green Sea Turtle ( <i>Chelonia mydas</i> )	X	T	X	X
Loggerhead Sea Turtle ( <i>Caretta caretta</i> )	X	T	X	X
Pallid Sturgeon ( <i>Scaphirhynchus albus</i> )		E	X	
Gulf Sturgeon ( <i>Acipenser oxyrinchus desotoi</i> )	X	T	X	X
Alabama Heelsplitter Mussel ( <i>Potamilus inflatus</i> )		T	X	
Louisiana Quillwort ( <i>Isoetes louisianensis</i> )		E	X	

#### West Indian Manatee

The West Indian manatee is federally and state-listed as endangered and also is protected under the Marine Mammal Protection Act of 1972, under which it is considered depleted (USFWS 2001). Critical habitat for the manatee has been designated in Florida, but not in Louisiana (USFWS 1977).

The manatee is a large gray or brown aquatic mammal that may reach a length of 13 feet and a weight of over 2,200 pounds. It occurs in both freshwater and saltwater habitats within tropical and subtropical regions. The manatee is not a year-round resident in Louisiana, but it may migrate there during warmer months. The primary human-related threats to the manatee include watercraft-related strikes (impacts and/or propeller strikes), crushing and/or entrapment in water control structures (flood gates, navigation locks), and entanglement in fishing gear, such as discarded fishing line or crab traps (USFWS 2007).

There have been 110 reported sightings of manatees in Louisiana since 1975 (LDWF 2005). Sightings in Louisiana, which have been uncommon and sporadic, have included occurrences in Lake Pontchartrain as well as the Amite, Blind, Tchefuncte, and Tickfaw Rivers. Between 1997 and 2000, there were approximately 16 sightings in the Lake Pontchartrain area and a general increase in the number of manatees per sighting (Abadie et al. 2000). Sightings of the manatee in the Lake Pontchartrain basin have increased in recent years, and in late July 2005, 20 to 30 manatees were observed in the lake from the air (Powell and Taylor 2005).

To minimize the potential for construction activities to cause adverse impacts to manatees, the following standard manatee protection measures, developed by the USFWS, Lafayette, Louisiana Field Office, would be implemented when activities are proposed that would impact habitat where manatees could occur: All contract personnel associated with the project would be informed of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel would be responsible for observing water-related activities for the presence of manatees. Temporary signs would be posted prior to and during all construction/dredging activities to remind personnel to be observant for manatees during active construction/dredging operations or within vessel movement zones (i.e., the work area), and at least one sign would be placed where it is visible to the vessel operator. If a manatee is sighted within 100 yards of the active work zone, special operating conditions would be implemented, including: moving equipment would not operate within 50 feet of a manatee; all vessels would operate at no wake/idle speeds within 100 yards of the work area; and siltation barriers, if used, would be re-secured and monitored. Once the manatee has left the 100-yard buffer zone around the work area of its own accord, special operating conditions would no longer be necessary, but careful observations would be resumed. Any manatee sighting would be immediately reported to the USFWS (337/291-3100) and the Louisiana Department of Wildlife and Fisheries (LDWF), Natural Heritage Program (225/765-2821).

### **Gulf Sturgeon**

The Gulf sturgeon was listed as threatened throughout its range on September 30, 1991. The Gulf sturgeon is an anadromous fish that migrates from salt water into coastal rivers to spawn and spend the warm summer months. Subadults and adults typically spend the three to four coolest months of the year in estuaries or Gulf of Mexico waters foraging before migrating into the rivers. This migration typically occurs from mid-February through April. Most adults arrive in the rivers when temperatures reach 70 degrees Fahrenheit and spend eight to nine months each year in the rivers before returning to estuaries or the Gulf of Mexico by the beginning of October.

Critical habitat identifies specific areas that have been designated as essential to the conservation of a listed species. Critical habitat units (areas) designated for the Gulf sturgeon in Louisiana include Lake Pontchartrain east of the Causeway, Lake Catherine, Lake Borgne, out into the Mississippi Sound (USACE 2006a). Studies by the LDWF have shown the presence of Gulf sturgeon in Lake Pontchartrain during the winter and during periods of migration between marine and riverine environments. Records indicate that Gulf sturgeon have been located in Lake Pontchartrain east of the Causeway, particularly on the eastern Northshore. Gulf sturgeon have been documented west of the causeway, typically near the mouths of small rivers (USFWS and NMFS 2003).

### **Kemp's Ridley, Loggerhead, and Green Sea Turtles**

Sea turtles inhabit tropical and subtropical marine and estuarine waters around the world. Of the seven species in the world, six occur in U.S. waters, and all are listed as threatened or endangered. The three species potentially occurring in Lake Pontchartrain and Lake Borgne in the vicinity of the mitigation projects have a similar appearance, though they differ in maximum size and coloration. The Kemp's ridley is the smallest sea turtle – adults average about 100 pounds with a carapace length of 24 to 28 inches and a shell color that varies from gray in young individuals to olive green in adults. The loggerhead sea turtle is the next largest of these three species – adults average about 250 pounds with a carapace length of 36 inches and a reddish brown shell color. The green sea turtle is the largest of these three species – adults average 300 to 350 pounds with a length of more than 3 feet and a brown coloration (its name comes from its greenish colored fat). The Kemp's Ridley has a carnivorous diet that includes fish, jellyfish, and mollusks. The loggerhead has an omnivorous diet that includes fish, jellyfish, mollusks, crustaceans, and aquatic plants. The green sea turtle has an herbivorous diet of aquatic plants, mainly sea grasses and algae, which is unique among sea turtles. All three species nest on sandy beaches, which are not present near Lake Pontchartrain. The life stages that may occur in Lake Pontchartrain range from older juveniles to adults.

### **3.4.3 Fisheries/Aquatic Resources/Water Quality**

#### **Existing Conditions**

The NMFS oversees and manages our Nation's domestic fisheries through development and implementation of fishery management plans and actions. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), first enacted in 1976, amended in 1996, and reauthorized in 2006, is the primary law governing marine fisheries management in United States Federal waters to end overfishing, promote market-based management approaches, improve science, serve a larger role in decision-making, and enhance international cooperation.

The NMFS has determined that Lake Pontchartrain and adjacent wetlands provide nursery and foraging habitats which support varieties of economically important marine fishery species, including striped mullet, Atlantic croaker, Gulf menhaden, spotted and sand sea trout, southern flounder, black drum, and blue crab. Some of these species also serve as prey for other fish species managed under the MSFCMA by the Gulf of Mexico Fishery Management Council (e.g., mackerel, snapper, and grouper) and highly migratory species managed by NMFS (e.g., billfish and shark).

The existing submerged aquatic vegetation and shallow open water within the project area, and adjacent wetlands, provide important estuarine fisheries habitat, including transitional habitat between estuarine and marine environments used by migratory and resident fish, as well as other aquatic organisms for nursery, foraging, spawning, and other life requirements. Historically and currently, the area provides valuable recreational and commercial fishing opportunities that include a wide variety of finfish and shellfish (Rounsefell, 1964; Penland et al., 2002).

The assemblage of species in the proposed project area is largely dictated by salinity levels and season. During low-salinity periods, species such as Gulf menhaden, blue crab, white shrimp, blue catfish, largemouth bass and striped mullet are present in the project area. During high-salinity periods, more salt-tolerant species such as sand seatrout, spotted seatrout, black drum, red drum, Atlantic croaker, sheepshead, southern flounder, Spanish mackerel, and brown shrimp may move into the project area, especially the borrow area in Lake Pontchartrain. Wetlands throughout the project area also support small resident fishes and shellfish such as least killifish, sheepshead minnow, sailfin molly, grass shrimp, and others. Those species are typically found along marsh edges or among submerged aquatic vegetation, and provide forage for a variety of fish and wildlife.

The water quality in the hydrologic units in which these projects are located does not fully support two of their designated uses: (1) Primary Contact Recreation. The suspected source of this impairment, fecal coliform, is from on-site treatment systems, such as septic systems and similar decentralized systems. (2) Fish and Wildlife Propagation. The suspected sources of this impairment, low dissolved oxygen, includes on-site treatment systems such as septic systems and similar decentralized systems, and permitted discharges in the area. Lake Pontchartrain, the project borrow source, is considered to fully support its designated uses.

### 3.4.4 Essential Fish Habitat

#### Existing Conditions

The MSFCMA (50 CFR 600) states that EFH is “those waters and substrate necessary for fish for spawning, breeding or growth to maturity” (16 United States Code [USC] 1802(10); 50 CFR 600.10). The 2005 amendments to the MSFCMA set forth a mandate for the NMFS, regional Fishery Management Councils (FMC), and other Federal agencies to identify and protect EFH of economically important marine and estuarine fish. A provision of the MSFCMA requires that FMCs identify and protect EFH for every species managed by a Fishery Management Plan (FMP) 16 USC 1853. The public places a high value on seafood and recreational and commercial opportunities provided by EFH. Specific categories of EFH include all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), subtidal vegetation (seagrasses and algae), and adjacent intertidal vegetation (marshes and mangroves). Table 5 shows the categories of EFH and the managed species that occur in the project area.

**Table 5: EFH Species in the Project Area**

Life Stage	Brown Shrimp	White Shrimp	Red Drum
Adults		R	R
Eggs			
Juveniles	C to HA	C to A	C
Larvae			
Spawners			
<b>Relative Abundance:</b> Blank - Not Present    A – Abundant    R – Rare    HA - Highly Abundant    C – Common (Variation in abundance due to seasonality) (NMFS, 1998)			
Life Stage	Essential Fish Habitat		
Brown Shrimp - Adults	Silt, sand, muddy sand		
Brown Shrimp - Juveniles	Marsh edge, submerged aquatic vegetation, tidal creeks, inner marsh		
White Shrimp - Adults	Silt, soft mud		
White Shrimp - Juveniles	Marsh edge, submerged aquatic vegetation, ponds, inner marsh, oyster reefs		
Red Drum – Adults	Estuarine mud substrate		
Red Drum - Juveniles	Submerged aquatic vegetation, estuarine mud substrate, marsh/water interface		

The project is located within an area identified as essential fish habitat for postlarval/juvenile brown shrimp; postlarval/juvenile white shrimp; and postlarval/juvenile and adult red drum. The 2005 generic amendment of the FMP for the Gulf of Mexico, prepared by the Gulf of Mexico FMC, identifies EFH in the project area to be estuarine emergent wetlands, submerged aquatic vegetation, estuarine water column, and mud substrates.

### 3.4.5 Cultural Resources

#### Existing Conditions

A review of the Louisiana Division of Archaeology, Cultural Resources Map indicates that two surveys for cultural resources have been previously carried out in portions of the proposed project area. In 1983, Coastal Environments, Inc. conducted a Level I survey of the Rigolets Estates Property for a proposed residential development (Gagliano 1982). During this survey no sites were identified in the survey area. A portion of the proposed projects access corridor would extend through the area surveyed by Coastal in 1983. In 1999, Historic Preservation Associates conducted a survey to identify cultural resources along a proposed fiber optic line extending from New Orleans, Louisiana to Pensacola, Florida. A portion of this survey was located along Highway 90 adjacent to the currently proposed project area, and a single cultural resource was identified. The site was identified as a very thin scatter of Rangia shell and three flakes of unknown prehistoric affiliation. The site record indicates that the site is not eligible for listing to the National Register of Historic Places.

### 3.4.6 Air Quality

#### Existing Conditions

The EPA, under the requirements of the Clean Air Act of 1963 (CAA), has established National Ambient Air Quality Standards (NAAQS) for seven contaminants, referred to as criteria pollutants (40 CFR 50). These are carbon monoxide, nitrogen dioxide, ozone, and particulate matter less than 10 microns in diameter (PM10), particulate matter less than 2.5 microns in diameter (PM2.5), lead, and sulfur dioxide. The NAAQS standards include primary and secondary standards. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air. The primary and secondary standards are presented in Table 6.

**Table 6: National Ambient Air Quality Standards (NAAQS)**

Pollutant and Averaging Time	Primary Standard		Secondary Standard	
	µg/m <sup>3</sup>	Parts per million (ppm)	µg/m <sup>3</sup>	ppm
Carbon Monoxide 8-hour concentration 1-hour concentration	10,000 <sup>1</sup> 40,000 <sup>1</sup>	9 <sup>1</sup> 35 <sup>1</sup>	- -	- -
Nitrogen Dioxide Annual Arithmetic Mean	100	0.053	Same as primary	
Ozone 8-hour concentration	157	0.08 <sup>2</sup>	Same as primary	
Particulate Matter PM2.5: Annual Arithmetic Mean 24-hour Maximum PM10: 24-hour concentration	15 <sup>3</sup> 35 <sup>4</sup> 150 <sup>1</sup>	- - -	Same as primary	
Lead Quarterly Arithmetic Mean	1.5	-	Same as primary	
Sulfur Dioxide Annual Arithmetic Mean 24-hour concentration 3-hour concentration	80 365 <sup>1</sup> -	0.03 0.14 <sup>1</sup> -	- - 1300 <sup>1</sup>	- - 0.50 <sup>1</sup>
Notes:				

<sup>1</sup> Not to be exceeded more than once per year  
<sup>2</sup> 3- year average of the 4<sup>th</sup> highest daily maximum 8-hour concentration may not exceed 0.08ppm  
<sup>3</sup> Based on a 3-year average of annual averages  
<sup>4</sup> Based on a 3-year average of annual 98<sup>th</sup> percentile values  
Source: 40 CFR 50

This project is in St. Tammany Parish which is currently in attainment of NAAQS.

### 3.4.7 Recreational Resources

#### Existing Conditions

Recreational resources in the project area are affected by loss of wetlands/marshes and habitat diversity. Many recreation activities are based on aquatic resources and are directly related to the habitat and species in an area. Habitat changes affect fish and wildlife populations, thereby affecting many recreational resources. Changes in habitat types can be a result of increased salinities and other factors affecting estuarine dependent fish. Loss of marshland and an increase in open water is expected to have impacts on recreational fishing and hunting over the next 50 years. Fishery habitats would decline as spawning places in the marsh are destroyed. Larger open water areas are forming resulting in less shallow waters available as nursery habitat for spawning areas of fish. A decline in the game fish population would also affect hunting opportunities. Populations of migratory birds and other animals directly dependent on the marsh and swamp would decrease dramatically as would bird viewing, an impact that would be felt in much of North America, where some of these species spend part of their life cycle.

Another major impact of land loss is the possible loss of facilities and infrastructure that support or are supported by recreational activities. Land loss can literally result in the loss of boat launches, parking areas, access roads, as well as marinas and supply shops. The loss of access features, such as roads and boat launches, directly impacts the public's ability to recreate in particular areas. Marinas and other shops may lose business as access diminishes or may lose their facilities altogether. Alternatively, demand for goods and services may change. Habitat change and resulting changing recreation opportunities (i.e. fresh to marine) may for example severely impact a marina specializing in services to particularly types of recreation (i.e. loss of freshwater opportunities).

Recreation areas in the Pontchartrain Basin include two NWR, four LA Wildlife Management Areas, four state parks, and one state historic site, as well as other significant areas. These areas alone represent approximately 214,000 acres that are visited annually nearly 450,000 times for recreational purposes. The recreation areas include 46 miles of trails for hiking and biking, 38 boat ramps, 2 fishing piers, 4 classroom spaces, 3 visitor centers or museums, 4 picnic shelters, and 2 historic sites. The recreation areas provide opportunities for hunting, hiking, biking, boating, bird watching, fishing and crabbing, crawfishing, shrimping, education, camping, picnicking, and playing.

Waterfowl hunting is the most popular activity at the New Zydeco Ridge location. According to the BBNWR Manager, the Salt Bayou parking lot is full during waterfowl season as hunters launch pirogues and paddle to the nearest site, New Zydeco Ridge. About 5-10 hunters use the site per day during the season, according to the NWR Manager.

### 3.4.8 Wetlands

#### Existing Conditions

Project area wetlands within the terrace field transitioned from predominantly fresh marsh in 1956 and 1978 to brackish marsh in 1988. The 2000 data shows an almost even split within the terrace field between intermediate and brackish marsh. In the 2007 Operations, Maintenance, and Monitoring Report for the Fritchie Marsh Restoration Project (PO-06), salinity data was collected throughout the project area pre-construction, from 1997-2000, and from 2001-2005. The summary

statistics showed that during the monitoring period, salinity averaged about 3 ppt post construction. This average was considerably higher pre-construction at about 6 ppt. Measurements taken during the WVA trip in June 2009 showed salinities around 3 ppt as well. The 2007 report discussion on vegetative composition indicated that portions of the vegetative communities were trending brackish, with the predominant vegetation being *Spartina patens* and *Schoenoplectus americanus*; however, there are several areas that are trending intermediate. As such, the area is suitable for both intermediate and brackish marsh mitigation.

Existing emergent wetlands and shallow open water within the project areas provide important habitat and EFH, including transitional habitat between estuarine and marine environments used by migratory and resident fish, as well as other aquatic organisms for nursery, foraging, spawning, and other life requirements. Emergent fresh, intermediate, and brackish wetlands are typically used by many different wildlife species, including: seabirds; wading birds; shorebirds; dabbling and diving ducks; raptors; rails; coots; and gallinules; nutria; muskrat; mink, river otter, and raccoon; rabbit; white-tailed deer; and American alligator. Emergent saline marshes are typically utilized by: seabirds; wading birds; shore birds; dabbling and diving ducks; rails, coots, and gallinules; other saline marsh residents and migrants; nutria; muskrat; mink, river otter, and raccoon; rabbits; deer; and American alligator.

Open water habitats such as Lake Pontchartrain provide wintering and multiple use functions for brown pelicans, seabirds, and other open water residents and migrants. Open water habitats in the project area provide wintering and multiple use functions for brown pelicans, seabirds, dabbling and diving ducks, coots, and gallinules as well as other open water residents and migrants.

## 4. ENVIRONMENTAL CONSEQUENCES

This section describes the direct, indirect and cumulative effects of mitigation projects on significant resources found within the LPV mitigation basin, and notes whether they would be impacted by implementation of the proposed project. The period of impact analysis begins when project construction is completed and generally extends 50 years for USACE projects. No natural and scenic rivers or upland resources would be impacted with implementation of any of the projects in the final array.

Direct impacts are those that are caused by the action taken and occur at the same time and place (40 CFR §1508.8(a)). Indirect impacts are those that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR §1508.8(b)). Cumulative impacts are the effects on the environment that results from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future action, regardless of what agency or person undertakes such actions. More information on the Cumulative impacts is discussed in Section 6.

### 4.1 Wildlife

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

#### Future Conditions with the Proposed Action (*the Expansion of NZR*)

Impacts to this resource would not be different than those identified in SIER 1 in that the project area for BSFS4 and the expansion at NZR are the same habitat, namely shallow open water surrounded by marsh. Species present would be similar as these two projects occur in the vicinity of each other.

Direct impacts to wildlife would result from the conversion of approximately 60 acres of shallow open water to emergent marsh habitat. This conversion would reduce use and function of these areas for brown pelicans, seabirds, dabbling and diving ducks, coots, and gallinules and other species that feed in the shallow open water in this location, but it is anticipated they would utilize adjacent areas of open water habitat that are abundant in close proximity to the proposed features. It is anticipated that the project areas would experience improved overall wetland habitat functions once construction and establishment of the proposed marsh is achieved.

These actions would create or enhance emergent marsh habitat for terrestrial and semi-aquatic species such as nutria, muskrat, mink, river otter, and raccoon. Reptiles including the American alligator, western cottonmouth, water snakes, speckled kingsnake, rat snake, and eastern mud turtle are likely to utilize and populate the proposed marsh areas as well. Amphibians expected to colonize the area include the bullfrog, southern leopard frog, and Gulf coast toad. The edges and small areas of open water that would form over time would also provide feeding habitat for common wading bird species including great blue heron, green heron, tricolored heron, great egret, snowy egret, yellow-crowned night-heron, black-crowned night-heron, and white ibis. The creation of an additional 60 acres of brackish marsh habitat, combined with the original 160 acres of marsh approved in SIER 1 at the NZR feature would provide habitat utilized by species such as songbirds, white-tailed deer, raccoons, squirrels, and rabbits.

Indirect impacts of the proposed action would be a displacement of species that utilize shallow open water habitats. However, these species would have the opportunity to utilize adjacent shallow open water areas. Many species utilizing the current habitat type would thrive with the additional foraging, cover, and resting habitat the project would create. A rise in turbidity at the borrow site could immediately reduce water quality in the area; however those effects would be temporary and would be reduced by movement of the tides. Any bottlenose dolphins or their prey in the borrow area would be free to relocate during construction since the borrow area encompasses only a small section of a 403,200 acre estuarine/brackish lake. This project would help to offset an overall loss in the basin of intermediate and brackish marsh habitat necessary for many wildlife species. This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would prevent the net loss of intermediate, brackish wetland function and overall decline of wildlife species within the basin and would be beneficial in both preserving the species bio-diversity and combating the current trend of conversion of coastal marsh to open water, which would be accelerated due to sea level rise.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to wildlife would be incurred from the purchase of these credits for the HSDRRS mitigation.

## **4.2 Threatened and Endangered Species**

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

### Future Conditions with the Proposed Action (*The Expansion of NZR*)

Impacts to this resource would not be different than those identified in SIER 1 in that the project area for BSFS4 and the expansion at NZR are the same habitat, namely shallow open water surrounded by marsh. The borrow sites for both projects occur in the same portion of Lake Pontchartrain (in an area designated as critical habitat for Gulf sturgeon), with similar bottom substrates, and similar excavation depths (19 and 20 ft respectively). Since the borrow site for the BSFS Brackish Marsh project is shrinking by 41 acres with the removal of the BSFS4 feature, and the NZR borrow site is expanding by 41 acres for the proposed action, no overall difference in impact to Gulf sturgeon, their critical habitat or any other T&E species from what was addressed in SIER 1 is anticipated.

No listed species is expected to be directly impacted within the proposed marsh expansion footprint since water depths in the area are typically less than 2 feet and access to the site is restricted. Still, precautions would be taken during construction of retention dikes to ensure no impacts to listed species. The construction contractor would be required to induce listed species to leave the immediate work area prior to any work regardless of water depth. A bucket (or similar equipment) would be dropped into the water and retrieved empty one time. After the bucket has been dropped and retrieved, a 1-minute no work period must be observed. During this no work period, personnel should carefully observe the work area in an effort to visually detect listed species. If species are sighted, no bucket dredging should be initiated until the listed species have left the work area. If the water turbidity makes such visual sighting impossible, work may proceed after the 1-minute no work period has elapsed. If more than 15 minutes elapses with no work, then the empty bucket drop/retrieval process shall be performed again prior to work commencing.

The borrow area could potentially be utilized by Gulf sturgeon, manatees and sea turtles. Dredging for borrow material would occur via hydraulic cutterhead dredge. Entrainment of Gulf sturgeon and sea turtles is not expected since hydraulic dredges are slow moving and their use is not known to impact these species. The presence of construction-related activity, machinery, and noise would be expected to cause these species to temporarily avoid the project area during the construction period. Manatees could potentially be affected by dredging operations, but adverse impacts to this species would be avoided through the implementation of standard manatee protection measures developed by the USFWS. These conditions are included in the construction contract specifications for nearly all USACE dredging contracts in coastal Louisiana.

The indirect impacts resulting from the temporary loss of the borrow area as foraging habitat would be insignificant given the small size of the borrow area compared to the overall area of Lake Pontchartrain. Although the borrow area is inside of designated critical habitat for Gulf sturgeon, Gulf sturgeon primarily feed on sandy substrates and preliminary borings show that the borrow area has a high clay content especially at surface floor levels; the sandy substrates lie 10-11 feet below surface. Turbidity would increase at each location, but would remain localized and should be reduced by movement of the tides.

CEMVN assessed the potential of the recommended action in SIER 1 to affect listed species and determined that the proposed action may affect, but is not likely to adversely affect the Gulf Sturgeon, West Indian manatee, and the green, Kemp's Ridley, and loggerhead sea turtles and may affect, but is not likely to adversely affect Gulf Sturgeon Critical Habitat and is not likely to destroy or adversely modify it. In its August 19, 2015 letter, NMFS concurred that the proposed action was not likely to adversely affect listed species and critical habitat. More specifically, NMFS concluded:

“Because all potential project effects to listed species and critical habitat were found to be discountable, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species and critical habitat under NMFS’s purview. This concludes your

consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if ... new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered.... NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require re-initiation of consultation with NMFS." Appendix B.

CEMVN's determinations with respect to potential effects to listed species and to Gulf sturgeon critical habitat remain unchanged from the conclusions articulated in the SIER. Namely, CEMVN's position continues to be that the proposed action may affect, but is not likely to adversely affect the Gulf Sturgeon, West Indian manatee, and the green, Kemp's Ridley, and loggerhead sea turtles and may affect, but is not likely to adversely affect Gulf Sturgeon Critical Habitat and is not likely to destroy or adversely modify it.

Applying the standard articulated by NMFS's concurrence, i.e., whether the action is modified in a manner that causes an effect to listed species or to critical habitat in a manner or to an extent not previously considered, CEMVN has concluded that the minor modification to the proposed action does not cause an effect to listed species or to critical habitat in any manner or to any extent that was not previously considered. NMFS's evaluation considered impacts to 748 acres of Gulf sturgeon critical habitat, which impacts remain unchanged with the proposed modification. As noted previously, the design of the New Zydeco borrow site is the same as the design evaluated in the SIER and by NMFS with respect to shape, side slopes and depth. The methods and precautions for excavating borrow likewise remain the same. Effects to listed species will be identical. Because there will be no effects of the proposed action to either listed species or critical habitat that were not previously considered and because the proposed minor modification will not cause effects in a manner or to an extent not previously considered, re-initiation of consultation is not required.

In its August 26, 2014 letter, USFWS concurred that the proposed action was not likely to adversely affect listed species under USFWS's purview and has verified this determination in its XX-XX, 2016 re-coordination email CEMVN for the proposed action.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to threatened and endangered species would be incurred from the purchase of these credits for the HSDRRS mitigation.

### **4.3 Fisheries/Aquatic Resources/Water Quality**

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

#### Future Conditions with the Proposed Action (*The Expansion of NZR*)

Impacts to this resource would not be different than those identified in SIER 1 in that the project area for BSFS4 and the expansion at NZR are the same habitat, namely shallow open water surrounded

by marsh. The borrow sites for both projects occur in the same portion of Lake Pontchartrain and excavation depths are similar (19 and 20 ft respectively).

With the expansion at the NZR location, approximately 60 acres of open water, broken marsh, SAVs, and mud substrate would be replaced with intermediate and brackish marsh, increasing spawning, nursery, forage and cover habitat for fisheries resources over the long term. Implementation of the proposed action would prevent an overall loss in the basin of brackish marsh habitat. This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help retard the loss of wetlands and combat the current trend of conversion of marsh to open water. There would be an overall loss of shallow open water habitat in the basin, but no permanent adverse impacts are anticipated because this habitat is prevalent throughout the basin. Direct impacts from the SAV loss were factored into the mitigation planning analysis and would be mitigated by the restoration of intermediate and brackish marsh in the proposed project areas.

For approximately 5 years after project construction the project area would be above daily tidal inundation and only partially vegetated, so maximum fisheries benefits would not be realized until after this 5-year de-watering and settlement period has elapsed. Turbidity during borrow excavation and fill placement would temporarily impair visual predators and would impact filter feeders, but these impacts are expected to cease after construction and benthic species would rebound once construction is complete. Temporary water quality impacts from turbidity are not anticipated to be substantial enough to cause impairment of the water body's designated uses as defined under the standards of Louisiana Administrative Code, Title 33, Part IX, Chapter 11. Water quality impacts in the fill area would temporarily add to the water quality impairment of this sub-segment, but these impacts would be minimized through best management practices and would diminish to background levels after construction.

Fish access to this area would be extremely limited until the material consolidated and settled to an elevation conducive to natural emergent marsh habitats. It is expected this "lag" time would be approximately 5 years. Once the success criteria have been achieved, this area would once again serve its traditional functional role in the local ecosystem.

It is probable that crab fishermen sometimes place crab traps within the proposed borrow area as the practice is common throughout Lake Pontchartrain. Shrimp fishermen may venture into the area either pulling trawls or pushing "skimmer" nets. The fishermen and their gear would be temporarily displaced during project construction, and the borrow area may be less productive for up to a year after project construction due to loss of benthic animals from the dredging operation. The depth restriction on the borrow pit, preventing it from being more than 20 feet in total depth, would minimize the chance that the area would suffer from low oxygen conditions post construction. The borrow pit should revert to productive habitat within a couple growing seasons after project construction. Further, the relative size of the borrow area compared to the open water areas in the Lake is fairly small. Overall, commercial fisheries in Lake Pontchartrain would not be disrupted by the proposed action.

Activities associated with the dredging of borrow material for the proposed action would impact an additional 41 acres over the 289 acres identified in SIER 1. Although turbidity impacts would be localized and temporary, concern over borrow pit water quality impacts is justified as improperly planned dredge pits can result in hypoxic/anoxic conditions. The development of these conditions has been linked to the inability of the water to be properly mixed and flushed within the pits, resulting in stagnation and stratification. Water quality impacts from borrow pits varies greatly due to geographic location, pit design, and environmental parameters.

Hypoxic and anoxic conditions have been linked to the tendency for a borrow pit to accumulate organic material. This accumulation can be reduced by: 1) limiting the depth of the pit; 2) increasing the pits surface area; and 3) decreasing side-slopes that transition from the pit to adjacent water bottoms. A shallow and broad “pan-shaped” borrow pit would facilitate circulation with adjacent waters, thereby decreasing the likelihood that organic material would become entrained, as well as allow for periodic flushing of the pit during storm events.

The proposed borrow plan has been developed with an emphasis of mimicking a natural depression in the lake bottom. A gradual side slope of 1V:3H has been designed for the borrow pits. This gradual slope would facilitate tidal flushing. The NZR borrow pit, including the proposed expansion, is located in an area of tremendous tidal flow and high current velocities that would ensure water exchange within the borrow pit. Borrow pits also have been consolidated together to increase their surface area, which would facilitate tidal mixing of the water column.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to these resources would be incurred from the purchase of these credits for the HSDRRS mitigation.

#### **4.4 Essential Fish Habitat**

##### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

##### Future Conditions with the Proposed Action (*The Expansion of NZR*)

Impacts to this resource would not be different than those identified in SIER 1 in that the project area for BSFS4 and the expansion at NZR are the same habitat, namely shallow open water surrounded by marsh. The borrow sites for both projects occur in the same portion of Lake Pontchartrain and excavation depths are similar (19 and 20 ft respectively).

The existing essential fish habitat at the marsh restoration features includes estuarine water bottom, estuarine water column, and submerged aquatic vegetation. These habitats would be largely converted to another type of essential fish habitat – estuarine intertidal herbaceous wetlands (marsh). Benthic resources within the borrow site would be lost until they can re-colonize the borrow area. Relatively species-poor benthic assemblages associated with low salinity estuarine sediments can recover in periods of time ranging from a few months to approximately one year (Leathem et al. 1973; McCauley et al. 1976 and 1977; Van Dolah et al. 1979 and 1984; Clarke and Miller-Way 1992). Based on characteristics of the existing benthic community in the vicinity of the project area (Ray, 2007) it seems likely that the benthic community in the borrow areas would recover in one to two years. The borrow area would not be excavated to more than 20 feet deep thereby minimizing the possibility of anoxic conditions. Fisheries access to the marsh mitigation area would be extremely limited during the initial 3-5 years of the project life while the pumped-in sediments are dewatering and subsiding. These areas were once a functional marsh system that provided nursery and feeding habitat to local fisheries. Over time, the proposed actions would result in an increase of functional marsh and associated shallow water habitat thereby accomplishing the required level of mitigation and offsetting adverse impacts to certain categories of EFH. The adverse impacts to essential fish habitat that would result from the proposed actions may affect, but should not adversely affect,

managed species considering the small acreage involved relative to Lake Pontchartrain, plus the project would provide long-term benefit to the managed species by providing intertidal wetlands, a valuable type of essential fish habitat.

Indirect impacts to managed species include increased turbidity and disturbance of Lake Pontchartrain in the vicinity of the borrow area. These species may be temporarily displaced. Cumulative impacts to fresh and intermediate marsh EFH resulting from construction of the LPV HSDRRS were considered and found to be adequately offset by the resulting increase in habitat quality from the proposed action. Implementation of the proposed action would result in sufficient EFH habitat improvement to offset adverse impacts to brackish and intermediate marsh EFH and open water designated as essential fish habitat from the LPV HSDRRS construction projects as well as the construction of this proposed mitigation project. The other LPV HSDRRS mitigation projects recommended in PIER 36 and SIER 36 were evaluated and found to have inconsequential cumulative impacts to EFH. No additional UCASE activities that would impact similar open water EFH were identified in the project vicinity.

The proposed action would convert approximately 60 acres of shallow open water habitat and SAVs to brackish marsh habitat. However, shallow open water is found in abundance throughout the LPV basin. The resulting marsh would be cumulatively neutral in the form of additional spawning, nursery, forage and cover habitat for important fish species in the LPV basin because the mitigation is offsetting losses due to construction of the LPV HSDRRS. Implementation of this project would offset the loss of brackish marsh habitat that occurred as a result of the HSDRRS construction. There would be an overall loss of open water habitat in the basin, but no permanent adverse impacts are anticipated because this habitat is prevalent throughout the basin.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to cultural resources would be incurred from the purchase of these credits for the HSDRRS mitigation.

### **4.5 Cultural Resources**

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

#### Future Conditions with the Proposed Action (*The Expansion of NZR*)

Existing and as yet undiscovered cultural resources could be adversely impacted by activities associated with the proposed projects such as retention dike construction, gapping along natural bayous, degrading of dikes, staging area location, access corridor use, and other activities. Implementation of the proposed action to restore vegetated marsh could help to prevent or slow future erosion, which over time could contribute to the protection and preservation of cultural resources that may exist in the project area.

The draft report titled "Phase I Cultural Resources Investigations and Remote Sensing Survey of Lake Pontchartrain and Vicinity Refuge Mitigation Projects – National Wildlife Refuge Habitat Mitigation, Orleans and St. Tammany Parishes, Louisiana – Turtle Bayou, Bayou Sauvage Marsh,

and New Zydeco Ridge” was received on July 7, 2014. The SHPO concurred in a letter dated October 6, 2014, that the project would have no adverse effects on historic properties. No comments were received from federally recognized Indian Tribes. Consultation pursuant to Section 106 of the National Historic Preservation Act has been concluded.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Purchase of mitigation credits from an approved mitigation bank would have no impacts to cultural resources.

### **4.6 Air Quality**

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

#### Future Conditions with the Proposed Action (*The Expansion of NZR*)

During construction of this project, an increase in air emissions could be expected during construction. These emissions could include exhaust emissions from operations of various types of non-road construction equipment such as a cutterhead dredge, tender boats, marsh buggies, etc. and from vehicles used to access the project area. Fugitive dust emissions are not anticipated during construction.

Any site-specific construction effects to air quality would be temporary, and air quality would return to pre-construction conditions shortly after the completion of construction activities. There would be no adverse indirect impacts to air quality with construction of the proposed action.

Because the project area is in a parish in attainment of NAAQS, a conformity analysis is not required.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative air quality impacts would be incurred from the purchase of these credits for the HSDRRS mitigation.

### **4.7 Recreational Resources**

#### Future Conditions with No-Action

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

#### Future Conditions with the Proposed Action (*The Expansion of NZR*)

Recreational opportunities within the project area may increase with increased formation of emergent marsh and other fish and wildlife habitats. An increase in habitat value would likely result in increased

wildlife usage of the project area. The New Zydeco Ridge mitigation features are all located within NWRs and would continue to be used recreationally.

Direct impacts from the restoration include restricted boating, fishing and hunting during construction and for a period afterwards. Earthen retention dikes would remain in place for a period to allow for material to settle out within the restoration feature. Once the restoration is complete and the site matures, direct benefits should accrue to recreational users in the restoration features due to improved habitat quality attracting wildlife or fish. Indirect benefits would also take place in areas surrounding the restoration features as some of the material placed would naturally migrate once the dikes are plugged and/or degrade, nourishing marsh cells and benefiting waterfowl and birds.

Positive long-term benefits would likely be realized from the deposition of dredged material into shallow open water areas and onto existing emergent marsh vegetation. The mitigation area would accept the dredge material in its highly turbid form and in time, become continuous, non-turbid, brackish marsh. Marsh plants consisting of emergent and/or submergent vegetation would become established, complementing the already existing fish and wildlife habitat and increasing future recreational activities in the area. Once the site is fully functional, better habitat from the marsh restoration should improve conditions and opportunities for hunting or bird viewing.

Temporary direct impacts from dredging Lake Pontchartrain include an increase in water turbidity, which would affect fishing in the area of work. Dredging activities would disrupt most recreational activity occurring within the area of work; however, these adverse impacts would be temporary, short-lived, and confined to a relatively small area of the lake. There are, however, many other locations in the lake to fish. Once construction activities are completed, the newly dug pits at the lake bottom should offer new habitat and fishing opportunities should return to the area.

Indirect impacts to boaters would be minor and result from placement of the pipeline needed to deliver the dredge material to the restoration feature. In general, waterways would remain accessible and would not be totally shutoff from navigation. Where the pipeline crosses a navigable waterway, it would be submerged. In areas where the pipeline crosses a body of waterway, it would run along the waterway near its edge. Boaters may have to travel longer distances to arrive at their destination in areas where the floating pipeline blocks navigation. Indirect impacts would also accrue to areas surrounding the proposed restoration features as wildlife and fish in the vicinity would benefit from improved habitat nearby.

Recreational opportunities should improve in Lake Pontchartrain Basin once all of the LPV mitigation features are restored. These areas would provide valuable habitat to both fisheries and wildlife using the Lake and surrounding marshes. Long-term cumulative impacts of proposed marsh and BLH creation in the Lake Pontchartrain Basin would have positive impacts on recreational fishing and hunting by increasing habitat nursery and feeding areas. Cumulative impacts of these types of actions normally are positive for recreational resources; however, the negative impacts that occur during construction activities may affect recreational use in the short-term. Since there are an abundant number of places to fish and hunt in the basin, these negative, temporary impacts are expected to only minimally, cumulatively impact recreational resources and are far outweighed by the long-term benefits.

#### Future Conditions with the Purchase of Mitigation Bank/ILF Credits

There would be no direct indirect or cumulative impacts to recreational resources from the purchase of mitigation bank credits.

## **4.7 Wetlands**

### **Future Conditions with No-Action**

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1 and impacts to this resource would be the same as those presented for the brackish marsh portion of the proposed action in SIER 1.

### **Future Conditions with the Proposed Action (*The Expansion of NZR*)**

Impacts to this resource would not be different than those identified in SIER 1 in that the project area for BSFS4 and the expansion at NZR are the same habitat, namely shallow open water surrounded by marsh.

The NZR location was originally coordinated with FWS staff during the SIER 1 process to select wetlands areas that provided relatively low habitat quality and to improve the habitat through the creation of higher quality wetland habitat such as emergent marsh. Although the proposed project would take place in existing shallow open water habitats, the overall habitat quality of the project area would be enhanced by the proposed creation of 60 acres of marsh habitat. There is no lack of open water habitat in Coastal Louisiana as natural processes continually erode existing land, converting wetland habitat to open water.

### **Future Conditions with the Purchase of Mitigation Bank/ILF Credits**

Since the purchase of mitigation bank credits would occur at an existing approved bank and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to wetlands and other surface waters would be incurred from the purchase of these credits for the HSDRRS mitigation.

## **4.11 Hazardous, Toxic, and Radioactive Waste**

In accordance with Engineering Regulation 1165-2-132, identification and evaluation of the potential to encounter HTRW in the project area was investigated.

The proposed mitigation features were surveyed via aerial photographs, topographic maps, field investigation, and database searches. The proposed feature has not been developed in recent times based on a time-series of aerial photography. No recognized environmental concerns were found or identified within or near the proposed mitigation area. The database searches failed to identify any pipelines crossing the proposed mitigation area or borrow area. Likewise, no oil or gas wells or waste pits have been identified. In conclusion, there would be a low probability of encountering HTRW in the proposed mitigation area and borrow area.

## **4.12 Cumulative Impacts Analysis**

NEPA requires Federal agencies to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impacts of the action. The Council on Environmental Quality (CEQ) Regulations define cumulative impacts (CI) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR §1508.7).” CI can result from individually minor but collectively significant actions taking place over a period of time.”

Appendix B-19 in PIER 36 shows the impacts of other past, present and reasonably foreseeable

projects in the LPV basin on the significant resources documented in this EA. The ecosystem restoration type projects in the basin work to enhance and restore historic ecosystem processes within the basin. Although these projects may result in temporal impacts and tradeoffs among the species within the important resources, their overall effects on the system from a human and natural environmental perspective would be wholly positive. The structural projects (e.g. levee systems), to a large degree, produce socioeconomic benefits (primarily in the form of navigation or flood control) that are the impetus for their construction. Though impacts to the natural environment from construction of these projects have been avoided to the maximum extent practicable, remaining unavoidable impacts require mitigation. Environmental Justice impacts have been avoided during design of these projects however, these projects have resulted in impacts to the aesthetics and recreational opportunities within the system. Some of these projects have had impacts to cultural resources in the basin; however, those impacts have been mitigated by excavating the site, removing the cultural pieces, and documenting the site. In the same vein, construction of many of the structural features in the FWOP has resulted in the protection of cultural sites found within the protection of the levee system. Ecosystem restoration plans in the LPV and WBV basins and in the region that improve estuarine habitat also provide benefits to the commercial fishing industry.

The cumulative impacts caused by construction of the HSDRRS in conjunction with other past and reasonably foreseeable future projects was evaluated in the Final Comprehensive Environmental Document, Phase 1 released May 22, 2013. That analysis is incorporated by reference.

### **NO ACTION**

The approved project in PIER 36 and SIER 1 for mitigating the LPV HSDRRS brackish marsh impacts was the BSFS Brackish Marsh Project. Under the no action alternative, this project would be constructed as discussed in SIER 1. Although, implementation of the BSFS4 feature of the BSFS Brackish Marsh Project is not currently feasible, compliance with the laws requiring mitigation is assumed and the impacts from the LPV HSDRRS improvements would be mitigated elsewhere in the basin by the USACE. As such, there would be no overall loss of marsh habitat in the basin due to the LPV HSDRRS improvements.

### **PROPOSED ACTION**

Construction of either layout in the proposed action would satisfy the outstanding 18.4 AAHUs of brackish marsh impacts at the NZR location. This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would help prevent the net loss of wetland function and overall decline of wildlife species within the basin. Although the proposed project may result in impacts to wildlife, T&E species, aquatic resources, EFH, wetlands, water quality and recreational opportunities within the system, these impacts would be insignificant or temporary throughout the period of construction. Overall, the cumulative impacts of the proposed action are expected to be positive, with long-term benefits to wetlands, EFH, aquatic resources, wildlife resources, and recreational opportunities.

## **5. AGENCY COORDINATION**

Preparation of this supplemental has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. An interagency environmental team was established in which Federal and state agency staff played an integral part in the project planning and alternative analysis phases of the HSDRRS mitigation planning. This interagency environmental team was integrated with the CEMVN project delivery team. A subset of the interagency environmental team participated in the more detailed development and analysis of the refuge mitigation projects and during preparation of this document.

The following agencies and Tribes, as well as other interested parties, received copies of the draft supplement:

U.S. Department of the Interior, Fish and Wildlife Service  
U.S. Environmental Protection Agency, Region VI  
U.S. Department of Commerce, National Marine Fisheries Service  
U.S. Natural Resources Conservation Service, State Conservationist  
U.S. Coast Guard Sector New Orleans  
U.S. Coast Guard Marine Safety Unit Baton Rouge  
Maritime Navigation Safety Association  
The Associated Branch (Bar) Pilots  
Crescent River Port Pilots Association  
New Orleans Baton Rouge Steamship Pilot Association  
Associated Federal Pilots  
Big River Coalition  
Lower Mississippi River Committee (LOMRC)  
Coastal Protection and Restoration Authority Board of Louisiana  
Advisory Council on Historic Preservation  
Governor's Executive Assistant for Coastal Activities  
Louisiana Department of Wildlife and Fisheries  
Louisiana Department of Natural Resources, Coastal Management Division  
Louisiana Department of Natural Resources, Coastal Restoration Division  
Louisiana Department of Environmental Quality  
Louisiana State Historic Preservation Officer  
Plaquemines Parish Government  
Alabama-Coushatta Tribe of Texas  
Caddo Nation of Oklahoma  
Chitimacha Tribe of Louisiana  
Choctaw Nation of Oklahoma  
Coushatta Tribe of Louisiana  
Mississippi Band of Choctaw Indians  
Jena Band of Choctaw Indians  
Seminole Tribe of Florida  
Seminole Nation of Oklahoma  
Tunica-Biloxi Tribe of Louisiana

USFWS recommendations to MVN in a Draft CAR are currently pending and will be added to the final version of this EA.

## **6. Compliance with Environmental Laws and Regulations**

Environmental compliance for the proposed action would be achieved upon the following:

- Coordination of this EA and draft FONSI with appropriate agencies, organizations, and individuals for their review and comments;
- LDNR concurred by letter dated (pending) with the determination that the proposed action is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program; Consistency (pending). (Appendix B)
- Receipt of and acceptance or resolution of all USFWS Fish and Wildlife Coordination Act recommendations; MVN is in receipt of Draft CAR dated (pending), USFWS recommendations have been accepted or resolved and responses are provided in section 5.0 Coordination. (Appendix B)

- USFWS concurred with a determination of not likely to adversely affect Federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of USFWS. (Appendix B)
- A State Water Quality Certificate was received from the Louisiana Department of Environmental Quality on (pending) (Appendix B)
- A Section 404(b)(1) evaluation was signed on (pending) (Appendix C)
- In a letter dated October 6, 2014, the Louisiana State Historic Preservation Officer (SHPO) concurred with a recommendation of no effect on historic properties. (Appendix B)
- There would be a low probability of encountering HTRW in the proposed mitigation area and borrow area.
- NMFS concurred with the CEMVN's determination that the proposed action was not likely to adversely affect Federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of NMFS. Letter of concurrence was received Aug 19, 2015.

The FONSI will not be signed until the proposed action achieves environmental compliance with applicable laws and regulations, as described above.

## **7. MITIGATION SUCCESS CRITERIA, MITIGATION MONITORING AND REPORTING, AND ADAPTIVE MANAGEMENT**

An effective monitoring program is required by the Water Resources Development Act of 2007, Section 2036, to determine if the project outcomes are consistent with the identified success criteria. A monitoring plan including success criteria, monitoring requirements, and planting guidelines was developed for the approved mitigation projects in SIER 1 and can be found in Appendix N of SIER 1. For the proposed 60 acre expansion at NZR, the same mitigation success criteria, monitoring and reporting applicable to the originally approved project would apply to the expansion.

The purpose of adaptive management activities in the life-cycle of the project is to address ecological and other uncertainties that could prevent successful implementation of a project. Adaptive management also establishes a framework for decision making that utilizes monitoring results and other information, as it becomes available, to update project knowledge and adjust management/mitigation actions. Hence, early implementation of adaptive management and monitoring allows for a project that can succeed under a wide range of conditions and can be adjusted as necessary. Furthermore, careful monitoring of project outcomes both advances scientific understanding and helps adjust operations changes as part of an iterative learning process. An adaptive management plan was developed for the approved mitigation projects in SIER 1 and can be found in Appendix N of SIER 1. For the proposed 60 acre expansion at NZR, the same adaptive management plan applicable to the originally approved project would apply to the expansion.

## **8. CONCLUSION**

The proposed action has been assessed for its potential impacts to wildlife, threatened and endangered species, fisheries, aquatic resources, water quality, essential fish habitat, cultural resources, and recreation, and for the potential of the project to encounter HTRW. The proposed action would provide the 18.4 AAHU of brackish marsh mitigation that can no longer be satisfied with the BSFS4 feature of the Bayou Sauvage Flood Side Brackish Marsh Project approved in SIER 1. These benefits would be realized through restoration of approximately 60 acres of brackish marsh adjacent to the NZR Brackish Marsh and BLH features. Construction of the proposed action is recommended to satisfy the outstanding portion (18.4 AAHUs) of general brackish marsh impacts from construction of the LPV HSDRRS.

## 9. Prepared By

SEA #546 and the associated FONSI were prepared by Patricia S. Leroux, biologist, U.S. Army Corps of Engineers, New Orleans District; Regional Planning and Environment Division South, MVN-PDN-CEP; P.O. Box 60267; New Orleans, Louisiana 70160-0267.

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## Appendix A: Adaptive Management Plan

### ADAPTIVE MANAGEMENT PLAN

#### 1.0 Introduction to Adaptive Management

Adaptive Management (AM) is an iterative and structured process which reduces ecological and other uncertainties that could prevent successful project implementation and performance. Adaptive Management establishes a framework for decision making which utilizes monitoring results and other information, as it becomes available, as a feedback mechanism used to update project knowledge and adjust management/mitigation actions to better achieve project goals and objectives. Hence, early implementation of AM and monitoring better enables a project to succeed under a wide range of conditions which can be adjusted as necessary. Furthermore, careful monitoring of project outcomes not only helps to adjust project management operations to changing conditions, but also advances scientific understanding as part of an iterative learning process.

All restoration and mitigation projects are required to consider AM; however, there may be some projects for which AM is not applicable. Adaptive Management is warranted when there are consequential decisions to be made, there are high uncertainties, when there is an opportunity to apply learning, when the value of reducing uncertainty is high, and when a monitoring system can be put in place to reduce uncertainty. In cases where AM is not warranted, the project would still develop an AM Plan but the plan would clearly describe the rationale as to why AM actions would not be warranted. A project where AM is not warranted would still contain a Monitoring Plan to measure project success.

This AM Plan for the Lake Pontchartrain and Vicinity (LPV) mitigation projects describes the organizational structure for the AM process, identifies key project uncertainties, explains how these uncertainties and risks were minimized through the Alternatives Evaluation Process (AEP), evaluates all of the Lake Pontchartrain and Vicinity (LPV) Tentatively Selected Plan (TSP) mitigation projects (Figure 1) as candidates for AM actions, and also describes the monitoring design developed to evaluate progress towards meeting identified mitigation success criteria.

#### 1.1 Authorization

The Water Resources Development Act (WRDA) of 2007, Section 2036 (a) and USACE implementation guidance for Section 2036 (a) (CECW-PC 31 August 2009 Memorandum: *“Implementation Guidance for Section 2036 (a) of the Water Resources Development Act of 2007 (WRDA 2007) – Mitigation for Fish and Wildlife and Wetland Losses”*) require AM and monitoring be included in mitigation plans for fish and wildlife and wetland losses.

#### 2.0 Project Adaptive Management Planning

Adaptive Management planning was conducted for the entire TSP and the first tier of implementable projects as presented in programmatic IER. The AM plan will be refined as necessary for subsequent TSP projects as they are developed in future environmental documents.

# LPV HSDRRS Mitigation Projects



**Figure1. PIER 36 Tentatively Selected Plan**

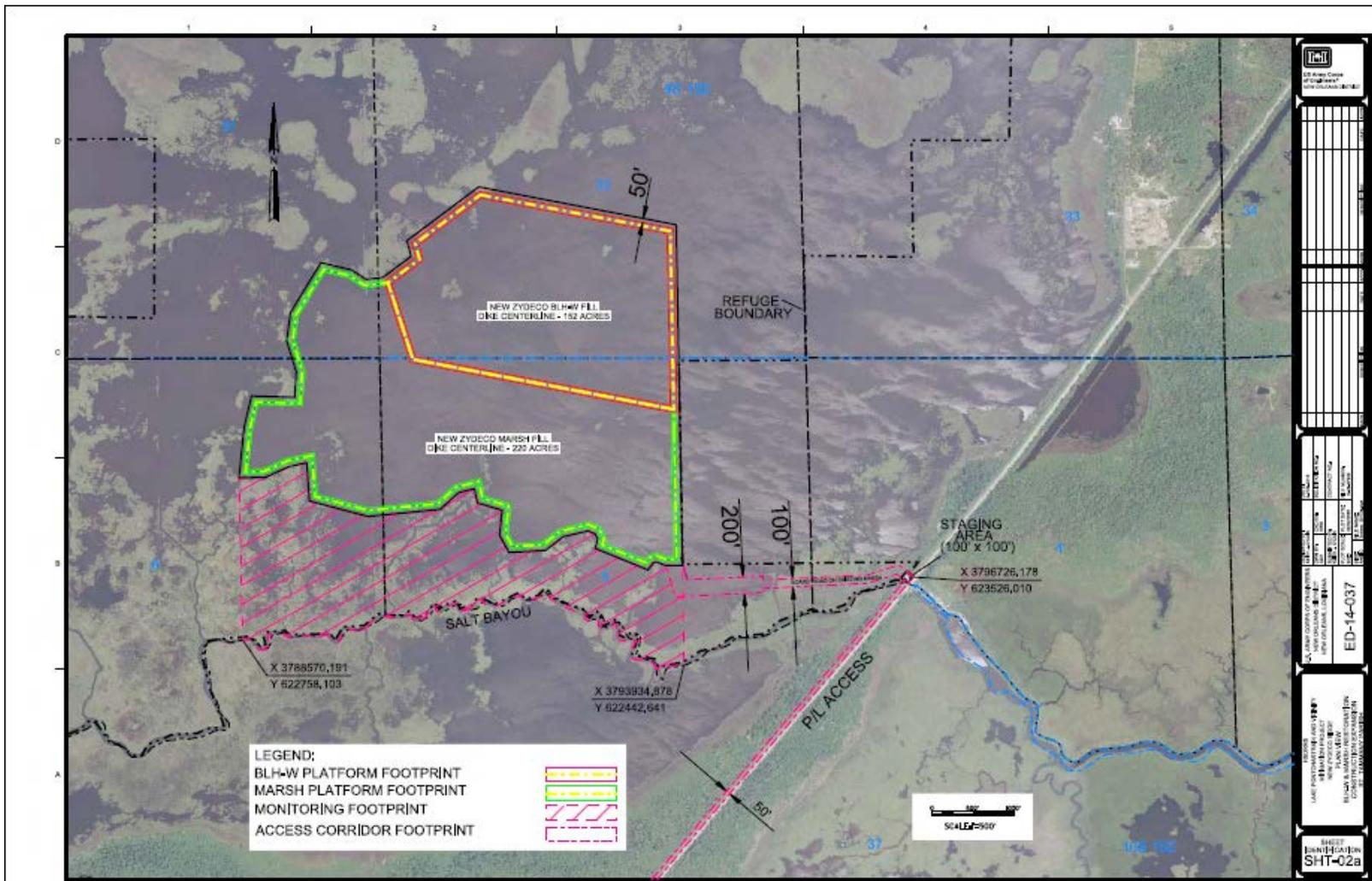


Figure 2: NZR Expansion – Design Layout 1

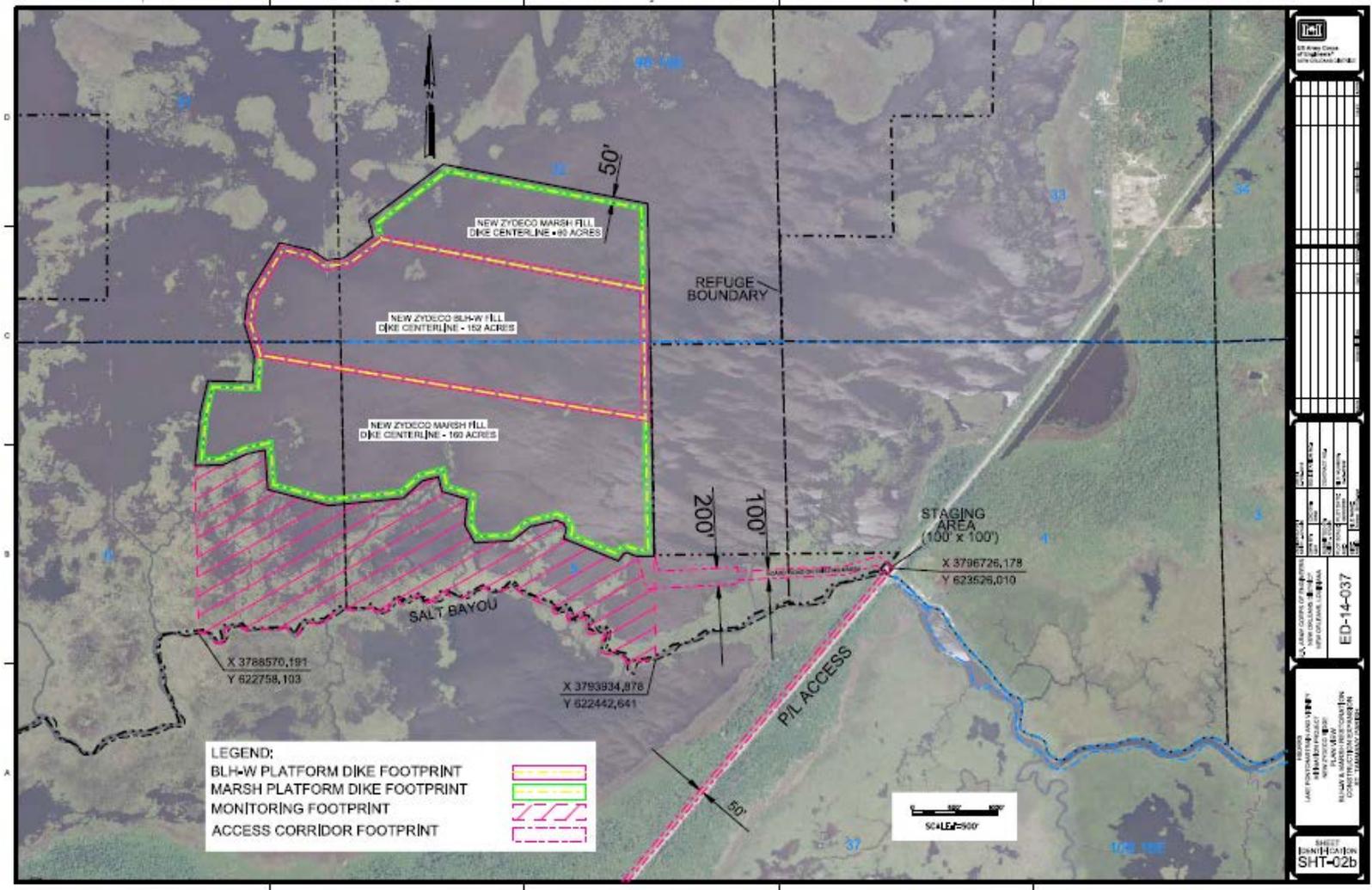


Figure 3: NZR Expansion – Design Layout 2



The level of detail in this AM Plan is based on the best currently available information developed as part of the programmatic Individual Environmental Report (IER). The IER presents the entire TSP for mitigating all the LPV Hurricane and Storm Damage Risk Reduction System (HSDRRS) impacts, but only proposes implementation of a portion of the identified projects at this time to facilitate mitigating impacts as quickly as possible.

Adaptive Management planning was conducted by using the AM program framework structure developed by the Corps New Orleans District that includes both a Set-up Phase (Figure 5) and an Implementation Phase (Figure 6). The Set-up Phase proceeded concurrently with the planning process; while the planners were evaluating and comparing alternatives and selecting a recommended plan, the Adaptive Management & Monitoring Plans were developed. The implementation phase of the Adaptive Management Framework will subsequently put the developed Adaptive Management and Monitoring Plans into action. Through the AM process projects will be designed, constructed, monitored and assessed to understand responses of the system to implementation of the project relative to stated targets, goals, objectives and project success criteria.

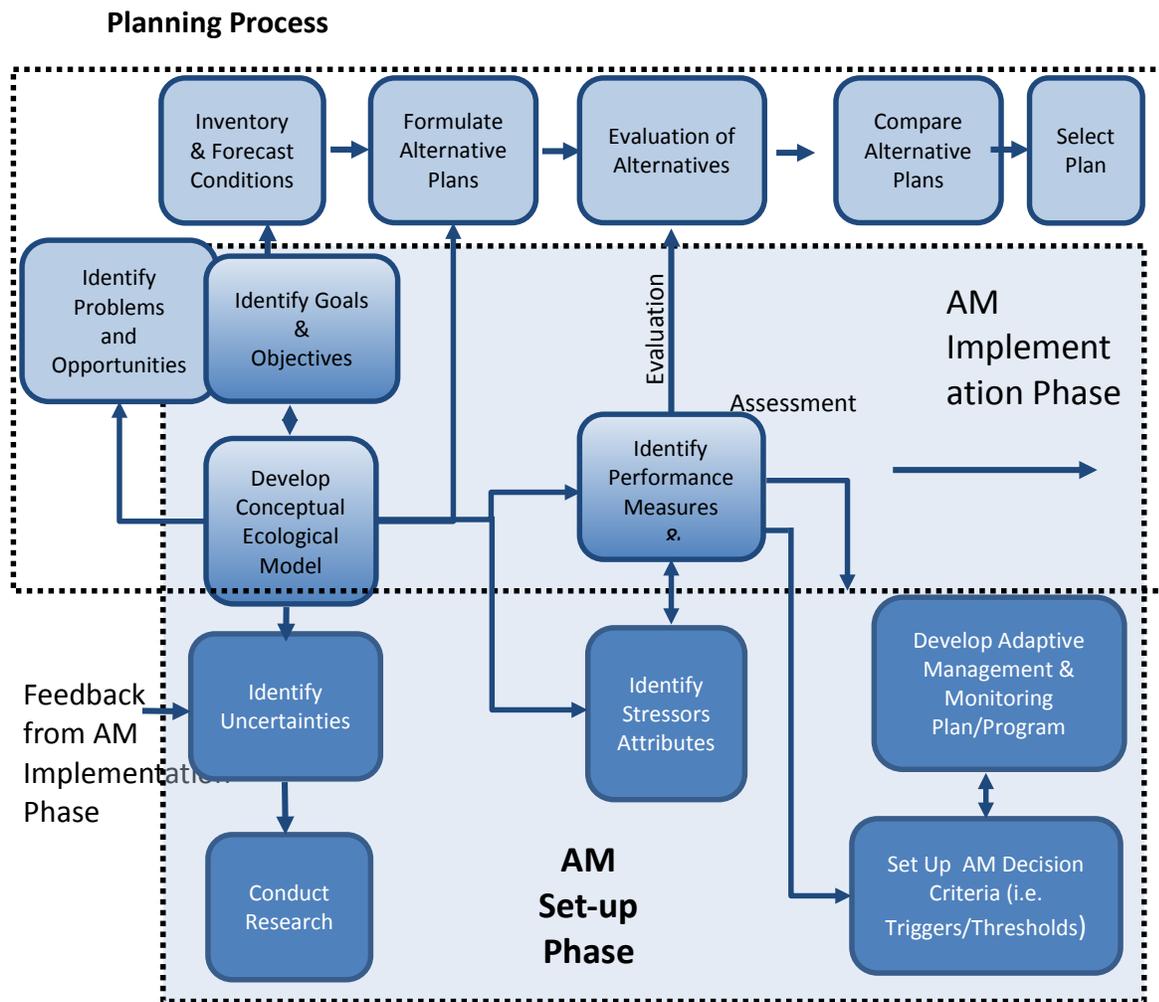
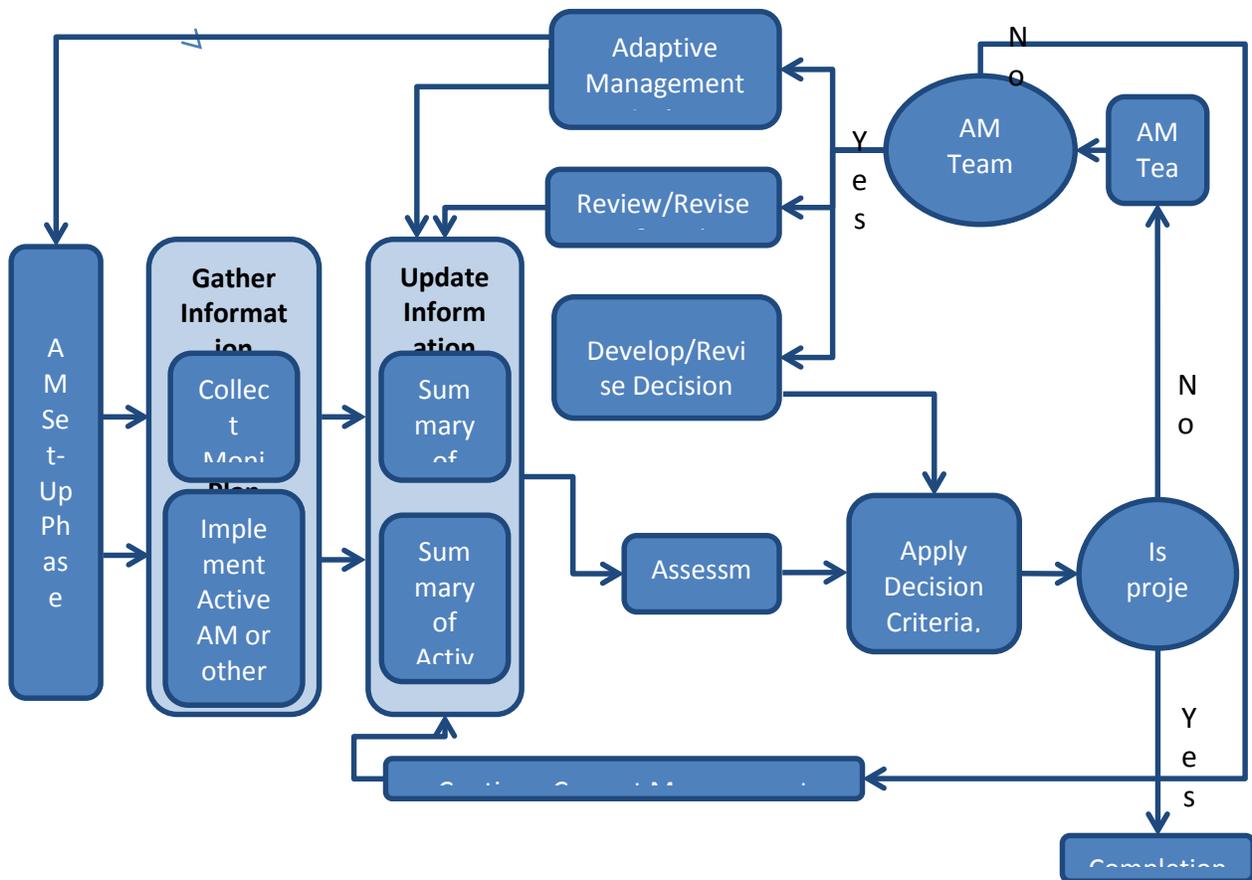


Figure 5. Set-up Phase of Adaptive Management Framework



**Figure 6. Implementation Phase of the Adaptive Management Framework**

## 2.1 Conceptual Ecological Model

A conceptual ecological model (CEM) was developed to identifying the major stressors and drivers affecting each proposed mitigation type (see Table 1). The CEM does not explain all possible relationships of potential factors influencing the sites; rather, the CEM presents only those relationships and factors deemed most relevant to obtaining the required acres/average annual habitat units (AAHUs). Furthermore this CEM represents the current understanding of these factors and will be updated and modified, as necessary, as new information becomes available. Stressors and Drivers identified in the CEM were used during the (AEP) process to evaluate relative risks associated with each mitigation alternative.

**Table 1. Conceptual Ecological Model**

Alternatives/ Issues, Driver	Non-Refuge BLH Dry/BLH Wet	Non- Refuge Swamp	Non-Refuge Intermediate Marsh	Non- Refuge Brackish Marsh	Refuge PS BLH Wet	Refuge FS BLH Wet	Refuge PS Intermediate Marsh	Mitigation Banks*
Freshwater Input (Spillway/Diversion Operations)	+/-	+/-	L	+/-	+/-	+/-	L	0
Salinity	-	-	+/-	L	+/-	+/-	+/-	0
Subsidence	-	-	-	-	-	-	-	0
Sea Level Rise	-	-	-	-	-	-	L	0
Runoff	-	-	-	-	-	-	-	0
Storm induced salinity Impacts	-	-	+/-	L	-	-	+/-	0
Wave Action	-	-	-	-	L	-	-	0
Storm Surge	-	-	-	-	-	-	-	0
Vegetative Invasive Species	-	-	-	-	-	-	-	0
Herbivory	-	-	-	-	-	-	-	0
Hydrology (water table; wet/dry days; soil inundation)	+/-	+/-	+/-	+/-	+/-	+/-	+/-	0
Topography (elevation)	+/-	+/-	+/-	+/-	+/-	+/-	+/-	0

Key to Cell Codes: - = Negative Impact/Decrease + = Positive Impact/Increase +/- = Duration dependent

L = Alternative location determined to have a low risk of exposure to stressor

\*Issues and drivers assumed to be addressed by Mitigation Bank sponsors; not a concern for the PDT

## 2.2 Sources of Uncertainty and Associated Risks

A fundamental tenet underlying AM is decision making and achieving desired project outcomes in the face of uncertainties. There are many uncertainties associated with restoration of the coastal systems. The PDT identified the following uncertainties during the planning process. The alternatives considered were evaluated and ranked to select the TSP with minimal risk and uncertainty.

- Climate change, such as relative sea level rise, drought conditions, and variability of tropical storm frequency, intensity, and timing
- Subsidence, salinity, and water level trends:
  - Subsidence rates (+/-) throughout the mitigation project life
  - Water level trends (+/-) throughout the mitigation project life
  - Variable salinities
- Uncertainty Relative to Achieving Ecological Success:
  - Water, sediment, and nutrient requirements:
  - Magnitude and duration of wet/dry cycles for bottom land hardwood (BLH) and swamp
  - Magnitude and duration of inundation for marsh
  - Annual sediment requirements
  - Nutrients required for desired productivity
  - Growth curves based on hydroperiod and nutrient application
  - Tree and marsh litter production based on nutrient and water levels
  - Tree propagation in relation to management/regulation of hydroperiod
- Uncertainty Relative to Implementability
- Reliability and Resiliency of Design
- Self-Sustainability of Project Once Ecological Success Criteria are Achieved
- Long-Term Sustainability of Project Benefits
- Adaptability

Issues such as climate change and relative sea level change (i.e., combination of eustatic sea level change and regional subsidence) are significant scientific uncertainties for all coastal Louisiana projects. These uncertainties were incorporated into the AEP. Specifically, relative sea level rise (RSLR) USACE EC-1165-2-212 provides an 18-step process for developing a “low”, “intermediate”, and “high” future relative sea level rise scenario and provides guidance to incorporate these potential effects into project management, planning, engineering, design, construction, operation and maintenance. The PDT, in accordance with EC-1165-65-2-212, evaluated the final array of alternatives under three potential future RSLR scenarios.

## 2.3 Adaptive Management Evaluation

The TSP project features were evaluated against the potential need for AM actions. However, prior to AM evaluation, the proposed alternatives were evaluated through the AEP to select a TSP with minimal risk and uncertainty. The AM Team, in coordination with the PDT, determined that uncertainties and risk elements identified for the majority of the TSP project features had been avoided during the AEP evaluation and project implementation process. To further reduce the remaining uncertainties and diminish potential future risks, a monitoring feedback loop was developed to help determine project success. This feedback loop included contingency actions if criteria were not achieved. The items listed below have already been incorporated into the LPV Mitigation project implementation plan and OMRR&R plan to ensure the plan achieves success.

- Planting Guidelines for BLH, Swamp, and Intermediate and Brackish Marsh

- General monitoring guidelines for Project success
- Guidelines for Clearing, Grading, and other Earthwork Activities
- Specified Success Criteria (i.e., mitigation targets)
- Invasive Species Control
- Hydrologic Enhancement
- Phasing of Marsh Plantings
- Supplementary Plantings as required (contingency).
- Corrective actions to meet topographic success as required (contingency)
- Timber management activities

The need for AM actions will be reviewed and revised, as necessary, for subsequent TIER projects. If the Corps determines, based on a consideration of relevant factors, not to purchase mitigation bank credits to compensate for impacts to BLH and swamp, the Bonnet Carré swamp and BLH projects would instead become the proposed action to mitigate for BLH and swamp losses. AM contingencies, if needed for the Bonnet Carré swamp and BLH projects, would address any uncertainties and risks related to the operation of the Bonnet Carré spillway.

The Bonnet Carré Spillway was constructed as a flood control measure. When opened, the spillway diverts floodwaters from the Mississippi River to Lake Pontchartrain in order to reduce the water discharge flowing past New Orleans. In the 81 years since its construction, the Bonnet Carré spillway has been opened ten times, diverting water for between 13 and 75 days. Opening the Bonnet Carré spillway could impact the survival of mitigation plantings within the spillway depending on the timing (i.e. when in the plant lifecycle), duration (i.e. number of days spillway was open) and frequency (i.e. opening structure multiple times in a few years) of spillway openings. The AM Team recommends that two additional re-plantings be included as potential AM actions for both Bonnet Carré alternatives. The need for additional re-plantings could also trigger the need for additional mitigation monitoring. Hence, funding for four additional monitoring and reporting events should be included as potential AM actions (i.e., two additional monitoring/reporting events for each of the two re-planting events). The total cost for these additional re-plantings and monitoring/reporting AM actions is estimated to be approximately \$1,750,000 for the Bonnet Carré BLH mitigation alternative, and approximately \$2,215,000 for the Bonnet Carré Swamp mitigation alternative.

### **3.0 Monitoring for Project Success**

Independent of AM, an effective monitoring program is required (WRDA 2007 Section 2036) to determine if the Project outcomes are consistent with the identified success criteria. Hence, a preliminary general Monitoring Plan was developed for each habitat type within the TSP (see Appendix C-7). The Plan identifies success criteria and targets, a general schedule for the monitoring events and the specific content for the monitoring reports that measure progress towards meeting the success criteria. A detailed monitoring plan specific to the Bonnet Carré BLH mitigation alternative has been developed (see Appendix C-8) and a detailed monitoring plan specific to the Bonnet Carré Swamp mitigation alternative has also been developed (see Appendix C-9). Detailed monitoring plans will be developed for the remaining Corps-constructed mitigation TSP projects in conjunction with the local Sponsor following completion of the design of these TSP projects. These detailed plans will be provided in one or more of the future TIERS.

The USACE will be responsible for conducting the baseline monitoring (Time Zero) and subsequent monitoring and preparing the associated monitoring reports until such time that

certain mitigation success criteria are achieved (see Table 2), although the cost for conducting these activities will be cost-shared with the Sponsor. Once the specified success criteria are achieved (see Table 2), the Sponsor will be solely responsible for conducting all subsequent monitoring and preparing the associated monitoring reports.

Mitigation success criteria, mitigation monitoring and reporting requirements, and mitigation management and maintenance activities for mitigation banks are set forth in the Mitigation Banking Instrument (MBI) for each particular bank. In cases where the TSP involves purchase of credits from a mitigation bank, the bank sponsor (bank permittee) is responsible for these activities rather than the USACE and/or the local Sponsor. USACE Regulatory staff review mitigation bank monitoring reports and conduct periodic inspections of mitigation banks to ensure compliance with mitigation success criteria stated in the MBI.

Table 2 summarizes the success criteria outlined in Appendix C-7 and may be used to depict project progress towards achieving the identified success criteria. It should be noted that the success criteria summarized above may need to be modified later with the final mitigation designs and project implementation or due to factors such as sea level rise, salinity or hydroperiod. Any deviations would be approved by the USACE in coordination with the non-Federal sponsor and Interagency Team, and would supersede the above criteria once approved.

In the event monitoring results and reports reveal that any success criteria have not been met, the USACE, non-Federal sponsor, or its assigns after consultation with CEMVN and other appropriate agencies, will modify management practices in order to achieve these criteria in the future. Items included in the project and planting implementation plans and OMRR&R plan to better ensure that the success criteria include:

- Planting Guidelines for BLH, Swamp and Intermediate and Brackish Marsh
- Invasive Species Control
- Timber Management Activities
- Hydrologic Improvements/Modifications needed for success of specific habitat types
- Phasing of Marsh Plantings
- Supplementary Plantings as required
- Corrective Actions to meet topographic success as required

The costs associated with implementing the Monitoring Program was estimated based on currently available data and information. The current estimate for set-up and implementing the Monitoring Program for the Bonnet Carré BLH mitigation alternative is \$566,000, while the current estimate for the Monitoring Program for the Bonnet Carré Swamp mitigation alternative is \$689,000. These costs include data collection, data assessment, data management, and development of required reports.

**Table 2: Summary of Mitigation Success Criteria for Corps-Constructed Mitigation Projects - Report Card.**

Performance Categories	Mitigation Success Criteria by Habitat Type		
	BLH	Swamp	Marsh
<b>Mitigation Construction</b>	<p>Criteria 1A: Complete necessary initial earthwork and construction activities.</p> <p>Criteria 1B: Complete final construction activities (for mitigation in open water areas).</p>	<p>Criteria 1A: Complete necessary initial earthwork and construction activities.</p> <p>Criteria 1B: Complete final construction activities (for mitigation in open water areas).</p>	<p>Criteria 1A: Complete initial construction activities.</p> <p>Criteria 1B: Complete final construction activities.</p>
<b>Native Vegetation</b>	<p>Criteria 2A: Complete initial plantings.</p> <p>Criteria 2B: 1 year after initial plantings achieve:</p> <ul style="list-style-type: none"> <li>• Survival of ≥50% canopy species.</li> <li>• Survival of ≥85% midstory species.</li> </ul> <p>Criteria 2C: 4 years after initial plantings achieve:</p> <ul style="list-style-type: none"> <li>• ≥300 living native canopy species per acre.</li> <li>• 120-150 hard mast trees per acre</li> <li>• ≥85 midstory species per acre.</li> </ul> <p>For BLH-wet must meet hydrophytic vegetation criteria.</p>	<p>Criteria 2A: Complete initial plantings.</p> <p>Criteria 2B: 1 year after initial plantings achieve:</p> <ul style="list-style-type: none"> <li>• Survival of ≥50% canopy species.</li> <li>• Survival of ≥85% midstory species.</li> </ul> <p>Criteria 2C: 4 years after initial plantings achieve:</p> <ul style="list-style-type: none"> <li>• ≥250 native canopy species per acre.</li> <li>• ≥125 living bald cypress trees per acre.</li> <li>• ≥ 85 native midstory species per acre.</li> <li>• Vegetation meets hydrophytic vegetation criteria.</li> </ul>	<p>Criteria 3A. Complete initial plantings for intermediate and brackish marsh.</p> <p>Criteria 3B: For fresh marsh, 1 year after final construction completed, achieve:</p> <ul style="list-style-type: none"> <li>• ≥50% cover of native fresh marsh species.</li> <li>• meets hydrophytic vegetation criteria.</li> </ul> <p>Criteria 3C: For intermediate and brackish marsh , 1 year after initial plantings, achieve:</p> <ul style="list-style-type: none"> <li>• ≥80% survival of planted species OR ≥25% cover by native herbaceous species</li> <li>• meets hydrophytic vegetation criteria.</li> </ul>

Performance Categories	Mitigation Success Criteria by Habitat Type		
	BLH	Swamp	Marsh
	<p>Criteria 2D: Within 10 years after initial plantings, achieve: ≥80% coverage by native canopy species.</p> <p>Criteria 2E: 15 years after initial plantings, achieve: ≥75 mid-story native canopy trees per acre.</p> <p>Criteria 2F: 25 years after initial plantings, achieve:</p> <ul style="list-style-type: none"> <li>• 20-50% cover by native midstory species.</li> </ul> <p>30-60% cover by native understory vegetation.</p>	<p>Criteria 2D. Within 15 years after initial plantings, achieve:</p> <ul style="list-style-type: none"> <li>• (1) ≥50% native canopy cover &amp; &gt;33% native midstory cover &amp; &gt;33% ground cover.</li> </ul> <p>OR</p> <p>(2): ≥75% native canopy cover AND: &gt;33% native midstory cover; OR &gt;33% native ground cover</p> <p>Criteria 2E: Within 45 years after initial plantings, achieve:</p> <ul style="list-style-type: none"> <li>• DBH of living bald cypress &gt;10 inches.</li> <li>• DBH of other living native trees &gt;12 inches.</li> </ul> <p>Total basal area of all living native trees exceeds 161 square feet per acre.</p> <p>Criteria 2F: 45 years after initial plantings, achieve:</p> <ul style="list-style-type: none"> <li>• ≥160 living native trees per acre.</li> <li>• Maintain Criteria 2D (1) or Criteria 2D(2).</li> </ul>	<p>Criteria 3D: For fresh marsh 3 years after final construction completion, achieve: ≥85% cover by native herbaceous species.</p> <p>Criteria 3E: For intermediate &amp; brackish marsh 3 years after initial plantings, achieve: ≥75% cover by native herbaceous species.</p> <p>Criteria 3F: For all marshes, 5 through 20 yrs after final construction completion, achieve: ≥80% cover by native herbaceous species.</p>
<b>Invasive and Nuisance Vegetation (INV)</b>	<p>Criteria 3A. Complete initial Eradication of INV.</p> <p>Criteria 3B. Maintain &lt;5% cover by INV.</p>	<p>Criteria 3A. Complete initial Eradication of INV.</p> <p>Criteria 3B. Maintain &lt;5% cover by INV.</p>	<p>Criteria 4A. Complete initial Eradication of INV.</p> <p>Criteria 4B. Maintain &lt;5% cover by INV.</p>

Performance Categories	Mitigation Success Criteria by Habitat Type		
	BLH	Swamp	Marsh
<b>Topography</b>	<p>Criteria 4A: After completion of construction, ≥ 80% of total graded area must be within 0.5 ft of target elevation (for mitigation other than in open water areas).</p> <p>Criteria 4B: For open water areas in the year after construction completion, ≥85 % of total graded area must be within 0.5 ft of target elevation.</p>	<p>Criteria 4A: After completion of construction, ≥ 80% of total graded area must be within 0.5 ft of target elevation (for mitigation other than in open water areas).</p> <p>Criteria 4B: For open water areas in the year after construction completion, ≥85 % of total graded area must be within 0.5 ft of target elevation.</p>	<p>Criteria 2A: Upon completion of construction, ≥ 80% of total area must be within 0.5 ft of target elevation.</p> <p>Criteria 2B: 1 year after completion of construction, ≥ 80% of total area must be within 0.5 ft of target elevation.</p> <p>Criteria 2C: 3 year after completion of construction, ≥ 90% of mitigation site must be within functional marsh elevation range.</p>
<b>Thinning of Native Vegetation</b>	<p>Criteria 5: TBD; at 15 to 20 years following initial plantings PDT will determine if thinning of canopy and midstory strata is warranted.</p>	<p>Criteria 5: TBD after the average total basal area of canopy species &gt;170 square feet/acre.</p>	<p>Not applicable.</p>
<b>Hydrology</b>	<p>Criteria 6A: Demonstrate water table is ≤ 12 inches above soil surface for 14 consecutive days in a normal rainfall year (for BLH-Wet only).</p> <p>Criteria 6B: demonstrate soils are inundated or saturated between 7-13% of growing season (for BLH-Wet only).</p>	<p>Criteria 6A: Demonstrate compliance with the following in a normal rainfall year:</p> <ul style="list-style-type: none"> <li>• 200-300 consecutive days of inundation.</li> <li>• 60-90 consecutive days of non-inundation.</li> <li>• Average peak water table elevation 1.0-2.0 ft above soil surface.</li> </ul> <p>Criteria 6B. In a normal rainfall year, for Swamp areas without hydrologic enhancement the water table must be ≤ 12 inches above</p>	<p>Not applicable.</p>

Performance Categories	Mitigation Success Criteria by Habitat Type		
	BLH	Swamp	Marsh
		soil surface for 14 consecutive days.	

## **Appendix B: Agency Coordination**

*Pending. Will be completed before final FONSI is signed*

## Appendix C: 404(B)(1)

The 404(b)(1) documentation can be reviewed at [www.nolaenvironmental.gov](http://www.nolaenvironmental.gov)

# Appendix D: Wetland Value Assessment

## WETLAND VALUE ASSESSMENT COMMUNITY MODEL Fresh/Intermediate Marsh

Project: **New Zydeco Marsh Mitigation - Expansion**

Project Area:	60
% Fresh	0
% Intermediate	100

Condition: Future Without Project

Variable		TY 0		TY 1		TY 50	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	0	0.10	0	0.10	0	0.10
V2	% Aquatic	31	0.38	31	0.38	20	0.28
V3	Interspersion %						
	Class 1	0	0.10	0	0.10	0	0.10
	Class 2	0		0		0	
	Class 3	0		0		0	
	Class 4	0		0		0	
	Class 5	100		100		100	
V4	%OW <= 1.5ft	66	0.84	56	0.84	44	0.60
V5	Salinity (ppt)						
	fresh	3.2	0.86	3.2	0.86	3.2	0.86
	intermediate	3.2		3.2		3.2	
V6	Access Value						
	fresh	0.8500	0.88	0.8500	0.88	0.8500	0.88
	intermediate	0.8500		0.8500		0.8500	
<b>Emergent Marsh HSI =</b>		<b>0.22</b>		<b>EM HSI =</b>	<b>0.22</b>	<b>EM HSI =</b>	<b>0.22</b>
<b>Open Water HSI =</b>		<b>0.50</b>		<b>OW HSI =</b>	<b>0.50</b>	<b>OW HSI =</b>	<b>0.41</b>

Intermediate Calculations			
Interspersion			
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0.1	0.1	0.1	
Salinity			
0.46	0.46	0.46	
0.86	0.86	0.86	
Access Value			
0.90	0.90	0.90	
0.88	0.88	0.88	

Project: **New Zydeco Marsh Mitigation**

FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Emergent						
V2	% Aquatic						
V3	Interspersion %						
	Class 1						
	Class 2						
	Class 3						
	Class 4						
	Class 5						
V4	%OW <= 1.5ft						
V5	Salinity (ppt)						
	fresh						
	intermediate						
V6	Access Value						
	fresh						
	intermediate						
<b>EM HSI =</b>				<b>EM HSI =</b>		<b>EM HSI =</b>	
<b>OW HSI =</b>				<b>OW HSI =</b>		<b>OW HSI =</b>	

Intermediate Calculations			
Interspersion			
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
Salinity			
Access Value			

## WETLAND VALUE ASSESSMENT COMMUNITY MODEL Fresh/Intermediate Marsh

Project: **New Zydeco Marsh Mitigation**

Project Area	60
% Fresh	0
% Intermediate	100

Condition: Future With Project

Variable		TY 0		TY 1		TY 2	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	1	0.11	1	0.11	10	0.19
V2	% Aquatic	31	0.38	0	0.10	0	0.10
V3	Interspersion	%		%		%	
	Class 1	0	0.10	0	0.10	0	0.40
	Class 2	0		0		0	
	Class 3	0		0		100	
	Class 4	0		0		0	
	Class 5	100		100		0	
V4	%OW <= 1.5ft	66	0.84	100	0.60	100	0.60
V5	Salinity (ppt)						
	fresh	3.2	0.86	3.2	0.86	3.2	0.86
	intermediate	3.2		3.2		3.2	
V6	Access Value						
	fresh	0.8500	0.88	0.0001	0.20	0.0001	0.20
	intermediate	0.8500		0.0001		0.0001	
<b>Emergent Marsh HSI =</b>		<b>0.23</b>		<b>EM HSI =</b>	<b>0.20</b>	<b>EM HSI =</b>	<b>0.29</b>
<b>Open Water HSI =</b>		<b>0.50</b>		<b>OW HSI =</b>	<b>0.21</b>	<b>OW HSI =</b>	<b>0.23</b>

Intermediate Calculations		
Interspersion		
0	0	0
0	0	0
0	0	0.4
0	0	0
0.1	0.1	0
Salinity		
0.46	0.46	0.46
0.86	0.86	0.86
Access Value		
0.90	0.30	0.30
0.88	0.20	0.20

Project: **New Zydeco Marsh Mitigation**

FWP

Variable		TY 3		TY 5		TY 6	
		Value	SI	Value	SI	Value	SI
V1	% Emergent	25	0.33	98	0.98	97	0.97
V2	% Aquatic	0	0.10	31	0.38	36	0.42
V3	Interspersion	%		%		%	
	Class 1	0	0.40	50	0.70	100	1.00
	Class 2	0		0		0	
	Class 3	100		50		0	
	Class 4	0		0		0	
	Class 5	0		0		0	
V4	%OW <= 1.5ft	100	0.60	100	0.60	100	0.60
V5	Salinity (ppt)						
	fresh	3.2	0.86	3.2	0.86	3.2	0.86
	intermediate	3.2		3.2		3.2	
V6	Access Value						
	fresh	0.0001	0.20	0.8500	0.88	0.8500	0.88
	intermediate	0.0001		0.8500		0.8500	
<b>EM HSI =</b>		<b>0.37</b>		<b>EM HSI =</b>	<b>0.92</b>	<b>EM HSI =</b>	<b>0.95</b>
<b>OW HSI =</b>		<b>0.23</b>		<b>OW HSI =</b>	<b>0.52</b>	<b>OW HSI =</b>	<b>0.58</b>

Intermediate Calculations		
Interspersion		
0	1	1
0	0	0
0.4	0.4	0
0	0	0
0	0	0
Salinity		
0.46	0.46	0.46
0.86	0.86	0.86
Access Value		
0.30	0.90	0.90
0.20	0.88	0.88





## Appendix E: Draft Coordination Act Report (CAR)



### United States Department of the Interior

FISH AND WILDLIFE SERVICE  
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Suite 400  
Lafayette, Louisiana 70506



May 24, 2016

Colonel Richard L. Hansen  
District Commander  
U.S. Army Corps of Engineers  
Post Office Box 60267  
New Orleans, Louisiana 70160-0267

Dear Colonel Hansen:

Please reference the U.S. Army Corps of Engineers' (Corps) Programmatic Individual Environmental Report (PIER) 36, Supplement 1 (SPIER 1), titled "Bayou Sauvage, Turtle Bayou, and New Zydeco Ridge Restoration Projects, St. Tammany and Orleans Parishes, Louisiana." PIER 36 and SPIER 1 were completed under the approval of the Council on Environmental Quality (CEQ) and partially fulfills the Corps compliance with the National Environmental Policy Act (NEPA) of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). Work proposed in those documents is being conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity, LPV) in the Greater New Orleans area in southeast Louisiana, and is collectively known as the Hurricane Storm Damage Risk Reduction System (HSDRRS).

The Corps is preparing a Supplemental Environmental Assessment (SEA #546) to address changes to the design of some of the features in the recommended mitigation plan described in SPIER 1. Specifically, SEA #546 evaluates the potential impacts associated with implementing brackish marsh mitigation by expanding the New Zydeco marsh mitigation project in St. Tammany Parish, Louisiana. That mitigation was originally proposed at the Bayou Sauvage Flood-side (BSFS) mitigation area in Orleans Parish, Louisiana, and will mitigate brackish marsh impacts associated with the construction and upgrading of the LPV, HSDRRS project. These impacts are considered general impacts in that they did not occur on public lands [i.e., National Wildlife Refuge, (NWR)].

The Fish and Wildlife Service (Service) provided to the Corps an October 28, 2013, Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) report and a

September 2, 2015, supplemental report that addressed the mitigation plan for NWR and non-NWR impacts resulting from the LPV, HSDRRS project (Table 1). This report also incorporates, and supplements the numerous FWCA Reports provided for the work authorized under 4<sup>th</sup> and 5<sup>th</sup> Supplemental for the LPV Hurricane Protection Project only (i.e., IERS 1-11, including supplemental documents). Those reports contain a thorough discussion of the significant fish and wildlife resources (including those habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein, however the following information contains an analysis of the impacts on fish and wildlife resources that would result from changes to the previously proposed plan and provides recommendations to minimize impacts and optimize benefits proposed in the revised mitigation plan. The Service submits the following comments in accordance with provisions of the NEPA, Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.), and the Fish and Wildlife Coordination Act (FWCA, 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

**Table 1: LPV HSDRRS Project Impacts Addressed in SIER#1**

Habitat	Levee Side	AAHUs*	Acres
General Brackish Marsh	floodside	118.06	226.47
Refuge Brackish Marsh	floodside	8.79	24.59
Refuge Intermediate Marsh	protected side	41.29	86.34
Refuge BLH-Wet Flood side	floodside	8.91	22.85
Refuge BLH-Wet Protected side++	protected side	83.92	164.52

\*AAHUs = average annual habitat units  
 ++includes Task Force Guardian impacts

#### ALTERNATIVES EVALUATED

The Corps proposes design changes to the BSFS marsh restoration features approved in SPIER 1 and evaluates the potential of satisfying 18.4 AAHUs of the mitigation requirement that can no longer be accomplished at BSFS-4 feature (Figure 1). That alternative feature is no longer viable due to North American Waterfowl Conservation Act (NAWCA) funds being awarded in November 2014, to protect and restore marsh in the project area. That project awarded in partnership with The Conservation Fund will be managed as part of the refuge after those lands are acquired. Those proposed alternative project features have been discussed and evaluated in our September 2, 2015, supplemental report, and those descriptions are incorporated by reference herein. To compensate for the loss of 60 acres of mitigation that was previously approved under the BSFS4 alternative in SPIER 1, the Corps has evaluated the following alternatives:

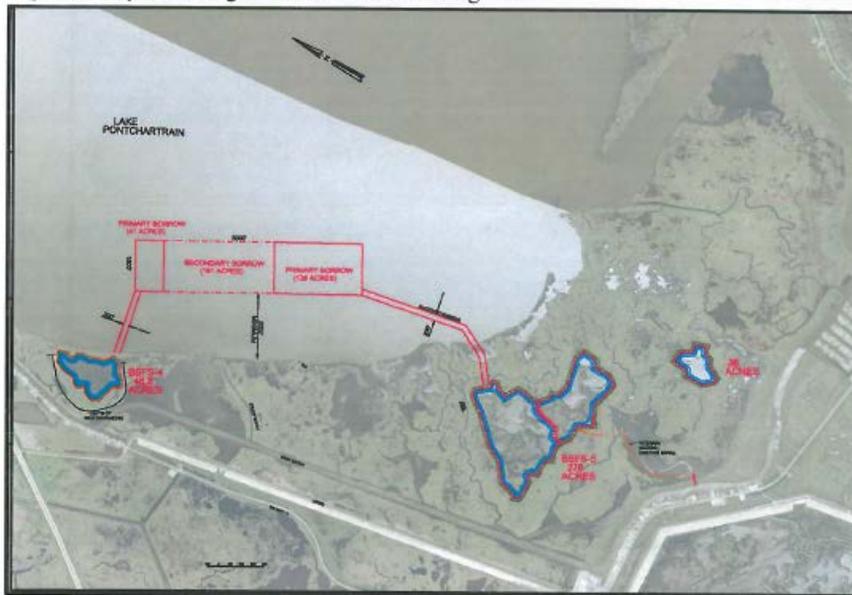
1. Expansion of the marsh mitigation component at the proposed New Zydeco marsh and bottomland hardwood (BLH) habitat mitigation alternative;
2. Addition of a 60-acre marsh mitigation component to the north of the currently proposed New Zydeco BLH habitat feature of the New Zydeco alternative; or,

3. Purchase credits at an approved mitigation bank.

### PROJECT IMPACTS & MITIGATION PLAN

The New Zydeco marsh and bottomland hardwood habitat mitigation projects are located on the north shore of Lake Pontchartrain, northwest of U.S. Highway 90, and approximately 5 miles east of Slidell, Louisiana on the Big Branch NWR. The project sites are bounded on the east by U.S Highway 90, on the North by U.S. Highway 190, on the west by U.S. Interstate 10, and on the south by Lake Pontchartrain. The approved projects in SPIER 1 consist of creating approximately 159 acres of bottomland hardwood habitat and creating 160 acres of brackish marsh habitat (Figure 2).

Figure 1. Bayou Sauvage Flood-side Marsh Mitigation

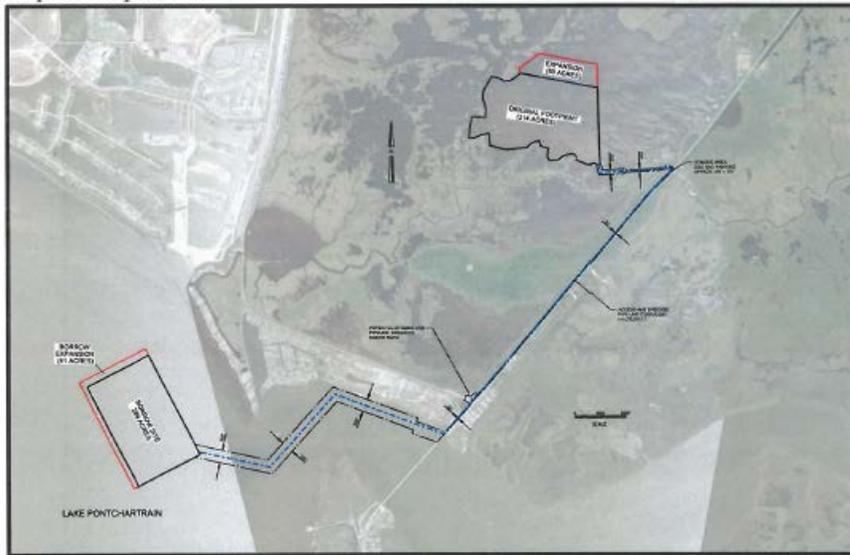


As a replacement to the BSFS4 mitigation feature, the Corps is evaluating the restoration of marsh habitat in addition to, and in conjunction with, the proposed New Zydeco marsh restoration and BLH habitat mitigation feature (Figure 2). The proposed marsh restoration expansion feature at the New Zydeco location is within the Pontchartrain Basin and is considered to be located in the “middle” Pontchartrain Basin along with the areas of impact. Implementation of the mitigation plan would maintain and/or increase fish and wildlife resource

values via the restoration of estuarine marsh. This proposed mitigation plan is being developed to offset losses to brackish marshes and includes the purchase of protective easements (or fee-title) and the construction of restoration projects (containment dike construction, dedicated dredging, and filling of open water areas) within Big Branch Marsh NWR.

Two layout options are being considered to satisfy the outstanding 18.4 AAHUs of brackish marsh impacts at the New Zydeco location. The first layout option expands the currently proposed design of the New Zydeco brackish marsh restoration feature by approximately 60 acres, making the total acreage for that project approximately 220 acres; and moving the approved New Zydeco BLH habitat footprint northward. This project alternative minimizes the linear footage of retention dike required by maintaining an outer perimeter dike and a cross dike between the two habitat varieties.

Figure 2. New Zydeco Marsh and Bottomland Hardwood Habitat Mitigation Footprint with Proposed Expansion



The second layout option being considered is to maintain the alignment of the New Zydeco BLH habitat and brackish marsh layouts approved in SPIER 1 and to add a 60-acre brackish marsh cell to the north of the BLH habitat footprint.

Any earthen perimeter dike around the marsh creation area will be constructed to an elevation +4.0 feet North American Vertical Datum (NAVD) 88 with a five foot crown and 1 vertical (V) on 3 horizontal (H) side slopes. The retention dike around the BLH habitat mitigation area will be constructed to elevation +7.0 feet NAVD88 with a 5 foot crown and 1V on 3H side slopes. Borrow for dike construction would be obtained from the interior of the marsh creation footprint. This varies

from the original New Zydeco design in that the retention dikes were to be constructed to an elevation of +4 feet NAVD88, with a 1V on 4H side slope.

The marsh creation area(s) will initially be filled to an elevation of approximately +3.0 feet NAVD88 to ultimately reach a target marsh elevation ranging from +1.0 feet to +1.5 feet NAVD88.

It is anticipated that the proposed 60 acres expansion of the brackish marsh mitigation footprint would require approximately 500,000 cubic yards of dredged material to construct. To provide this needed additional borrow material, the proposed borrow site would need to be expanded 200 feet in width along the south boundary and 300 feet along the west boundary resulting in a total increase in the borrow footprint of 3,000 feet by 4,800 feet (330 acres) or an increase of 41 acres.

The Service quantified unavoidable project impacts on wildlife resources and calculated mitigation needs and benefits through the use of the Wetland Value Assessment (WVA). Habitat units fluctuate in response to changes in habitat quality, represented by the Habitat Suitability Index (HSI), and/or quantity (acres); those changes are predicted for various target years over the period-of-analysis (i.e., 50 years), for future without-project and future with-project scenarios. Target years (TY) were selected for this analysis to capture the effects of important biological events. Values for model variables were obtained from site visits to the area, previous wetland assessments in similar habitats, communication with personnel knowledgeable about the study area and similar habitats, and review of aerial photographs and reports documenting fish and wildlife habitat conditions in the study area and similar habitats. For all the habitat assessments, the products of the resulting HSI values and acreage estimates were then summed and annualized for each habitat type to determine the average annual habitat units (AAHUs) available. The net change (increase or decrease) in AAHUs under future with-project conditions, compared to future without-project conditions, provides a quantitative comparison of anticipated project impact/benefits in AAHUs. By dividing the AAHU by the proposed mitigation project acreage a mitigation potential per acre was determined. That mitigation potential was used to refine the project size to meet the mitigation needs. Further explanation of how impacts/benefits are assessed with the WVA and an explanation of the assumptions affecting HSI values are available for review at the Service's Louisiana Ecological Services Office. Impact assessments and mitigation benefit assessments considered sea-level rise, subsidence, accretion, and historic marsh loss trends and were coordinated with other State and Federal agencies.

According to the WVA, the addition of 60 acres of marsh mitigation at the New Zydeco alternative location will offset an estimated 18.96 AAHUs of impacts (Table 2). The marsh mitigation feature provides a mitigation potential of 0.32 AAHUs per acre. With the additional 60 acres of marsh mitigation, the New Zydeco Ridge mitigation will be comprised of creating a total of 220 acres of marsh and 159 acres of BLH habitat, of which 207.88 acres of marsh and 154.72 acres of BLH habitat is required to compensate for impacts.

**Table 2: Total Benefits in AAHUs Due to Project.**

A. Emergent Marsh Habitat Net AAHUs	=	38.34
B. Open Water Habitat Net AAHUs	=	-21.74
Net Benefits = (2.1xEMAAHUs+OWAAHUs)/3.1	=	<b>18.96</b>

Additional impacts to fish and wildlife resources are associated with the construction of the refuge mitigation features, and to ensure a no net loss these impacts have been incorporated into the overall mitigation requirement and mitigation plan. Because these impacts were not addressed in our September 2, 2015, report, they are accounted for in this report. These additional impacts are associated with access rights-of-way through vegetated marsh habitat and are presented in Table 3.

**Table 3. Impacts Associated with Mitigation Features**

Mitigation Access	Levee Side	Habitat*	AAHUs	Acres
Turtle Bayou	flood side	BM	0.77	2.11
Turtle Bayou	protected side	IM	3.36	10.13
Bayou Sauvage	flood side	BM	0.41	0.5
New Zydeco	flood side	BM	1.51	3.75

\* BM = brackish marsh, IM = intermediate marsh, SAV = submerged aquatic vegetation - brackish

Success Criteria, Monitoring and Adaptive Management

The mitigation plan was developed in coordination with the Service and the Interagency Team. That plan can be found in Appendix C of the SPIER 1, and is incorporated by reference herein. That plan provided conceptual layouts of the number and location of monitoring plots and transects. The expansion footprint of the New Zydeco marsh restoration feature is comparable to the size of the originally proposed BSFS4 feature, and therefore the number of transects and monitoring plots proposed for the New Zydeco marsh restoration expansion should be comparable. After completion of the initial construction of mitigation, a baseline monitoring report will be prepared to record the final design of the monitoring plan. Future changes to those plans should be evaluated against the accrued and anticipated benefits and the effect of implementing the proposal on achievement of the mitigation plan goals.

Endangered Species Act (ESA)

To accommodate the proposed marsh expansion feature the Corps proposes to expand the New Zydeco borrow area and reduce the Bayou Sauvage borrow area, accordingly. The Corps determined that the recommended proposed action addressed in SPIER 1 may affect, but is not likely to adversely affect the Atlantic sturgeon, West Indian manatee, and the green, Kemp's Ridley, and loggerhead sea turtles. The Corps also determined that the recommended action may

affect, but is not likely to adversely affect Atlantic sturgeon critical habitat and is not likely to destroy or adversely modify it. In an August 19, 2015, letter to the Corps, the NMFS concurred that the proposed action was not likely to adversely affect listed species and critical habitat under their purview. The Service provided an updated concurrence on September 28, 2015, that the proposed action recommended in SPIER 1 was not likely to adversely affect listed species under our purview. In order to ensure compliance with the ESA, we recommend that the Corps re-examine the projects to determine whether they may affect those species listed above and provide a basis for that determination. Because the proposed action includes modifications to the proposed borrow area footprints, we recommend further consultation with the NMFS (Ms. Cathy Tortorici at 727.209.5953) to determine affects to Atlantic sturgeon designated critical habitat.

### Protected Species

The Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) offer additional protection to many bird species within the project area including colonial nesting birds, osprey, and the bald eagle (*Haliaeetus leucocephalus*). We continue to recommend that a qualified biologist inspect proposed work sites for the presence of undocumented nesting colonies during the nesting season (e.g. March 1<sup>st</sup> through September, depending on the species). If colonies exist, work should not be conducted within 1,000 feet of the colony during the nesting season. Reduced no-work buffers may be possible in coordination with this office. On-site personnel should also be informed of the possible presence of nesting bald eagles and ospreys near the project boundary.

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: <http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf>. Those Guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. During any project construction, on-site personnel should be informed of the possible presence of nesting bald eagles in the vicinity of the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

Further, on-site personnel should also be informed of the possible presence of nesting shorebirds should the construction occur any time during the nesting season (March 1<sup>st</sup> to September 15<sup>th</sup>). Borrow material being placed at the mitigation site may be suitable for and attract nesting shorebirds. In this case we recommend that an abatement plan be developed in coordination with this office and be available in the event that shorebirds exhibit evidence of nesting behavior.

### National Wildlife Refuge

The National Wildlife Refuge System Improvement Act of 1997 authorized that no new or expanded use of a refuge may be allowed unless it is first determined to be compatible. A compatibility determination is a written determination signed and dated by the Refuge Manager and Regional Refuge Chief, signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. A compatible use is defined as a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the NWR. A compatibility determination is only required when the Service has jurisdiction over the use.

The Corps should continue to work closely with the Refuge to determine if the proposed project constitutes a "refuge use" subject to a compatibility determination. If the proposed project requires a compatibility determination, a concise description of the project (refuge use) including who, what, where, when, how and why will be needed to prepare the compatibility determination. In order to determine the anticipated impacts of use, the project proponent may be required to provide sufficient data and information sources to document any short-term, long-term, direct, indirect or cumulative impacts on refuge resources. Compatibility determinations will include a public review and comment before issuing a final determination.

All construction or maintenance activities (e.g., surveys, land clearing, etc.) on a NWR will require the Corps to obtain a Special Use Permit from the Refuge Manager; furthermore, all activities on that NWR must be coordinated with the Refuge Manager. Therefore, we recommend that the Corps request issuance of a Special Use Permit well in advance of conducting any work on the refuge. Please contact Stacy Armitage, the Project Leader for the Service's Southeast NWR, (985) 822-2000, for further information on compatibility of restoration features, and for assistance in obtaining a Special Use Permit. Close coordination by the Corps, Local Sponsor, and its contractor must be maintained with the Refuge Manager, Daniel Breaux, (985) 882-2030, to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit issued by the NWR.

The Service continues to recommend and support the mitigation for impacts to public lands on public lands within the managing agencies jurisdiction. If mitigation lands are purchased for inclusion within a NWR, those lands must meet certain requirements; a summary of some of those requirements was provided in our September 2, 2015, supplemental report, and are incorporated by reference herein. Coordination with the Service's Southeast Louisiana Refuge Complex should continue.

### Coastal Wetlands Planning, Protection, and Restoration Act

As you are aware, several restoration projects, which are authorized by the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) (104 Stat. 4779; 16 U.S.C. 3951 et seq.) are located within and near the proposed LPV mitigation features. Additional projects have been

approved since our last report was provided. Should the proposed mitigation projects directly and/or indirectly affect any of the CWPPRA project features (e.g., canal plugs, rock dikes, levees, water control structures, diversion channels, etc.) associated with those CWPPRA projects, the Corps should coordinate with the respective Federal agency. The exact locations of the proposed and existing specific CWPPRA project features may be obtained at <http://lacoast.gov/new/Projects/List.aspx>, and we recommend that the Corps coordinate directly with the appropriate CWPPRA agency sponsors of the project in developing their proposed project. Please be aware that Section 303(d) of the CWPPRA requires that all Federal activities be consistent with the purposes of that Act. Since those activities would also include permits issued by any Federal, State, and/or local agencies, we recommend that the design and features of the proposed project are consistent with the need to protect the public investment in those CWPPRA projects.

### SERVICE POSITION AND RECOMMENDATIONS

The Service supports the Corps' proposed mitigation plan to mitigate impacts to fish and wildlife resources (i.e., brackish marsh impacts) associated with HSDRRS, either by the expansion of the New Zydeco marsh mitigation feature or the addition of brackish marsh north of the New Zydeco bottomland hardwood habitat feature. Both of which occur on Big Branch NWR. However, we are concerned that the Corps is continuing to evaluate a mitigation concept that would rely on bank/credits from mitigation banks that are currently not approved by the Interagency Review Team. Because this concept does rely on banks that are not approved and functioning and could result in further delays in mitigation implementation the Service cannot support any alternative that would rely on this concept at this time. Further, should the State's In-Lieu-Fee program be used there is a concern that mitigation will not be in-kind and within the same hydrologic basin. Although not preferred, provided that the State can confirm that credits are available, and that the funds will be used to create in-kind habitat and within the Lake Pontchartrain Basin, the Service would not oppose that option. In addition, the following recommendations are provided specific to the projects referenced in this report:

1. After completion of the initial construction of mitigation, a baseline monitoring report should be prepared to record the final design of the monitoring plan and submitted to the Interagency Team for review. Future changes to those plans should be evaluated against the accrued and anticipated benefits and the effect of implementing the proposal on achievement of the mitigation plan goals.
2. We recommend that the Corps reinstate ESA consultation with this office and NMFS to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat. Subsequently, ESA consultation should be reinstated should the proposed project features change significantly or are not implemented within one year of the last ESA consultation to ensure that the proposed project does not adversely affect any federally listed threatened or endangered species or their habitat.

3. We recommend that a qualified biologist inspect proposed work sites for the presence of undocumented bald eagle and osprey nests. Adverse impacts to bald eagle and osprey nesting locations and wading bird colonies should be avoided through careful design of project features and timing of construction. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.
4. We recommend that a qualified biologist inspect proposed work sites for the presence of undocumented nesting colonies during the nesting season (e.g. March 1<sup>st</sup> through September, depending on the species). If colonies exist, work should not be conducted within 1,000 feet of the colony during the nesting season. Reduced no-work buffers may be possible in coordination with this office. On-site personnel should also be informed of the possible presence of nesting bald eagles and ospreys within the project boundary.
5. On-site personnel should also be informed of the possible presence of nesting shorebirds should the construction occur any time during the nesting season (March 1<sup>st</sup> to September 15<sup>th</sup>). Should borrow material being placed at the mitigation site be suitable for and attract nesting shorebirds, we recommend that an abatement plan be developed in coordination with this office and be available in the event that shorebirds exhibit evidence of nesting behavior.
6. Should the proposed mitigation projects directly and/or indirectly affect any of CWPPRA project features (e.g., canal plugs, rock dikes, levees, water control structures, diversion channels, etc.) associated with those CWPPRA projects, the Corps should coordinate with the respective Federal agency.
7. Water quality monitoring within the borrow areas is recommended, and should be conducted at least during March through November for a minimum of three years post dredging to verify the conductance, temperature, dissolved oxygen, and pH from the bottom to surface in five foot profiles. Samples should be collected at least monthly during March, April, September, October, and November. During the hotter months of May, June, July and August, sampling should be conducted once every two weeks. Benthos should be sampled immediately prior to construction and thereafter annually for three years post-dredging to evaluate potential recovery or changes in the community structure.
8. The Corps should continue to coordinate with refuge personnel during planning and compatibility determination processes. A Special-Use Permit should be obtained prior to any entrance onto the refuge. Coordination should continue until construction of the flood protection project and restoration projects are complete and prior to any subsequent maintenance. Points of contacts for that refuge are Stacey Armitage, (985) 822-2000, Project Leader for the Service's Southeast National Wildlife Refuges and Daniel Breaux, (985) 882-2030, Refuge Manager for the Big Branch NWR. The Corps should not sign the Decision of Record until a Compatibility Determination is complete.

The Service appreciates the opportunity to comment on the draft SEA #546, and we look forward to continuing coordination with the Corps and the other natural resource agencies to finalizing a

mitigation plan for the LPV project in a timely manner. If your staff has additional questions regarding our comments, please contact Angela Trahan at (337) 291-3137.

Sincerely,



Darryl Clark  
Acting Field Supervisor  
Louisiana Ecological Services Office

Enclosure

cc: FWS, Southeast Refuge Complex, Lacombe, LA  
NMFS, Baton Rouge, LA  
EPA, Dallas, TX  
LDWF, Baton Rouge, LA  
LDNR, CMD, Baton Rouge, LA  
CPRA, Baton Rouge, LA