SUPPLEMENTAL PROGRAMMATIC
INDIVIDUAL ENVIRONMENTAL REPORT

MITIGATION FOR PROTECTED SIDE BOTTOMLAND HARDWOODS DRY

WESTBANK AND VICINITY HURRICANE STORM DAMAGE AND RISK REDUCTION MITIGATION

JEFFERSON PARISH, LOUISIANA-

SPIER #37a

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

February 2016

Contents

Tables

APPENDICES

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), has prepared this Supplemental Programmatic Individual Environmental Report # 37a (SPIER # 37a) to evaluate changes to the approved Mitigation Plan (MP) for mitigating the impacts associated with construction of the West Bank and Vicinity (WBV) 100-year Hurricane and Storm Damage Risk Reduction System (HSDRRS) as presented in the Programmatic Individual Environmental Report # 37 West Bank and Vicinity Hurricane and Storm Damage Risk Reduction System Mitigation, Jefferson, Lafourche, Plaquemines and St. Charles Parishes, Louisiana (PIER #37) with a Decision Record (DR) signed on June 13, 2014. The term "100-year level of risk reduction," as it is used throughout this document, refers to a level of risk reduction that reduces the risk of hurricane surge and wave driven flooding that the New Orleans Metropolitan Area experiences to a 1 percent chance each year. The HSDRRS work consists of upgrading the existing system of levees, floodwalls and gates around the New Orleans Metropolitan Area to provide the 100-year level of risk reduction. The WBV portion of the HSDRRS is the work that is occurring on the west bank of the Mississippi River. A list of the abbreviations used in the PIER #37 is provided in appendix C.

SPIER #37a has been prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality's (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] §1500-1508), as reflected in the USACE ER 200-2-2 (33 CFR §230). This SPIER has been prepared in lieu of a traditional environmental assessment (EA) or Environmental Impact Statement (EIS) pursuant to the CEQ approved NEPA Emergency Alternative Arrangements (40 CFR §1506.11). The Alternative Arrangements can be found at www.nolaenvironmental.gov, and are herein incorporated by reference.

The CEMVN published the Alternative Arrangements in the Federal Register on March 13, 2007 (72 FR 11337). This process was implemented to expeditiously complete environmental analysis for the 100-year level of the HSDRRS, formerly known as the Hurricane Protection System (HPS). The recommended actions are located in southeastern Louisiana (LA) and are part of the Federal effort to construct the HSDRRS in the New Orleans Metropolitan area after the destruction caused by Hurricanes Katrina and Rita.

This SPIER #37a identifies substitute projects for the protected side (PS) bottomland hardwoods dry (BLH-Dry) feature of the MP found in the PIER #37 and provides an assessment of the revised compensatory mitigation plan for the WBV HSDRRS impacts using the selected replacement projects.

Construction impacts of the WBV HSDRRS are described in Individual Environmental Reports (IERs) 12-17 and 33, and their associated Supplemental IERs (IERS). The IERs are available on www.nolaenvironmental.gov. The CEMVN continues to make a concerted effort to avoid and minimize environmental impacts to the maximum extent practicable while designing and constructing the HSDRRS. However, unavoidable impacts have occurred and continue to occur to fresh, intermediate, and brackish marsh, BLH-Dry and BLH-wet, and swamp.

Compensatory mitigation is an integral feature of the HSDRRS work. The CEMVN is required by the Water Resources Development Acts (WRDAs) of 1986 and 2007 to offset unavoidable habitat impacts through compensatory mitigation by replacing the lost habitat's functions and services in-kind to the extent possible. WRDA 1986, Section 906(d)(1), as amended by WRDA 2007, Section 2036(a), and by WRRDA 2014 Section 1040, provides additional requirements for Corps'

compensatory mitigation plans. Pursuant to these provisions, specific mitigation plans shall ensure that impacts to bottomland hardwood forests are mitigated in-kind and other habitat types are mitigated to not less than in kind conditions to the extent possible. Corps' Implementation Guidance for Section 2036(a) of the WRDA of 2007 states that compensatory mitigation should be located within the same hydrologic basin (watershed) as where the impacts occurred. The Clean Water Act (CWA) Section 404(b)(1) Guidelines also require compensatory mitigation for unavoidable habitat losses.

In accordance with the Alternative Arrangements, this draft SPIER was distributed for a 30-day public review and comment period. The only comments received during that review period were from state and federal agencies. The comments received and CEMVN responses can be found in appendix L. The CEMVN Commander has reviewed all comments received and has made a determination that they do not rise to the level of being substantive. The CEMVN Commander has made a decision on the action proposed in the draft SPIER. This decision is documented in the decision record (DR).

Unless otherwise indicated, all figures cited man be found in appendix A and all tables in appendix B.

1.1 PURPOSE AND NEED

The purpose of the recommended action is to compensate for habitat losses incurred during construction of the WBV HSDRRS to PS BLH-Dry which is the only feature of the WBV HSDRRS Mitigation Plan that has been revised by this SPIER. All other general features identified in the approved mitigation plan (MP) remain as set forth in the PIER #37 and its Record of Decision and the Park approved mitigation plan remains the same as stated in the joint Environmental Assessment (EA) with the National Park Service entitled “Jean Lafitte National Historical Park and Preserve Mitigation Features, Environmental Assessment and National Historic Preservation Act Assessment of Effects, West Bank and Vicinity Hurricane and Storm Damage Risk Reduction System Mitigation, Jefferson Parish, Louisiana, PIER #37, TIER 1 EA, FONSI approved Dec 18, 2015 . The BLH-Dry habitat type is described in section 2.1 of the PIER #37. The recommended compensatory mitigation would replace the lost functions and services of the impacted habitat through enhancement activities designed to create/increase/improve the habitat functions and services at specific mitigation sites.

1.2 AUTHORITY

The authority for the action was provided as part of legislation authorizing a number of HSDRRS projects spanning southeastern LA, including the Lake Pontchartrain and Vicinity (LPV) project and the WBV project. Additionally, Congress passed a series of supplemental appropriations acts following Hurricanes Katrina and Rita to repair and upgrade the projects damaged by these storms.

The WBV project was authorized by the WRDA of 1986 (P.L. [Public Law] 99-662, Section 401(b)). The WRDA of 1996 modified the project and added the Lake Cataouatche Project and the East of Harvey Canal Project (P.L. 104-303, 101(b)(11) & P.L. 104-303, Section 101(a)(17)). The WRDA 1999 (P.L. 106-53, Section 328) combined the three projects into one project as the West Bank and Vicinity Hurricane Protection Project.

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, Construction, and Flood Control and Coastal Emergencies) authorized accelerated completion of the WBV project and restoration of project features to design elevations at full Federal expense. 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, Construction, and Flood Control and Coastal Emergencies and 6th Supplemental - PL 110-252, Title III, Chapter 3) authorizes modification to WBV to provide the level of protection necessary to achieve the certification required for participation in the National Flood Insurance Program; the replacement or reinforcement of floodwalls; and the construction of levee armoring at critical locations.

1.3 PUBLIC CONCERNS

Throughout the WBV basin, the public has expressed concern that sufficient funding be allocated for the HSDRRS mitigation efforts and that the HSDRRS mitigation is completed in a timely manner. Concern has also been expressed that mitigation banks are given the opportunity to sell credits to satisfy the HSDRRS mitigation requirement.

During the public review of the PIER #37, the Lafourche Parish community expressed concerns about the use of condemnation to acquire private lands for mitigation associated with the Lake Boeuf alternative. Concern was also expressed that conversion of agricultural land to forested wetlands would impact the community and its economy.

1.4 PRIOR REPORTS

A number of studies and reports on water resources development in the project area have been prepared by CEMVN, other Federal, state, and local agencies, research institutes, and individuals. Pertinent studies, reports, and projects are discussed in the following sections. Additional studies and reports were discussed in PIER #37 which is incorporated into this SPIER #37a by reference. The following documents can be found at www.nolaenvironmental.gov

Mitigation for impacts to the human and natural environment caused by construction of the WBV HSDRRS work within the Jean Lafitte National Historical Park and Preserve were analyzed in the joint EA entitled Jean Lafitte National Historical Park and Preserve Mitigation Features, Environmental Assessment and National Historic Preservation Act Assessment of Effects, West Bank and Vicinity Hurricane and Storm Damage Risk Reduction System Mitigation, Jefferson Parish, Louisiana, PIER #37, TIER 1 EA.

1.4.2 WBV HSDRRS IERs and Impacts

Impacts to the human and natural environment caused by construction of the WBV HSDRRS work were analyzed in IERs 12 – 17, and 33 and supplemental reports. Environmental impacts, including jurisdictional wetlands and non-jurisdictional bottomland hardwoods forest impacts were assessed in cooperation with an interagency mitigation team in accordance with the NEPA, the Fish and Wildlife Coordination Act, and Section 906(b) WRDA 1986 (as amended) requirements. A summary discussion of impacts by IER can be found in appendix C-1 of the PIER #37.

A "habitat-based methodology" in the form of the wetland value assessment (WVA) model was used to assess impacts from construction of the HSDRRS work and future benefits to be obtained through the compensatory mitigation projects. The WVA model computes the difference in the habitat value over the period of analysis between the future without and future with project conditions. The difference is expressed as net average annual habitat units (AAHUs). For

example, if the net change between the future without project condition (FWOP) and the future with project condition (FWP) over the 50-year period of evaluation is +0.2 over 100 acres, then that project would produce 20 AAHUs of ecological benefit. The same version of the model was used to calculate both the impacts from construction the HSDRRS work and future benefits to be obtained through the implementation of the mitigation. For further information regarding WVA models please see section 2.7.

1.4.3 Government Furnished Borrow IERs and Impacts

Mitigation for Government Furnished Borrow Sites

Impacts to the human and natural environment caused by the use of government furnished borrow were analyzed in IERs 18, 22, 25, and 28. Of the government furnished borrow sites approved for use in the HSDRRS construction, the only site with environmental impacts requiring mitigation utilized to date is the Churchill Farms Site assessed in IER18. The total impact for the site is 29.9 acres (10.62 AAHUs) of PS BLH-Dry, which would be mitigated with the other WBV HSDRRS impacts.

1.4.4 Contractor Furnished Borrow IERs and Impacts

Mitigation for Contractor Furnished Borrow Sites

To meet the extremely large need for borrow for the HSDRRS improvements, utilization of Contractor Furnished (CF) borrow was also employed by the CEMVN. Impacts to the human and natural environment caused by the use of CF borrow were analyzed in IERs 19, 23, 26, 29, 30, 31, 32, and 35. To date, no wetlands have been impacted by the excavation of borrow for the HSDRRS program. Mitigation for BLH-Dry habitats impacted under the CF borrow program is not addressed in this SPIER #37a since mitigation for those impacts is performed by either the land owner or the contractor utilizing the site prior to allowing the site to be utilized.

1.4.5 Mitigation Requirement

1.4.5.1 Revision of WBV HSDRRS Impacts

Because the IERs evaluating the HSDRRS risk reduction features were completed at the 35 percent level of design, the footprints stated in those IERs were, in many cases, a worst-case scenario (i.e., larger than necessary) footprint. Through advanced engineering and design, the CEMVN has made a concerted effort to avoid and minimize impacts to the environment to the maximum extent practicable. As such, in many cases, the predicted impacts anticipated in the HSDRRS IERs were significantly reduced as the projects proceeded to 100 percent design. Consequently, to accurately capture the impacts caused by construction of the HSDRRS, the mitigation PDT, in cooperation with the resource agencies, revised the original impact estimates utilizing the 95-100 percent design plans. Additionally, following identification of tentatively selected mitigation plan alternative found in the PIER #37, the revised impact estimates were again revisited and verified by the United States Fish and Wildlife Service (USFWS), some final as-builts were received, and correction of NPS impacts based on the Omnibus Public Lands Management Act occurred, which resulted in further adjustment to the estimated impacts. Details of these revisions can be found in the PIER #37.

1.4.5.2 WBV Original Construction Impacts

Changes to the previously authorized WBV Hurricane Protection Project as assessed in EA 437 entitled "West Bank and Vicinity, New Orleans, Louisiana Hurricane Protection Project, Lake Cataouatche Levee Enlargement Highway 90 to Cataouatche Pump Stations" and EA 439 entitled "West Bank and Vicinity, New Orleans, Louisiana Hurricane Protection Project: Westwego to Harvey Canal Highway 45 Borrow Pits, Jefferson Parish, Louisiana" incurred impacts requiring mitigation. Because the impacts assessed in EAs 437 and 439 (Table 1.1) used a 100-year period of analysis and because the mitigation plan for those impacts was not fully developed in those EAs, a decision was made to re-assess those impacts using a 50 year period of analysis and to mitigate them along with the WBV HSDRRS impacts (which were also assessed using a 50 year period of analysis).

Table 1-1: WBV Original Construction Impacts

	PS BLH-Dry		FS BLH-Wet		FS Swamp	
EA	Acres	AAHUs	Acres	AAHUs	Acres	AAHUs
439			21.50	15.10	88.5	50.71
437	162.10	58.95				
PS Total	162.10	58.95				
FS Total			21.50	15.10	88.50	50.71

1.4.5.3 WBV Original and HSDRRS Mitigation Requirement

Combining the WBV HSDRRS construction impacts, WBV HSDRRS government furnished borrow impacts and impacts from the original construction of the WBV hurricane protection system produced the following requirement for mitigation (see Table 1.2).

Table 1-2: WBV Original and HSDRRS Mitigation Requirement Habitat Type

Habitat Type	AAHUs Impacted
General PS BLH-Wet/Dry	200.27 AAHUs
General FS BLH-Wet	72.04 AAHUs
General FS Swamp	134.52 AAHUs
General FS Fresh Marsh	65.92 AAHUs
Park/404(c) FS BLH-Wet	3.12 AAHUs
Park/404(c) FS Swamp	7.19 AAHUs
Park/404(c) FS Fresh Marsh	3.03 AAHUs

This SPIER #37a evaluates the impacts of the MP with the substitute projects for the PS BLH-dry feature and proposes moving forward with construction of this feature.

1.6 INTEGRATION WITH OTHER INDIVIDUAL ENVIRONMENTAL REPORTS

The CEMVN prepared the first phase of the Comprehensive Environmental Document (CED) that evaluated the cumulative effects of the HSDRRS work on a system-wide scale. The CED Phase 1 incorporated information from IERs completed by November 15, 2010 and public review of this document ended April 8, 2013. The next phase of the CED is under development and will include the HSDRRS mitigation plans, long-term monitoring and adaptive management commitments as well as IERs completed after November 15, 2010. A decision record will be executed following public review of the final phase of the CED.

2. ALTERNATIVE FORMULATION

The following sections walk the reader through the plan formulation process from identification of the approved MP in the PIER #37 and PIER #37, TIER 1 EA to events that have led us to this modified mitigation plan (MMP) presented in this supplemental document.

2.1 MITIGATION PLAN FORMULATION

The following mitigation projects were evaluated for each habitat type impacted from the WBV HSDRRS construction and constituted the final array of potential projects considered in the PIER #37. The mitigation project in Table 2-1 that is the subject of this supplemental document is highlighted in red and starred.

General BLH-Dry/BLH-Wet Protected Side Impacts

- Bayou Segnette PS BLH-Dry & BLH-Wet Enhancement
- Dufrene Ponds PS BLH-Wet Restoration
- Lake Boeuf PS BLH-Dry & BLH-Wet Restoration
- Plaquemines, Alt. 2 PS BLH-Wet Restoration
- General Mitigation Bank

General BLH-Wet Flood Side Impacts

- Dufrene Ponds FS BLH-Wet Restoration
- Lake Boeuf FS BLH-Wet Restoration
- Plaquemines, Alt. 2 FS BLH-Wet Restoration

General Swamp Flood Side Impacts

- Dufrene Ponds FS Swamp Restoration
- Lake Boeuf FS Swamp Restoration
- Plaquemines, Alt. 1 FS Swamp Restoration
- Plaquemines, Alt. 2 FS Swamp Restoration
- Salvador-Timken FS Swamp Restoration
- Simoneaux Ponds FS Swamp Restoration

General Fresh Marsh Flood Side Impacts

- Dufrene Ponds FS Marsh Restoration
- Jean Lafitte FS Marsh Restoration
- Plaquemines, Alt. 1 FS Marsh Restoration
- Salvador-Timken FS Marsh Restoration
- Simoneaux Ponds FS Marsh Restoration

Park/404(c) BLH-Wet Flood Side Impacts

- Jean Lafitte FS BLH-Wet Restoration

Park/404(c) Swamp Flood Side Impacts

- Jean Lafitte FS Swamp Restoration

Park/404(c) Marsh Flood Side Impacts

- Jean Lafitte FS Marsh Restoration

Screening of the above projects resulted in the identification of the following WBV HSDRRS MP that was approved by the CEMVN District Commander on June 13, 2014. Details of the screening process are located in chapter 2 of the PIER #37.

Table 2-1: PIER #37 Mitigation Plan

Habitat Type Impacted	Mitigation Project (MP)
General PS BLH-Wet/Dry	General Mitigation Bank*
General FS BLH-Wet	Lake Boeuf FS BLH-Wet Restoration
General FS Swamp	Lake Boeuf FS Swamp Restoration
General FS Fresh Marsh	Jean Lafitte FS Marsh Restoration
Park/404(c) FS BLH-Wet	Jean Lafitte FS BLH-Wet Restoration
Park/404(c) FS Swamp	Jean Lafitte FS Swamp Restoration
Park/404(c) FS Fresh Marsh	Jean Lafitte FS Marsh Restoration

* Projects are the subject of this SPIER #37a.

In accordance with the USACE Implementation Guidance for Section 2036 of the WRDA 2007, Mitigation for Fish and Wildlife and Wetlands Losses, as well as the standards and policies set forth in 33 CFR Part 332, compensatory mitigation was formulated to occur within the same watershed or hydrologic basin as the impacts and to replace the functions and services of each habitat type with functions and services of the same habitat type. The WBV HSDRRS Mitigation Basin boundaries coincide with the watershed boundaries except for the southern boundary. The southern boundary for planning purposes was limited to the intermediate/brackish marsh interface at 6 part per thousand (ppt) because the WBV HSDRRS work only impacted fresh marsh and the functions and services of fresh marsh could not be replaced in areas with salinities greater than those found in intermediate marsh systems.

In accordance with WRDA 1986, 33 U.S.C. 2283(d) and WRDA 2007 U.S.C. 2036(a) mitigation measures were required to either restore or enhance the same habitat types that were impacted (e.g. “habitat type for habitat type”) from the HSDRRS construction. In the case of impacts to BLH-Dry habitats, the PDT determined that the potential mitigation measures could involve restoring or enhancing BLH-Wet habitat instead of BLH-Dry habitat. This is possible because BLH-Wet habitat has an added hydrologic component that allows a greater diversity of species to thrive while still supporting the species that utilize BLH-Dry habitat. The result is an increase in

habitat functions and services for BLH-Wet over and above what BLH-Dry would provide. The reverse would not be possible because using BLH-Dry to mitigate BLH-Wet would result in the loss of wetland related functions and services essential to that system. Similarly, impacts to fresh marsh habitats could involve restoring or enhancing intermediate marsh as intermediate marsh provides similar functions and services for many of the same species utilizing fresh marsh.

With approval of the PIER #37 MP, CEMVN was able to move forward with the purchase of mitigation bank credits to satisfy the BLH-Wet portion of the PS BLH-Wet/Dry mitigation requirement on February 11, 2015.

PIER #37, TIER 1 EA MITIGATION PLAN FORMULATION

Impacts to JELA would be mitigated within the boundaries of JELA as per NPS Director's Order 77-1 requiring impacts occurring on a National Park (Park) to be mitigated on lands managed by the NPS, with the following recommended priority order: 1) within the same wetland system as the impacted wetland; 2) within the same watershed; or 3) in another watershed within the same NPS unit. Additionally, all unavoidable adverse impacts to the 404(c) would be mitigated within that area and/or on JELA as committed to by the CEMVN District Commander in his November 4, 2008 letter to the Regional Administrator for EPA Region 6 (see Appendix H of PIER 37, TIER 1). This commitment was also cited in EPA's May 27, 2009 Final Determination for the modification of the Section 404(c) determination for Bayou aux Carpes. The CEMVN is compensating for impacts to the three habitat types: fresh marsh, swamp and BLH-Wet within JELA.

BLH-Wet and Swamp

As final modeling was completed and the benefits of the projects refined, the design of the projects considered for mitigating the swamp and BLH-Wet Park/404c impacts presented in PIER #37 were modified. The modeling showed that gapping the northern Millaudon Canal berm, and gapping, instead of degrading, the original JL7 berm (adjacent to Horseshoe Canal) produced sufficient hydrologic benefits so as to mitigate all of the WBV HSDRRS Park/404c swamp impacts. As such, the filling of Horseshoe Canal (part of JL7) and the filling of the keyhole canals off of Bayou Barataria (JL8 and JL9) that were features of the recommended Park/404c swamp mitigation project in PIER #37 were dropped. Since the filling of Horseshoe Canal was dropped, degradation of the JL7 berm for borrow was un-necessary, which greatly reduced the impacts to BLH. Accordingly, the size of the Park/404c BLH-Wet mitigation project (JL14A) was also significantly reduced (Figure A-12).

Fresh Marsh

The design of the JL1B4 project has not changed since completion of the PIER #37.

2.2 MITIGATION PLAN RE-EVALUATION

Construction of most of the HSDRRS system is scheduled to be complete by December 2016, although construction on portions of the system, such as the permanent pumps on the Orleans Parish outfall canals and armoring of some levee reaches, will extend well beyond that date. WRDA 1986, Section 906 (33 U.S.C. 2283(a)) directs that mitigation occur before construction (of the project incurring the impact) or concurrent with construction. To comply with that requirement, the CEMVN has determined that all HSDDRS mitigation project construction contracts should be awarded before or as close as possible to December 2016. This directive

adds an additional constraint on the planning and implementation of the WBV HSDRRS Mitigation projects. Projects in the PIER #37 MP that could be implemented before or closer to the December 2016 date would be ranked higher based on the screening criteria and planning constraints.

The three projects identified in the PIER #37 MP that are at this time considered no longer desirable and/or implementable are the FS swamp and FS BLH-wet Lake Boeuf projects as well as the BLH-Dry portion of the PS BLH-Dry/BLH-Wet mitigation bank project. (The PS BLH-Wet requirement has been satisfied.) The FS swamp and FS BLH-Wet Lake Boeuf projects are considered not desirable due to a lack of support by the non-federal sponsor (NFS), and some members of the public and therefore are not considered acceptable projects. The PS BLH-Dry mitigation bank project currently cannot be implemented due to the lack of in-kind mitigation bank credits in the WBV basin.

Section 2.4.1 of the PIER #37 provides background information on the alternative evaluation process (AEP) utilized to compare projects mitigating for the same habitat type in the final array. In the PIER #37, section 2.8, Data Gaps and Uncertainties, under Implementation it was stated that "If any of the TSMP projects (features of the MP) could not be implemented, the CEMVN would either fall back to one of the other projects evaluated in the AEP in order of ranking for that habitat type or would, in coordination with the resource agencies and the NFS, explore other options to mitigate these impacts". Therefore the projects in the final array for general PS BLH-Dry were re-evaluated in an effort to identify potential substitute projects for this feature in the MP. In addition to evaluating these projects based on ability to implement the project as close to the HSDRRS construction completion deadline as possible, each of the projects in the final array was evaluated in terms of relative cost in light of the WBV HSDRRS Mitigation budget. Projects that were excessively expensive (whose costs would therefore jeopardize implementation of the other features of the MP) were eliminated from further consideration.

The projects in the final array for general FS BLH-Wet and FS Swamp are unacceptable to some members of the public and will undergo plan reformulation. Scoping meetings will be the first step of this process. Scoping meeting(s), which are open to the public, will be held in order for the CEMVN to receive feedback from the public regarding potential alternative mitigation sites that would be acceptable and feasible. The scoping meeting dates and locations will be published in the local paper.

2.3 RE-EVALUATION OF FINAL ARRAY PROJECTS FOR PS BLH-DRY

The following projects evaluated in the PIER #37 AEP for this habitat type were re-evaluated in an effort to find a potential substitute project for the general BLH-Dry portion of the PS BLH-Wet/Dry feature of the MP. Only one of these projects was found to be a feasible replacement project for the General PS BLH-DRY feature for the following reasons:

Table 2-2: Final Array Projects Evaluated in AEP for General PS BLH-Wet/Dry Impacts

Rank	General PS BLH-Wet/Dry Projects	Issue:	Comments:
1	Mitigation Bank	Credit Availability	Only sufficient in basin credits were available to mitigate the BLH-Wet portion of the impacts. At this time, there are not sufficient credits available

			in the WBV basin to satisfy the BLH-dry requirement.
2	Lake Boeuf PS BLH-Dry & BLH-Wet Restoration Project (TSMP)	Acceptability	ROE not granted for this location. The NFS, and some members of the public are against utilizing these lands for mitigation.
3	Bayou Segnette PS BLH-Dry Enhancement Project	None	ROE was granted for this location.
4	Plaquemines, Option 2 PS BLH-Wet Restoration Project	Cost/Acceptability	ROE was not granted for this location. Condemnation would likely be required, increasing the time to implementation. Creating BLH from open water is costly
5	Dufrene Ponds PS BLH-Wet Restoration	Cost/Acceptability	ROE was not granted for this location. Condemnation would likely be required, increasing the time to implementation. Creating BLH from open water is costly

Review of the AEP projects for this habitat type found the Bayou Segnette PS BLH-Dry Enhancement Project would be implementable sooner than any of the others and at a reasonable cost; therefore it becomes the new TSMP for this habitat type. However, based on the evaluations discussed in PIER #37, the purchase of mitigation bank credits remains a preferred alternative to the Bayou Segnette PS BLH-Dry project. Consequently, if sufficient PS BLH mitigation bank credits become available in basin, consistent with the MP identified in PIER #37, those credits would be purchased before building the project at Bayou Segnette.

During design and in the evaluation of the PS BLH-Dry Projects in PIER #37, the Project Delivery Team (PDT) referred to the project herein to compensate for PS BLH-Dry impacts as “Bayou Segnette” due to its location. However, there is an existing mitigation project near Bayou Segnette which is commonly referred to as “Pre-K Mitigation at Bayou Segnette” or “Bayou Segnette” for short. To avoid confusing the two projects, the PDT has changed the name of the PS BLH-Dry Bayou Segnette mitigation project in this document to “Avondale Gardens”. Therefore, from here on, the PS BLH-Dry project previously identified as Bayou Segnette in PIER #37 will be referred to as Avondale Gardens for this modified mitigation plan.

2.3.1 Avondale Gardens (Bayou Segnette) PS BLH-Dry Enhancement

This project would involve enhancing an existing degraded BLH habitat as mitigation for general PS BLH-Dry impacts. The recommended feature is located on the Westbank of Jefferson Parish, Louisiana near Bayou Segnette State Park. Two locations have been identified within the project area, BLH West and BLH East (Appendix A-5).

BLH West is bounded by the Inner Cataouatche Canal on the southwest, a utility easement to the north and the Avondale Garden Canal to the east. The site is currently 1,000 acres. BLH East consists of three (3) sub units; 262 acres, 542 acres, and 189 acres totaling 993 acres. The units are bordered to the south by the Inner Cataouatche Canal, an existing mitigation site currently under construction by USACE to the east, the NOLA Motorsports Park to the north, and the Avondale Gardens Canal to the west.

Only one of the potential sites would be used for the project. Currently, the preferred and anticipated site for project implementation is BLH West. However, if conditions at the BLH West site are not favorable for construction and/or for the long-term success and sustainability of the project or if negotiations with landowner(s) favor purchase of the East site, the project may be implemented at the BLH East site. At the selected site, approximately 920 acres of predominantly invasive and nuisance species would be eradicated and the area planted with native, high quality tree and shrub species. Due to the high density of invasive plant species, the project area would receive multiple herbicidal treatments prior to the initial planting of native, high-quality species. Approximately two months after the initial herbicidal treatment, the mitigation features would be mechanically cleared without grubbing. Large native trees and shrubs would be preserved during the mechanical clearing process to the greatest degree practicable. Woody debris generated during the clearing operations would be chipped and left within the mitigation features. Starting the following spring, multiple inspections and additional herbicidal treatments would be performed to ensure the project site is properly treated through the entire growing season.

Following the clearing activities, the features would be planted with high quality native trees. The planting would be performed in the winter after a full growing season of invasive species removal. The mitigation features would be planted with native BLH tree and shrub species in accordance with the BLH-Wet and BLH-Dry planting guidelines set forth in Appendix I.

2.3.2 Selection Rational

General PS BLH-Dry Impacts

Based on applicable statutes, regulations and guidance, compensating for construction impacts within the basin where those impacts occurred is an important goal. August 2009 USACE Implementation Guidance for WRDA 2007, Section 2036(a) states that mitigation planning efforts should identify and prioritize natural resource restoration as well as preserve existing natural resources that are important for maintaining or improving the ecological functions of the watershed. WRRDA 2014, Section 1040, requires use of a watershed approach for the design of mitigation projects. The USACE/EPA 2008 Mitigation Rule (33 CFR Part 332) also requires use of a watershed approach.

Currently there are insufficient mitigation bank credits available in the watershed to mitigate the PS BLH-Dry requirement. Of the viable options, the Avondale Gardens project is within the same watershed as the impacted habitat. Additionally, a contract for mitigation work at the site could be awarded sooner than any other project. As such, the Avondale Gardens PS BLH-Dry Enhancement in-basin project was selected as the replacement mitigation project (RMP) for the General PS BLH-Dry feature of the WBV HSDRRS MMP.

Avondale Gardens is the RMP for this habitat type because of current lack of mitigation bank credit availability in basin. However, if sufficient mitigation bank credits become available in-basin, consistent with the MP identified in PIER #37, those credits would be purchased before building a the project at Avondale Gardens.

2.3.3 Replacement Mitigation Project

General BLH-Dry Protected Side Impacts

- Avondale Gardens PS BLH-Dry Enhancement

2.4 MODIFIED MITIGATION PLAN (MMP)

The MP presented in the PIER #37 would be modified with the replacement of the recommended project for the general PS BLH-Dry feature. The MMP with the new RMP for PS BLH-Dry feature is as follows:

Table 2-3: WBV HSDRRS Modified Mitigation Plan

Habitat Type	MMP Project	AAHUs Impacted	Mitigation Project Acres
General PS BLH-Wet	Mitigation Bank (already satisfied)	7.27 AAHUS	N/A
General PS BLH-Dry	Avondale Gardens	193 AAHUs	920.00
* General FS BLH-Wet	Lake Boeuf BLH-Wet Restoration (not implementable)	72.04 AAHUs	221.90
*General FS Swamp	Lake Boeuf Swamp Restoration (not implementable)	134.52 AAHUs	319.80
General FS Fresh Marsh	Jean Lafitte (approved plan)	65.92 AAHUs	138.00
Park/404(c) FS BLH-Wet	Jean Lafitte(approved plan)	5.2 AAHUs	8.2
Park/404(c) FS Swamp	Jean Lafitte(approved plan)	8.42 AAHUs	106
Park/404(c)FS Fresh Marsh	Jean Lafitte(approved plan)	3.03 AAHUs	20.40

*These projects are not implementable and are undergoing reformulation

2.5 WVA MODEL AND SEA LEVEL RISE ANALYSES FOR THE MITIGATION PLAN

WVA Model Certification

The WVA Bottomland Hardwood and Swamp Community Models used for the HSDRRS Mitigation completed model were certified in accordance with EC 1105-2-412 and approved for regional use November 8, 2011.

For details on the model reviews please refer to Appendix I of the WBV HSDRRS Mitigation PIER #37.

WVAs

The WVA methodology operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum level to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of: 1) a list of variables that are considered important in characterizing fish and wildlife habitat; 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values; and 3) a mathematical formula that combines the Suitability Index for each variable into a single value for wetland habitat quality. That single value is referred to as the Habitat Suitability Index, or HSI.

The following WVA models (version 1.0) were used for the WBV HSDRRS mitigation effort: 1) CWPPRA, WVA Methodology, Bottomland Hardwood Community Model; 2) CWPPRA, WVA Methodology, Swamp Community Model; 3) and CWPPRA, WVA Methodology, Coastal Marsh Community Model for Fresh/Intermediate Marsh.

The WVA models assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. This standardized, multi-species, habitat-based methodology facilitates the assessment of project-induced impacts on fish and wildlife resources. The swamp WVA model consists of four variables: 1) stand structure; 2) stand maturity; 3) water regime; and 4) salinity. The Bottomland Hardwood Community Model, which was used for BLH-Wet and BLH-Dry features, consists of seven variables: 1) stand structure; 2) stand maturity; 3) understory/midstory; 4) hydrology; 5) size of contiguous forests areas; 6) suitability and traversability of surrounding land uses; and 7) disturbance.

Values for variables used in the models are derived for existing conditions and are estimated for conditions projected into the future if no mitigation efforts are applied (i.e., Future With Out Project or FWOP), and for conditions projected into the future when the recommended mitigation project is implemented (i.e., Future With Project or FWP), providing an index of habitat quality, or habitat suitability, for the period of analysis. The HSI is combined with the acres of habitat to generate a number that is referred to as "habitat units." Expected project impacts/benefits are estimated as the difference in habitat units between the FWP scenario and the FWOP scenario. To allow comparison of WVA benefits to costs for overall project evaluation, total benefits are averaged over a 50-year period, with the result reported as AAHUs. WVA assumptions used for the WBV HSDRRS MP area located in Appendix E of the WBV HSDRRS Mitigation PIER #37.

Sea Level Rise Analysis

Wetland Acreage Predictions Under Increased Sea Level Rise (SLR) Rates

In compliance with USACE policy (EC1165-2-212), the performance of all projects under all three SLR scenarios was analyzed to verify selection of the TSMPs. Potential increases in SLR could affect the performance and therefore ability of a mitigation project to achieve replacement of the services and functions of the impacted habitat types. Because all of the mitigation projects were designed based on the intermediate SLR scenario to account for potential uncertainties in future SLR impacts, the risk of the projects not successfully meeting the mitigation requirement due to SLR has been minimized.

The intent of compensatory mitigation is to offset unavoidable habitat losses by replacing those impacted habitats by restoring (re-establishment or rehabilitation), establishing (creation), or enhancing a naturally functioning system. Once the project meets its long term success criteria, it will experience natural successional phases common to that habitat type. Once the functions and services of the affected habitat have been replaced and the mitigation project becomes a naturally functioning, self-sustaining system which is protected and maintained in perpetuity, the compensatory mitigation obligation is satisfied.

Using USACE-predicted future water levels under the SLR scenarios, those water levels were converted into relative sea level rise (RSLR) rates, incorporating sea level rise effects measured at the gauges and land loss experienced in the extended project area for each project. No operations and maintenance activities were planned for any of the projects based on predicted future elevation changes. The WVA then utilized the RSLR rates and project design to predict

FWP acres left at the end of the 50-year period of analysis. Long term sustainability (percent land left at the end of the period of analysis) was used to analyze the impact the different SLR scenarios had on the project areas. Comparison between the long term sustainability numbers experienced under the intermediate and high SLR scenarios for all of the Corps constructed projects in the final array supported the ranking of the projects; namely all the Corps constructed TSMPs performed the best under the influence of both the intermediate and high SLR scenarios (all projects selected had the highest long term sustainability numbers). Details of the 3 SLR analyses can be found in Appendix B, Table 1.

2.6 DATA GAPS AND UNCERTAINTIES

Impact Assessment

The WBV mitigation requirement has been assessed for all the HSDRRS work through review of the 95-100 percent design plans and as-builts (to the extent as-builts were available). Once as-builts for the whole HSDRRS are complete, a final reassessment would be completed to ensure all impacts from construction of the HSDRRS are fully mitigated. If additional impacts are identified beyond what has been mitigated at that time, then an additional NEPA document would be prepared analyzing options to complete the outstanding mitigation. This document would be made available for public review and comment.

Tropical Storms

Tropical storm events can directly and indirectly contribute to coastal land loss through erosion from increased wave energies, removal and/or scouring of vegetation from storm surge and saltwater intrusion into estuaries and interior wetlands. Wetland loss and degradation of large areas can occur over a short period of time as a result of storms.

Approximately 52,480 acres of marsh were permanently or temporarily converted to open water in the Pontchartrain Basin following Hurricane Katrina, (Barras, 2009). There is a risk that a single storm event, or multiple storms over a short period of time, could significantly reduce or eliminate anticipated benefits of mitigation plans in areas susceptible to storm surge and shearing. All of the features of the TSMPA (and the associated costs and benefits found in Appendices B-7 and B-8 of PIER #37) are at some risk from storm damage. The extent of potential damage is dependent upon several unknown variables, including: the track and intensity of the storm, the development stage of the project, changes in future conditions in the study area, and variability of project performance from forecast conditions due to other factors of risk and uncertainty.

Increased Sea Level Rise and Subsidence

Increased sea level rise coupled with subsidence could convert emergent wetlands to shallow open water, and shallow open water to deeper water habitat, reducing or eliminating the effectiveness of mitigation plans.

Climate Change

Extreme changes in climate (temperature, rain, evaporation, wind) could result in conditions that cannot support the types of habitat restored, reducing the effectiveness of the mitigation plan. Extreme climate change could essentially eliminate the benefits of vegetative plantings, if the change resulted in plant mortality. The monitoring plan for all USACE constructed projects would

monitor the success of any vegetative plantings and includes provisions for replanting if mortalities become such that meeting the required success criteria is in jeopardy.

Errors in Analysis

Future conditions are inherently uncertain. The forecast of future conditions is limited by existing science and technology. Future conditions described in this study are based on an analysis of historic trends and the best available information. Some variation between forecast conditions and reality is certain. Mitigation features were developed in a risk-aware framework to minimize the degree to which these variations would affect planning decisions. However, errors in analysis or discrepancies between forecast and actual conditions could affect plan effectiveness.

All of the models used in this study are abstract mathematical representations of reality. Models simulate complex systems by simplifying real processes into expressions of their most basic variables. These tools assist with finding optimal solutions to problems, testing hypothetical situations, and forecasting future conditions based on observed data. No model can account for all relevant variables in a system. The interpretation of model outputs must consider the limitations, strengths, weaknesses, and assumptions inherent in model inputs and framework. Inaccurate assumptions or input errors could change benefits predicted by models used in this study. The potential for significant changes due to errors has been reduced through technical review, sensitivity analyses, and quality assurance procedures. However, there is inherent risk in reducing complex natural systems into the results of mathematic expressions driven by the simplified interaction of key variables.

WVA Model Uncertainties

WVAs models were run on the entire final array of mitigation projects using site-specific data collected at all project sites except for some portions of the Lake Boeuf projects. Right of entry (ROE) was not available for all portions of the Lake Boeuf projects at the time the WVAs were run. Where ROE was unavailable, assumptions were made based on aerial photography and field data was used from other similar projects for the WVAs at Lake Boeuf. We have reasonable confidence that these data are representative of actual site conditions, and that the WVAs have produced results representative of what would be found if ROE to the sites had been available.

Mitigation Bank Credit Availability

Whether in-basin mitigation banks may be capable of supplying the credits needed to meet any of the mitigation requirements at the time of solicitation is uncertain. Banks currently able to meet the mitigation requirements may not be able to do so at the time of solicitation. In addition, new banks able to meet the mitigation requirement may become approved by the time a solicitation is released. Accordingly, identification of particular banks that could be used to meet the mitigation requirement cannot occur with any degree of certainty and has not been done for this SPIER. Since the bank(s) that may ultimately be selected to provide the necessary mitigation credits is unknown, the existing conditions present at the bank site(s) are similarly unknown. Existing bank habitat quality varies depending on the success criteria met, as specified in the bank's MBI. Typically, as mitigation success criteria are met and the quality of the habitat increases within the bank, more credits are released for purchase.

Implementation

The timing for implementation is an uncertainty that must be considered. If the plan is not implemented in the near future, the existing conditions in the study area could degrade. The impact of the uncertainties associated with the future condition of the study area could increase mitigation costs, decrease mitigation benefits, or both.

If a proposed project becomes infeasible due to difficulties in implementation or changed conditions, the CEMVN will take appropriate action to ensure satisfaction of its mitigation requirement. For those features of the MP for which mitigation bank credits were the initial preferred alternative, if sufficient credits become available within the WBV basin, the preferred default alternative is the purchase of mitigation bank credits based on time to implement, reduced risk of project failure due to CEMVN oversight through its Regulatory program, and relief from operation and maintenance requirements.

The Lake Boeuf portions of the TSMP discussed in the PIER #37 are not considered desirable because they were unacceptable to the NFS, and the local community.

Mitigation for Coastal Zone Impacts

Louisiana Department of Natural Resources (LDNR) administers the Federal Coastal Zone Management Act in Louisiana through its Louisiana Coastal Resources Program (LCRP). Depending on the projects implemented, LDNR may determine that, in its view, such projects do not mitigate for coastal zone impacts. If deemed necessary, additional mitigation for coastal zone impacts may be required and would be assessed and coordinated in subsequent NEPA documents.

2.7 RECOMMENDED ACTION

The recommended action in this SPIER #37a consists of enhancing approximately 920 acres of BLH at the Avondale Gardens site to mitigate193 AAHUs of PS BLH-Dry impacts.

2.8 ALTERNATIVES TO THE RECOMMENDED ACTION

NEPA requires that in analyzing alternatives to a proposed action, a Federal agency 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. This section presents the No Action Alternative in which the recommended action in PIER #37 would be implemented. However, because the project identified in PIER #37 for the general PS BLH-Dry feature of the MP (the purchase of in-basin mitigation bank credits) is not implementable, the CEMVN considers the No Action Alternative not a reasonable alternative that should be selected. For an evaluation of the No Action Alternative defined as not implementing mitigation for HSDRRS construction impacts, see PIER 37. That evaluation is incorporated by reference.

2.8.1 No Action Alternative

The analysis for the No Action alternative considers previous, current, and reasonably foreseeable future projects, which could impact the resources evaluated in the SPIER. The location of these

projects is shown in Appendix A-4. For the purpose of this analysis, a project is considered "reasonably foreseeable" if it meets one of the following criteria:

- USACE authorized ecosystem restoration , flood risk reduction, and/or navigation project with an anticipated Tentatively Selected Plan;
- CWPPRA project authorized at a Phase 2 – construction status;
- Coastal Impact Assistance Program (CIAP) ecosystem restoration or flood risk reduction project which is funded for construction;
- State of Louisiana Surplus-funded ecosystem restoration or flood risk reduction project funded for construction; or
- Louisiana Levee District permitted flood risk reduction project.

Under the no action alternative, the Barataria basin would continue a trend of land loss caused by both natural factors such as subsidence, erosion, tropical storms and sea level rise, and human factors such as flood risk reduction, canal dredging, development, interruption of accretion processes and oil and gas exploration.

Appendices B-10, B-11 and B-12 includes a of list projects involving wetland or ecosystem restoration activities considered part of the no action alternative that could counter, to a degree, the current land loss trends throughout the basin and the progression of wetlands to open water. In addition to the name, general location, and a general description of each project, the tables note whether a project directly overlaps with one of the mitigation projects evaluated in this SPIER or whether the extended boundary of the project's wetland value assessment overlaps with one of the mitigation projects evaluated in this SPIER.

In addition to these ecosystem restoration projects, a number of flood risk reduction and navigation projects have been built or would be built within the Barataria basin that would continue to influence the hydrodynamics within the basin. Previously constructed flood risk reduction and navigation projects include:

- Algiers Lock: The lock, constructed in 1956, provides a navigation passage between the Mississippi River and the Gulf Intracoastal Waterway via the Algiers Canal. The lock is operated and maintained by the USACE (American Canal Society, 1979).
- Algiers Non-federal Levee (Donner Canal Levee): This segment of the non-federal levee was built prior to the construction of the Algiers Canal in 1956 near the southern boundary between the Orleans and Jefferson Parish line to provide flood protection to the communities in the vicinity of Algiers and Cutoff in Orleans Parish, Louisiana. The levee is owned and under the authority of the Algiers Levee District (SLFPAW, 2012).
- Bayou Gauche Ring Levee (Sunset Levee): The construction of levees and pumping stations in the 1970s to prevent tidal surges from flooding developed areas in near the community of Paradis in northern St. Charles Parish (Schiltz, 2011).
- Coastal Protection and Restoration Authority (CPRA) and North Lafourche Conservation, Levee and Drainage District, Valentine to Larose Levee, TE-111: To provide flood protection improvements to the current flood protection system along approximately 2,000 linear feet of levee along Bayou Lafourche, from the town of Valentine to the town of Larose. The project is part of the Lockport-to-Larose Levee Project. The project was constructed in 2014 (CPRA, 2015).

- Empire Lock: The lock is located on the west bank of the Mississippi River at Mississippi River mile 29.5 and was originally constructed prior to 1936 to provide navigation between the Mississippi River and the Gulf of Mexico through the Empire Canal. It is operated by the Louisiana Department of Transportation and Development (American Canal Society, 2012a).
- English Turn Non-Federal Levee (Donner Canal Levee): This segment of the non-federal levee was built prior to the construction of the Algiers Canal in 1956 to provide flood protection to the communities east of Algiers Canal on the west bank of Orleans Parish, Louisiana. The levee extends westerly along the southern Orleans Parish line from the west bank levee of the Mississippi River near Caernarvon and ties into the West Bank and Vicinity –East of Algiers federal levee near Highway 407. The levee is owned and under the authority of the Algiers Levee District (SLFPAW, 2012).
- Gulf Intracoastal Waterway (GIWW) Navigation System: A continuous waterway located inland and parallel to the Gulf of Mexico coast extending approximately 1,100 miles from Brownsville, Texas to Carrabelle, Florida. The federally authorized navigation project was designed to provide interstate commerce among the Gulf Coast States (Alperin, 1983; American Canal Society, 2012b).
- Harvey Canal Lock: The lock was constructed in the early 1930s by the USACE to provide a navigational passage between the Mississippi River and the GIWW via the Harvey Canal. The lock is operated and maintained by the USACE. (American Canal Society, 2012c)
- Mississippi River Levees: Mississippi River & Tributaries (MR&T) Project: The flood control plan authorized by the Flood Control Act of 1928 designed to control a Mississippi River flooding event which is greater than the 1927 flood within the lower Mississippi River Valley. The project includes levees, floodways, channel improvements and stabilization as well as tributary basin improvements (USACE, 2004a).
- Mississippi River Navigation Operations and Maintenance: Operations and maintenance of the Mississippi River by the USACE for navigational purposes.
- Oakville to La Reussite Non-federal Levee: The non-federal hurricane protection levee located in Plaquemines Parish was built in the late 1960s, early 1970s to reduce flood risk in the vicinity of the communities of Oakville, Jesuit Bend, Ollie, Naomi and La Reussite. The levee system is under the authority of the Plaquemines Parish West Bank Levee District and currently varies in elevation from 2 feet to 7 feet (USACE, 2009).
- State of Louisiana-Surplus Fund 2007 project, East of Harvey Canal Interim Hurricane Protection – Phase 1: The project was designed and constructed by the Southeast Flood Protection Authority - West as an interim non-federal flood protection levee, prior to the WBV HSDRRS floodwall construction, along the east side of the Harvey Canal from the sector gate at Lapalco Boulevard to the existing WBV levee at Hero Pump Station. The interim earthen flood protection levee was completed in July 2009. Due to its low elevation and the construction of the WBV HSDRSS in the area, it currently serves a temporary flood risk reduction from minor daily flooding events and closures of the West Closure Complex. The second phase of the project involves a study to evaluate the feasibility of elevating the interim levee to a permanent flood protection structure. Phase 2 is currently on hold in the planning phase. (McMenis 2012; CPRA 2012a)
- State of Louisiana-Surplus Fund 2007 project, Lafitte Tidal Protection, BA-75-3, 2007: The project is bordered by Bayou Barataria on the west, Goose Bayou to the north, The Pen to the west and Reserve Canal to the south. This project involves the uplift of existing levee segments originally constructed by the West Jefferson Levee District on the western

shore of The Pen near the community of Lafitte, Louisiana to provide flood risk reduction to the community of Lafitte, Louisiana. Construction was completed. The portion of the project constructed by West Jefferson Levee District consists of earthen levees reinforced with sheet pile along the northwestern shore of The Pen from Goose Bayou to Reserve Canal to provide limited flood risk reduction to the community of Lafitte, Louisiana. (Harper, 2012; CPRA 2012a)

- West Plaquemines Non-federal Levee: The non-federal hurricane protection levee was constructed in the late 1960s, early 1970s by the Plaquemines Parish government and private entities to reduce flooding risk to the communities between La Reussite and Point Celeste, Louisiana. The levee system is under the authority of the Plaquemines Parish West Bank Levee District and currently varies in elevation from 2 feet to 7 feet. (USACE, 2009).

Flood risk reduction and navigation projects currently under construction or reasonably foreseeable include:

- HSDRRS, WBV: The federal HSDRRS is currently under construction by the USACE to provide flood protection against a storm which has a 1% chance of occurring in a given year (100-year level of protection). The 91-mile risk reduction system includes the construction, enhancement and/or replacement of levees, floodwalls, floodgates, closure structures, and pumping stations to provide storm damage risk reduction to the New Orleans Metropolitan Area on the west bank of the Mississippi River including portions of Jefferson, Orleans, Plaquemines, and St. Charles parishes. The project was originally authorized and modified by the Water Resources Development Acts of 1986, 1996, 1999 and became known as the West Bank and Vicinity, Louisiana Hurricane Protection Project (WBVHPP). Additional emergency supplemental appropriations aimed at improving the system were authorized by Congress following Hurricane Katrina and include 3rd Supplemental-2006 (PL 109-148, Title 1,Chapter 3, [119 STAT. 2761-2763]), 4th Supplemental-2006 (PL 109-234, Title II, Chapter 3, [120 STAT. 454-455]), 5th Supplemental-2007 (PL 110-28, Title IV, Chapter3, [121 STAT. 153-154]), 6th Supplemental-2008 (PL 110-252, Title III, Chapter 3, [122 STAT. 2349-2350]), and 7th Supplemental-2009 (PL 110-329 Title I, Chapter 3 [122 STAT. 3589-3590]). Construction began in March 2007 and is over 92% complete. Anticipated completion date for the entire WBV HSDRRS system is December 2016 (USACE, 2012a; Salaam, 2015).

- Larose to Golden Meadow, Louisiana, Hurricane Protection Project (LGM): The project, originally authorized by the Flood Control Act of 1965 (PL-89-298), consists of approximately 48 miles of levees and floodwalls including two floodgates across Bayou Lafourche at the project's northern and southern ends. Eight (8) pumping stations were constructed in place of the authorized gravity drainage structures at the request and additional expense of the South Lafourche Levee District. The project is designed to protect the communities along the east and west banks of Bayou Lafourche, extending from Larose to just south of Golden Meadow in Lafourche Parish, Louisiana from tidal and hurricane surge flooding. The majority of the original 1965 project has been constructed as authorized, however due to subsidence and datum changes the project is not currently at the 1965 authorized elevations. A Post-Authorization Study(PAS) was initiated in 2009 to assess potential modifications to the system given changes in conditions and post-Katrina design criteria, however, after further investigations, it was determined that additional authorization would be required to address modifications to constructed features. The additional guidance focused the scope of the study to unconstructed

features in accordance with the 1965 authorization. The study efforts are complete and a final report is expected by July 2015. The results of the investigation identified only one unconstructed feature of the project and it is expected to be complete by 2018. (Wilson-Prater, 2015; USACE, 1985).New Orleans to Venice (NOV) levee project, St Jude to Venice: The federal hurricane protection levee project, originally authorized by the Flood Control Act of 1962, was designed to reduce the risk of flooding to the communities between St. Jude to Venice, Louisiana located on the west bank of the Mississippi River including the back levee in Plaquemines Parish. The project was approximately 85 percent complete prior to Hurricane Katrina. Following Hurricane Katrina, a levee upgrade was authorized by Congress to restore, armor, and accelerate the completion of the levees to the authorized design grade of 50-year (2%) level of storm risk reduction through additional emergency supplemental appropriations 3rd Supplemental-2006 (PL 109-148, Title 1,Chapter 3, [119 STAT. 2761-2763]), 4th Supplemental-2006 (PL 109-234, Title II, Chapter 3, [120 STAT. 454-455]), 6th Supplemental-2008 (PL 110-252, Title III, Chapter 3, [122 STAT. 2349-2350]), and 7th Supplemental-2009 (PL 110-329 Title I, Chapter 3 [122 STAT. 3589-3590]). Anticipated upgrades began in September 2012 and construction is expected to be completed by Fall 2020 (USACE, 2011b; Harris, 2015).

- New Orleans to Venice (NOV), Incorporation of Non-Federal Levees (NFL) into NOV: The NFL reduces the risk of flood inundation and protects evacuation routes for the communities between Oakville and St. Jude, Louisiana located on the west bank of the Mississippi River in upper Plaquemines Parish. The NFL connects to the West Bank and Vicinity HSDRRS levees at the Eastern Tie-In near Oakville, Louisiana. Proposed construction will heighten, strengthen and incorporate the NFL, into the federal NOV levee system. The levee components have been authorized by Congress following Hurricane Katrina to provide storm risk reduction through additional emergency supplemental appropriations 4th Supplemental-2006 (PL 109-234, Title II, Chapter 3, [120 STAT. 454-455]), 5th Supplemental-2007 (PL 110-28, Title IV, Chapter3, [121 STAT. 153-154]), and 6th Supplemental-2008 (PL 110-252, Title III, Chapter 3, [122 STAT. 2349-2350])). The Corps Risk Management Center (RMC) recently performed a risk analysis on certain reaches (reaches close to design completion and structures were omitted from the analysis) of the NFL and NOV levee systems. After evaluating the RMC risk assessment and recommendations, the USACE New Orleans/Vicksburg District (MVN/MVK) team determined that adapting the HSDRRS design guidelines for NOV and NFL represented the best opportunity to fulfill the project authority and provide maximum risk reduction with available funds. MVN/MVK team has requested concurrence with the RMC's recommendations and path forward from USACEHQ via memorandum through Mississippi Valley Division (MVD). Anticipated upgrades began in September 2012 and construction is expected to be completed by fall 2020. (USACE, 2011a; Harris, 2015).

- St. Charles Parish Levee – West Bank Magnolia Ridge Phase 1 (BA-85-1): The reduction to the risk of flooding to the communities near Boutte and Paradis, Louisiana on the west bank of Magnolia Ridge in St. Charles Parish by the construction of (Part 1) Magnolia Ridge Pump Station, (Part 2) upgrade of the existing non-federal earthen levee to meet the USACE standards with an estimated crown elevation of seven feet, (Part 3) Paradis Canal Gates, and (Part 4) pipeline T-walls. Part 1 Engineering and Design (E&D) is currently 60% in, with anticipated start and end construction dates of June 2016 and December 2017 respectively pending funding being secured. Part 2 E&D is currently 5% complete with anticipated start and end construction dates of January 2017 and December 2017 respectively pending funding being secured. Part 3 E&D is currently is 5% complete with anticipated start and end construction dates of July 2017 and December 2018

respectively pending funding being secured. Part 4 is pending E&D task order, with anticipated start and end construction dates of January 2018 and December 2018 respectively pending funding being secured. (Schiltz, 2012; St. Charles Parish, 2013; St. Charles Parish, 2015).

- St. Charles Parish Levee – West Bank Willowridge Phase 2 (BA-85-2): Construction of a non-federal levee with estimated crown elevation of seven feet, a pumping station and gates to reduce the risk of flooding in the vicinity of Willowridge in St. Charles Parish. The project is divided into three parts. Part 1 includes a seven feet levee lift between Peterson Canal and Willowridge Drive which is anticipated for completion in May 2015. Part 2 includes the construction of the Willowridge Pump Station and Part 3 includes the construction of tidal interchange structures and a seven foot levee lift from Willowridge Drive to Davis Diversion. The anticipated construction start dates for parts 2 and 3 are August 2015 and September 2015 respectively and construction end dates are December 2016 and September 2016 respectively (Schiltz, 2012; St Charles Parish, 2013; St. Charles Parish, 2015).

- St. Charles Parish Levee – West Bank Ellington Phase 3 (BA-85-3): The reduction to the risk of flooding in the vicinity of Ellington in St. Charles Parish, La but the construction of (Part 1) uplift non-federal levee with estimated crown elevation of seven feet, (Part 2) Ellington pump station, and (Part 3) pump stations and pipeline T-walls. Part 1 E&D is currently 70% complete in with anticipated begin and end construction dates of October 2015 and October 2017 respectively. Part 2 includes the construction of Ellington pump station which is currently 90% complete in E&D with anticipated begin and end construction dates of January 2017 and June 2018 respectively pending secured funding. Part 3 includes the construction of pump stations and pipeline T-walls which are currently 90% complete E&D in with anticipated begin and end construction dates of July 2018 and December 2019 respectively pending secured funding (Schiltz, 2012; St. Charles Parish, 2013; St. Charles Parish, 2015).

- State of Louisiana-Surplus Fund 2007 project, Jean Lafitte Tidal Protection, BA-75-1, 2007: This project involves the enhancement of existing levees originally constructed by the West Jefferson Levee District on the eastern and southern side of the community of Jean Lafitte, Louisiana. It also includes new levee construction and installation of floodwalls and floodgates along the eastern bank of Bayou Barataria and in gaps in the levee system on the eastern and southern side of Jean Lafitte, Louisiana to provide flood protection to the community within the Fischer School Basin. The project will be implemented by Jefferson Parish and the Lafitte Area Independent Levee District. Construction began in February 2014 with an anticipation completion date of September 2015. Funding for construction is also provided through Surplus Fund 2009 project, BA-75-4, Lafitte Levee Protection (Harper, 2012; CPRA, 2012a; CPRA, 2015).

3. AFFECTED ENVIRONMENT

3.1 ENVIRONMENTAL SETTING

WBV Basin

The WBV HSDRRS Mitigation Basin is bounded to the north by the Mississippi River starting east in Ascension Parish to west in Plaquemines Parish. In Plaquemines Parish, the boundary

proceeds south then north and west bordering the southern portion of Lake Salvador before turning south again to Golden Meadow. It then turns northwest to Assumption Parish (Appendix A-2). Major features in the WBV Mitigation basin include: Lakes Cataouatche and Salvador and their adjacent wetlands; Lac des Allemands and its adjacent wetlands and the Mississippi River.

Geomorphic and Physiographic Setting

Most of the present landmass of southeast LA was formed by deltaic processes of the Mississippi River. The WBV Basin is bounded on each side by a distributary ridge formed by the present and a former channel of the Mississippi River. Several large lakes occur between these ridges. The southern half of the basin consists of tidally influenced marshes. Freshwater and sediment input into the basin is limited by the flood protection levees along the Mississippi River and the closure of Bayou Lafourche at Donaldsonville. Riverine input into the basin's wetlands occurs through the Davis Pond diversion and the Naomi and West Pointe a la Hache siphons.

Climate

The West Bank 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.

Wetlands and Other Surface Waters

Wet BLH forests in the WBV Basin are dominated by water oak, nuttall oak, green ash, red maple, and pignut hickory. Fresh marsh is dominated by cattail, water lily, iris, duckweed, cutgrass, wild rice, bullwhip and bulltongue. Swamps are dominated by bald cypress and water tupelo, which have regenerated since extensive logging of virgin forest more than 70 years ago. The Louisiana swamps generally lack a mature canopy as was present in the forests before logging occurred and have lower productivity where isolated from riverine influences (Shaffer et al., 2003). The greatest potential to restore and sustain coastal forests is near the Mississippi River where freshwater reintroductions may be implemented. Other local sources of freshwater may be municipal wastewater or storm water. Economically important natural resources associated with these swamps include fisheries of crawfish, blue catfish, and channel catfish, as well as logging. See Appendix A-1 for the habitats and their quantity found in the WBV Basin and Appendix B-2 for a list of plant species referenced in this document and their scientific names.

Wildlife

Louisiana's coastal wetlands support numerous neotropical and other migratory avian species, such as rails, gallinules, shorebirds, wading birds, and numerous songbirds. The rigors of long distance flight require most neotropical migratory birds to rest and refuel several times before they reach their final destination. Louisiana coastal wetlands provide neotropical migratory birds essential stopover habitat on their annual migration routes. The coastal wetlands in the WBV Basin provide important fish and wildlife habitats, especially transitional habitat between estuarine and marine environments, used for shelter, nesting, feeding, roosting, cover, nursery, 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, wild hog 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 (LCWCRTF & WCRA, 1999).

Open water habitats such as Lakes Salvador and Cataouatche provide wintering and multiple use functions for brown pelicans, seabirds, and other open water residents and migrants. Open water habitats 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 (LCWCRTF & WCRA, 1999).

The bald eagle is protected under the Bald and Golden Eagle Protection Act ((BGEPA), and the Migratory Bird Treaty Act ((MBTA) 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). In southeastern Louisiana parishes, eagles typically nest in mature trees (e.g., bald cypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water.

Colonial nesting waterbirds are protected under the Migratory Bird Treaty Act ((MBTA) 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). Colonial nesting waterbirds are generally considered all species of herons, egrets, night herons, ibis, roseate spoonbill, anhinga and cormorants. These birds typically nest and forage in wetlands and open water areas.

A list of common wildlife species found in the WBV basin and their scientific names are located in Appendix B-3.

Threatened and Endangered Species

Within the State of Louisiana there are 33 animal and three plant species (some with critical habitat) under the jurisdiction of the USFWS and/or the NMFS, presently classified as endangered or threatened. The USFWS and the NMFS share jurisdictional responsibility for sea turtles and the Gulf sturgeon. Other species that were listed on the Endangered Species List but have since been de-listed because population levels have improved are the bald eagle and the 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. See Appendix B-4 for listed species in the project area.

Fisheries, Aquatic Resources, and Water Quality

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.

Major water bodies within the basin that may be impacted include Lac des Allemands, Lake Boeuf, Bayou Gauche, Lake Salvador, Lake Cataouatche, and the Mississippi River. These water bodies and adjacent wetlands provide nursery and foraging habitats which support varieties of

economically, recreationally, and ecologically important marine and freshwater fishery species, including shrimp, bay anchovy, gizzard shad, buffalo, yellow bass, largemouth bass, sunfish, catfish, spotted gar, bowfin, mosquitofish, least killifish, sailfin molly, striped mullet, Atlantic croaker, Gulf menhaden, spotted and sand sea trout, southern flounder, black drum, and blue crab (see Appendix B-5 for full list of species). 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 WBV Basin encompasses parts of three U.S. Geological Survey (USGS) Cataloging Units: 08090301 – East Central Louisiana Coastal Watershed, 08070100 - Lower Mississippi - Baton Rouge and 08090100 – Lower Mississippi-New Orleans. Within each of these Cataloging Units, the state has delineated hydrologic units, or sub-segments, within the state.

Section 305(b) of the Clean Water Act requires each state to monitor and report on surface and groundwater quality, which the Environmental Protection Agency (EPA) synthesizes into a report to Congress. The Louisiana Department of Environmental Quality (LDEQ) produces a Section 305(b) Water Quality Report that provides monitoring data and water quality summaries for hydrologic units (sub-segments) throughout the state.

Water quality criteria are elements of state water quality standards that represent the quality of water that will support a particular designated use. These criteria are expressed as constituent concentrations, levels, or narrative statements. There are currently eight designated uses adopted for Louisiana's surface waters: Primary Contact Recreation, Secondary Contact Recreation, Fish and Wildlife Propagation ("subcategory" for Limited Aquatic life and Wildlife), Drinking Water Supply, Oyster Propagation, Agriculture, and Outstanding Natural Resource Waters. Appendix A, figure 3 shows those hydrologic units or sub-segments in the WBV basin that contain water bodies that are considered "impaired" according to the 2010 Integrated Report.

Essential Fish Habitat

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 of the National Oceanic and Atmospheric Administration, regional Fishery Management Councils (FMC), and other Federal agencies to identify and protect EFH of economically important marine and estuarine fisheries. 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), sub-tidal vegetation (sea grasses and algae), and adjacent intertidal vegetation (marshes and mangroves). The existing emergent wetlands and shallow open water within the WBV Basin provide important habitat that may be classified as 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. Historically and currently, the area provides valuable recreational and commercial fishing habitat, oyster culture, and nursery areas for a wide variety of finfish and shellfish

Table 3-1 lists the expected salinity zones in WBV region mitigation sites and the abundance of the managed species expected (NOAA Mapper:

http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html or download of datasets at http://www.habitat.noaa.gov/protection/efh/newInv/index.html). Table 3-2 shows the EFH for the managed species expected in those areas.

Table 3-1: Essential Fish Habitat for Life Stages

Species	Life Stage	Essential Fish Habitat
Brown Shrimp	Adults	Gulf of Mexico <110 m, Silt sand, muddy sand
	Juvenile	Marsh edge, SAV, tidal creeks, inner marsh
White Shrimp	Adults	Gulf of Mexico <33 m, Silt, soft mud
	Juvenile	Marsh edge, SAV, marsh ponds, inner marsh, oyster reefs
Red Drum	Adults	Gulf of Mexico & estuarine mud bottoms, oyster reef
	Juvenile	SAV, estuarine mud bottoms, marsh/water interface
Coastal Migratory Pelagic	Juvenile	Beaches, estuaries, inlets, Coastal & shelf, Gulf, pelagic
Reef fish	Juvenile	SAV, mangroves, sand, mud, reefs, hard bottom

Cultural Resources

Historic and prehistoric sites in the WBV Basin tend to be located along the natural levees of waterways that were used as transportation routes. The Mississippi River was the main means of transportation and its natural levees were the choice location for settlement. The surrounding coastal lakes and areas were gradually explored for natural resources and utilized as well. As the population along the Mississippi River increased, land along its natural levees became scarce. Settlers began to move further outward following waterways such as Bayou Lafourche, Bayou Segnette, Bayou Verret, Bayou des Allemands, and other bayous and rivers in the coastal area. Borrow sources located in Lakes Salvador and Cataouatche also have the potential to contain submerged cultural resources.

Prehistoric sites include hunting and food processing camps, hamlets, and village sites. Native Americans relied on hunting, fishing, and gathering of plants. Discovered archeological sites in the basin represent the continuous span of human occupation in Louisiana's Mississippi River Delta region, from the Tchefuncte period (600-200 B.C.) to the Plaquemine period (a.d. 1000-1200).

Types of historic sites include domestic buildings, plantation sites, farmsteads, military sites, commercial sites, industrial sites, boat landings, and hunting and fishing camps along the coast. In addition to terrestrial historic sites, the project area has the potential to contain historic shipwrecks. Bayou Lafourche, Bayou Segnette, Bayou des Allemands, as well as the other bayous in the area, have been a major means of transportation in the Louisiana "bayou country" since prehistoric times. The smaller bayous that fill the basin connecting larger bayous and lakes were also used by the local Native Americans as well as by trappers, hunters, and fishermen. Watercraft from all time periods could be present in the area. Most of the vessels used historically in this area were vernacular watercrafts.

In the early 1900s, various subsistence activities that were initially developed prior to the 20th century became more commercial in nature. Moss, first gathered for the making of beds and as filler in the construction of houses, was commercially processed and sold to the upholstery business as stuffing for furniture and car seats. Following World War II, the moss industry declined as the result of the wide availability of foam rubber and the increased cost of gathering moss. The lumber industry that had flourished in the late 1800s continued to grow with the harvesting of cypress throughout south Louisiana. Lumber towns and sawmills dotted the landscape until most of the virgin cypress forests were cut and the lumber companies moved westward.

The trapping of animals in south Louisiana began with Native Americans and continued on into the 1900s. Otter, muskrat, and nutria were trapped in the marshes and provided furs for the garment industry all over the world. Hunting camps and processing stations were located throughout the marsh. The demand for furs has declined over the years. Nutria are trapped today for food and bounties, to keep the population from expanding and destroying the marsh, or from causing problems in municipal canals.

Seafood, one of the most important natural resources in south Louisiana, has continued to become more important to the economy of Louisiana. In the middle of the 19th century, methods of preservation (such as the drying of shrimp and canning of oysters) made it possible to export seafood. The introduction of the gasoline motor and refrigeration allowed fishermen greater access to markets in New Orleans and the larger towns inland from the coast. Seafood processing camps that had been established all over the coast in the 1800s, including Manila Village, Bayou St. Malo, and the Isle de Caminada, were abandoned after being hit by numerous tropical storms and hurricanes. In the 1900s, many of these fishermen established new settlement and seafood processing businesses along the major waterways leading away from the coast. Fishing remains a major economic activity in south Louisiana.

Rice and sugar remained major cash crops across the coastal parishes. By the eve of World War II, bad weather, plant diseases, and economic policies had almost destroyed sugar production in south Louisiana. Truck farming of vegetables and citrus to towns and cities provided fresh vegetables at local markets. Other industries developed in south Louisiana in the 1900s that have shaped the economy of the state. The oil industry began in the early 1900s and continues to be a major industry. Large oil fields are located in the marshy areas of south Louisiana and offshore. Pockets of sulfur and salt are located across south Louisiana. The extraction of these natural resources became major industrial activities.

All of these economic activities have contributed to the constructed environment of south Louisiana. In addition to the residential homes, public buildings, and commercial buildings, these industries have contributed to the south Louisiana landscape and to the heritage of the area. Historic standing structures, archaeological sites, and landscape features associated with man's activities in the coastal area may be significant cultural resources. The State of Louisiana, Office of Cultural Development's Division of Archaeology maintains information on over 12,000 archaeological sites and thousands of historic standing structures.

Recreational Resources

Recreation areas in the WBV Basin include Salvador Wildlife Management Area (WMA), Timken WMA, JELA, Bayou Segnette State Park, and Lake Boeuf Wildlife Management Area. Other recreational features are provided by parishes and historic communities that attract visitors to a variety of heritage and cultural festivals, historical sites, parks offering opportunities for passive and active recreation that include tennis courts, soccer and softball fields, swimming pools, and

golf courses. There are 37 boat launches throughout the WBV Basin. Appendix B-7 shows the number of fishing licenses, hunting licenses and boat registrations as well as the percent of state licenses and boat registrations in the WBV Basin.

The Louisiana Statewide Comprehensive Outdoor Recreation Plan (SCORP) provides a statewide inventory of recreation resources and identifies recreational needs. While regions defined in the SCORP do not fit perfectly within the WBV Basin, SCORP Region 1 and 3 and includes the WBV Basin. The state- and Federally-managed areas described previously represent just a portion of the more than 282,000 acres of recreational facilities inventoried for SCORP Region 1. Federal, state, parish, and municipal public recreational facilities within Region 1 provide more than 196,000 acres for hunting, 123 boat ramps, 1,833 picnic tables, 10 beaches, and 320-acres for camping with 263 tent sites and 1,739 trailer sites. Region 3 includes more than 107,000-acres for hunting, 194 boat lanes at 105 boat ramps; 131-acres with 365 tables for picnicking; 1 beach of 37-acres; and 71-acres for camping, 34 tent-sites and 422 trailer-sites. In a 2008 Residents Survey, most important activities for residents in Region 1 are visiting natural places, fishing, and visiting botanic gardens. Residents in Region 3 are identified fishing, visiting natural places, and public access to state waters as most important. Within the same survey, Region 1 residents had the highest participation rates in the following activities: driving for pleasure, fishing, and camping. Region 3 residents participated most in driving for pleasure, fishing, swimming, and camping.

Funds from the Land and Water Conservation Fund (L&WCF) have supported 65 different recreational projects within the same parishes as the WBV Basin since 1964. L&WCF provides funding for numerous boat ramps, other facilities or lands that enhance opportunities for recreation.

The following is a description of the federal and state recreation areas within the WBV Basin:

Salvador Wildlife Management Area

Salvador WMA is 31,520 acres and is located in St. Charles Parish, along the northwestern shore of Lake Salvador about 12 miles southwest of New Orleans. Access is limited to boat travel via three major routes: Bayou Segnette from Westwego into Lake Cataouatche, then west to area; Sellers Canal to Bayou Verrett into Lake Cataouatche, then west to area; or via Bayou Des Allemands. Accessibility into the interior marshes is excellent via the many canals, bayous, and ditches on the area.

Game species include waterfowl, deer, rabbits, squirrels, rails, gallinules, and snipe. Furbearing animals present are mink, nutria, muskrat, raccoon, opossum, and otter. Salvador supports a large population of alligators and provides nesting habitat for the bald eagle.

Excellent freshwater fishing is available on Lake Salvador. Bass, bream, crappie, catfish, drum, and garfish are abundant. Commercial fishing is prohibited on the WMA. Non-consumptive forms of recreation available are boating, nature study, and picnicking.

Timken Wildlife Management Area

The Timken WMA is a 3,000-acre marsh island that is leased by the City Park Commission of New Orleans. The area is identified as Couba Island on maps; however, it has been named the Timken WMA after the former landowner who donated it to the City Park Commission of New Orleans. The area is located immediately east of the Salvador Wildlife Management Area and can

be accessed by Lake Cataouatche. Like the Salvador WMA, Timken WMA consists of fresh to intermediate marsh and provides excellent habitat for waterfowl, furbearers, and alligators. Game species include waterfowl, deer, rabbits, squirrels, rails, gallinules, and snipe. Furbearing animals present are mink, nutria, muskrat raccoon, opossum, and otter.

Jean Lafitte National Historical Park and Preserve

JELA consists of six physically separated sites, including the Acadian Cultural Center; Prairie Acadian Cultural Center; Wetlands Acadian Cultural Center; Barataria Preserve; Chalmette Battlefield and National Cemetery; and French Quarter Visitor Center. Only the Barataria Preserve Unit is within the project area. The Barataria Preserve features trails and waterways through bottomland hardwood forests, swamps, and marsh. Additionally, there is an Education Center providing curriculum-based programming for school groups and a visitor center providing a film and exhibits. Hunting; trapping; and fishing, including commercial fishing, is permitted by the NPS at the preserve.

Bayou Segnette State Park

Bayou Segnette State Park offers recreational opportunities including, boating, fishing, canoeing, picnicking, playgrounds, a one mile nature trail, boat launches and a wave pool. Bass, catfish, bream, perch, redfish and trout are common in the area. Twenty waterfront cabins are available for overnight rental, as well as, 98 locations for RV and tent camping. The park also includes comfort stations with showers and laundry, an RV dump station, and a group camp with kitchen and dormitories for up to 120 people.

Lake Bouef WMA

The Lake Boeuf WMA is located east of Louisiana Highway 308, north of Raceland, Louisiana. The area includes approximately 800 acres of fresh marsh/swamp habitat and is accessible only by boat via Theriot Canal, Foret Canal, or Lake Boeuf. Hunting opportunities include archery, small game, waterfowl, and unmarked hogs.

Aesthetic Resources

The WBV Basin is a large area that includes an abundance of water resources, landscape types, terrain, historical and culturally significant features. In terms of public and institutional significance, the area boasts the Great River Road, which runs adjacent to the Mississippi River Road, the Louisiana Scenic Bayou Byway, which runs from Donaldsonville south towards Houma, and the Wetlands Cultural Trail, which is made up of a plethora of roadways crisscrossing the area around Houma and southeast towards Larose and Golden Meadow. The byways in the basin range from state designated roads to All American Roads.

Land use varies across the spectrum, but the majority of uses include residential, agricultural and some light highway and commercial. There are a great number of urban areas including that of southern New Orleans (including Algiers, Harvey, Gretna, Westwego, Estelle, Timberlane, a.k.a. “the West Bank), and other smaller communities such as Larose, Raceland, and Donaldsonville, just to name a few. The majority of communities throughout the basin are cloistered along the banks of major waterways and roadways where natural levees and ridges can be found.

With the variety of land uses present, user activity is relatively high throughout the region. The region is filled with commuters going to and from the New Orleans Metro Area for work, hunters and fishermen, and shrimping and shipping, just to name a few.

Access throughout is abundant with major U.S. Highways and State Highways crisscrossing the region. This being said, there are still many areas and thousands of acres that are remote; where access can only be attained via watercraft.

Air Quality

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, particulate matter (PM) less than 10 microns in diameter (PM_{10}), PM less than 2.5 microns in diameter ($PM_{2.5}$), 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 3-5.

Areas that meet the NAAQS for a criteria pollutant are designated as being “in attainment;” areas where a criteria pollutant level exceeds the NAAQS are designated as being “in nonattainment.” Currently, all parishes in the WBV Basin are in attainment of NAAQS standards.

Noise

The Noise Control Act of 1972 both regulates and promotes an environment for all Americans free from noise that jeopardizes their health or welfare. The Occupational Safety and Health Standards (29 CFR, part 1910) set standards regarding protection against the effects of noise exposure. Noise levels exceeding sound pressure levels are technically significant because noise can negatively affect the physiological or psychological well-being of an individual (Kryter, 1994). These effects can range from annoyance to adverse physiological responses, including permanent or temporary loss of hearing, and other types of disturbance to humans and animals, including disruption of colonial nesting birds. Noise is publicly significant because of the public's concern for the potential annoyance and adverse effects of noise on humans and wildlife.

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by EPA and has been adopted by most Federal agencies (USEPA 1974). A DNL of 65 weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by EPA as a level below which there is no adverse impact (USEPA 1974).

Most parishes in the WBV Basin have noise ordinances addressing loud machinery. Noise is typically associated with human activities and habitations, such as the operation of commercial and recreational boats; water vessels; air boats, and other recreational vehicles; aircraft; machinery and motors; and human residential-related noise (air conditioner, lawn mower, etc.).

The Corps constructed project areas are generally remote and uninhabited. The noise from distant urban areas surrounding the uninhabited portions of the project area contributes little, if any, to the natural noise levels of the area.

Socioeconomics/Land Use, Environmental Justice, Transportation, Navigation, and Commercial Fisheries

The WBV HSDDRS construction impacts would be mitigated in the Barataria Basin, between Bayou Lafourche and the Mississippi River. These resources are institutionally significant because of the NEPA of 1969; the Estuary Protection Act; the Clean Water Act; the River and Harbors Acts; the Watershed Protection and Flood Protection Act; and the Water Resources Development Acts. Of particular relevance is the degree to which the recommended action affects public health, safety, and economic well-being and the quality of the human environment. These resources are technically significant because the social and economic welfare of the Nation may be positively or adversely impacted by the recommended action. These resources are publicly significant because of the public's concern for health, welfare, and economic and social well-being from water resources projects.

Prime and Unique Farmlands

In 1980, the CEQ directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS). Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops *and that is available for these uses* [emphasis added]. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops.

There are no unique farmlands present within the WBV basin. However, prime farmlands are present and make up approximately 227,241.7 acres, or 27 percent of the soils; breakdown by parish is as shown in Appendix B-6. There are map units designated as prime farmlands at the Barataria Preserve of JELA. However, these areas are unavailable for agricultural uses because of their incorporation into JELA. There are no map units designated as unique farmlands at the Barataria Preserve (Ibid.).

Natural & Scenic Rivers

In 1970, the Louisiana Legislature created the Louisiana Natural and Scenic Rivers System under the Wild and Scenic Rivers Act of 1968 (16 USC 1271-1287). The System was developed for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regimes of certain free-flowing Louisiana streams.

Certain activities are prohibited on designated Natural and Scenic Rivers because of their detrimental ecological impacts on the streams. These include, but are not limited to; channelization, clearing and snagging, channel realignment, reservoir construction, the commercial cutting of trees within 100 feet of the ordinary low water mark and the use of motor vehicles or other wheeled or tracked vehicles on a designated system stream. Scenic River

Permits are required for all activities on or near System Rivers that may detrimentally impact the ecological integrity, scenic beauty or wilderness qualities of those rivers.

The only Natural and Scenic River in the WBV Basin is Bayou Des Allemands which is over six miles from the project area.

3.2 SIGNIFICANT RESOURCES

This section contains a list of the significant resources located in the vicinity of the recommended mitigation project, and describes in detail those resources that would be impacted, directly or indirectly, by construction of it. The significant resources impacted by the Lake Boeuf features are discussed in detail in PIER #37 and those impacted by the Jean Lafitte features are discussed in PIER #37, TIER 1 EA, therefore these impacts will not be discussed in detail in this document. Both documents are incorporated by reference. A summary of these resources can be found below.

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. Further detail on the significance of each of these resources can be found by contacting the CEMVN, or on www.nolaenvironmental.gov, which offers information on the ecological and human value of these resources, as well as on the laws and regulations governing each resource. Search for "Significant Resources Background Material" in the website's digital library for additional information. See Appendix A-1, for the habitats found in the WBV Basin. See Appendices B-2, B-3, B-4 and B-5, for scientific names of species identified throughout the document.

3.2.1 Summary of Significant Resources within Lake Boeuf FS BLH-Wet and Swamp Projects

This area is primarily bare land consisting mainly of agricultural lands. Animals that could be found within this area would be skunks, rabbits, deer, and various species of birds including raptors, red-winged blackbirds and swallows. None of the animals under USFWS and/or NMFS jurisdiction are expected to be found in the project area. The project is in an upland area and does not have any aquatic species or any EFH.

The CEMVN has elected to fulfill its obligations under Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended through the execution and implementation of a Programmatic Agreement that was executed on June 18, 2013. There have been no previous surveys for cultural resources conducted in the Lake Boeuf project area. The area has been heavily disturbed by plowing and other activities, but there remains a possibility that intact cultural resources could exist below the plow line. Any cultural resources surveys determined to be necessary will be completed prior to the construction of any mitigation features, and the results of the surveys will be coordinated with the LA SHPO and federally recognized Indian Tribes for review in accordance with the stipulations of the Programmatic Agreement.

There are no developed recreation sites within the project area which is privately owned. This project is in Lafourche Parish which is currently in attainment of NAAQS. Noise is produced by consistent and sporadically heavy traffic on this road. The nearest major navigable waterway is Bayou Lafourche, which is adjacent to the Lake Boeuf project area. Sporadic boat traffic may produce noise levels that exceed 55 dBA within the area. Two Recognized Environmental Conditions (RECs), a natural gas pipeline and one oil well, are located in the project area.

According to 2010 U.S. Census data, 281 people live in 6 census blocks comprising the Lake Boeuf project area vicinity and are part of block group 1 of census tract 20900. Land proposed for restoration is typically used for agricultural purposes and most land owners live in homes fronting Highway 308. Census block data reveals under 10% of the residents are minority and about the same percentage of households are below the poverty level. A smaller number of mitigation sites are located in block group 2 of census tract 20900. About 38% of the households in this block group have incomes below the poverty level while census block data reveals that 90% are minority.

The entire Lake Boeuf PS BLH site is classified as Prime Farmlands; Cancienne silty clay loam, Cancienne silty loam, and Schriever clay. The majority of the site is currently being used for agriculture and includes some pasture land. There are no state recognized scenic streams in the vicinity of the project area.

3.2.2 Summary of Significant Resources within the Jean Lafitte Projects

Marsh, swamp and BLH habitats are predominant throughout the park. The park supports a diverse bird community. Moreover, it is part of one of the largest and most productive estuaries in the USA and serves as important habitat for wintering waterfowl, wading birds, and migrating shorebirds (Watson 2005). Other wildlife present within the park consists of white-tailed deer, feral hogs, nutria, beaver, muskrat, armadillo, frogs, snakes, alligators and more. There is potential for one listed species, the West Indian manatee, to be present in the project area.

The park incorporates a complex set of aquatic habitats, and the waters of the park are primarily fresh, with brackish influence. The combination of aquatic habitats allows for the potential presence of a number of fish fauna including seasonal migrants. The waterways of the park contain relatively low dissolved oxygen concentrations associated with very warm slow moving water. Eutrophication is a major issue for many water bodies associated with the park as canals provide direct channels for nutrient runoff. Of the Jean Lafitte projects only the JL1B5 and JL1B4 projects and their borrow area are identified as EFH for coastal migratory pelagic, red drum, reef fish, and shrimp.

The park project area has strong probability for the presence of cultural resources. The Jean Lafitte National Historical Park and Preserve is a public park open daily to visitors for various activities such as hiking, fishing and hunting. The approved action is in Jefferson Parish which is currently in attainment of NAAQS. Common existing noise sources include on and off road vehicles of various types, heavy equipment and construction, a variety of vessels including airboats, a variety of aircraft including low-level military and passenger flights, firearms, and a nearby racetrack.

Population demographics were reviewed for the communities adjacent to the preserve. None of the adjacent communities is identified as an environmental justice community based on the available U.S. Census Bureau Data (2010). Several swamp tour companies are located adjacent to the preserve. The NPS intermittently issues permits for commercial fishing (often crabbing) in preserve waterways. Commercial fishers utilize navigation channels within and adjacent to the preserve.

No Recognized Environmental Conditions (RECs) were found within the approved mitigation areas, and the mitigation areas contain no sites of interest which pose potential environmental concerns.

3.2.3 Avondale Gardens PS BLH-Dry Enhancement Project

3.2.3.1 Wetlands and Other Surface Waters

This area is primarily BLH forest consisting of wet and dry species, scrub/shrub and invasive species.

3.2.3.2 Wildlife

A great variety of mammals, birds, reptiles, and amphibians are found in the vicinity of the Avondale Gardens project. Species inhabiting the area include white-tailed deer, wild hogs, skunks, rabbits, squirrels, armadillos, and a variety of other smaller mammals. Various raptors such as barred owls, red-shouldered hawks, northern harriers (marsh hawks), American kestrel, and red-tailed hawks are present. Passerine birds present include sparrows, vireos, warblers, Northern mockingbirds, grackles, red-winged blackbirds, wrens, blue jays, northern cardinals, and crows. Many of these birds are present primarily during periods of spring and fall migrations. The area provides habitat for salamanders, toads, frogs, turtles, and several species of poisonous and nonpoisonous snakes. There are currently no documented bald eagle nests in the project area. Prior to construction, a nest survey would be conducted. If a nest is found the National Bald Eagle Management Guidelines (Appendix H) would be followed.

3.2.3.3 Threatened and Endangered Species

None of the animals under USFWS and/or NMFS jurisdiction are expected to be found in the project area.

3.2.3.4 Fisheries, Aquatic Resources, and Water Quality

The project is in an upland area and does not have any aquatic species. The water quality of the hydrologic unit encompassing this project footprint does not fully support two of its designated uses: Fish and Wildlife Propagation and Primary Contact Recreation. The suspected sources of this impairment includes drainage/filling/loss of wetlands, habitat modification other than hydromodification, littoral/shore area modification, forced drainage pumping, municipal point source discharge, sewage discharges in unsewered areas, and natural sources.

3.2.3.5 Essential Fish Habitat

The project is in an upland area and does not have any EFH.

3.2.3.6 Cultural Resources

Several surveys for cultural resources have been carried out within and adjacent to the project area. In June of 2007, Coastal Environments, Inc. (CEI) undertook a cultural resources assessment for the U.S. Army Corps of Engineers, New Orleans District of a portion of the West Bank and Vicinity Hurricane Protection Levee in Jefferson Parish, Louisiana, in advance of proposed improvements to the levee system (Wells, et al. 2010). It was determined that there was a very low potential for cultural resources and no further work was recommended. There are two previously identified cultural resources located in or within one mile of the project area. Site 16JE26, Reforestation Tract Site, is located within the boundaries of one of the BLH-Dry Enhancement project areas. Site 16JE26 was recorded in 1997 (Jones, et al. 1997), and was determined to be potentially eligible for listing to the National Register of Historic Places (NRHP).

Site 16JE133 is located approximately 800 meters from the project area and is identified as a potential prehistoric "extraction locale." When initially recorded, an intact midden deposit was identified consisting of shell. The site was revisited in 1997 and the site record was updated to indicate the presence of prehistoric ceramics and human remains on the surface of the site (Jones et al. 1997).

The CEMVN has elected to fulfill its obligations under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, through the execution and implementation of a Programmatic Agreement. The Programmatic Agreement was developed in consultation with the Advisory Council on Historic Preservation, the Louisiana State Historic Preservation Officer (LA SHPO), federally-recognized Indian tribes, and other identified interested parties. Any cultural resources surveys determined to be required will be completed prior to the start of construction activities for the recommended action, and the results of surveys will be coordinated with the LA SHPO and federally-recognized Indian tribes for review in accordance with the stipulations of the Programmatic Agreement.

The following federally-recognized Indian tribes were invited to participate in the development of the Programmatic Agreement: Alabama-Coushatta Tribe of Texas, Caddo Nation of Oklahoma, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Jena Band of Choctaw Indians, Mississippi Band of Choctaw Indians, Quapaw Tribe of Oklahoma, Seminole Nation of Oklahoma, Seminole Tribe of Florida, and the Tunica-Biloxi Tribe of Louisiana.

The CEMVN, in consultation with the LA SHPO, has taken measures to identify other interested parties and organizations to participate in the development and execution of the Programmatic Agreement. The CEMVN notified interested parties and the public of the development of the Programmatic Agreement through mailings. The Programmatic Agreement was executed on 18 June 2013, and the CEMVN will follow the stipulations as outlined in that agreement with respect to any cultural resources identified at the site.

3.2.3.7 Recreational Resources

There are no developed recreation sites located in the project area which is privately owned. The Avondale Gardens East mitigation area is approximately ½ mile west of Bayou Segnette State Park and ¼ mile south of NOLA Motorsports Park.

3.2.3.8 Aesthetic Resources

The area is relatively flat terrain mixed with a variety of water resources. Vegetation in the area is a mixture of invasive species and dense hardwoods. The forestation cover is dense. Overall access to the site is limited, with Nicole Boulevard located well to the north. The primary access comes from Bayou Segnette State Park. User activity is relatively low in this region, and primarily relegated to Bayou Segnette State Park. There are no Federal or State designated Scenic Byways in the area. Bayou Segnette State Park is a state protected land.

3.2.3.9 Air Quality

This project is in Jefferson Parish which is currently in attainment of NAAQS.

3.2.3.10 Noise

Adjacent communities are extensively developed, primarily as residential and commercial properties. The NOLA Motorsports Park is located approximately one half of a mile from the eastern most side of the Avondale Gardens East site and from the closest residential area. The operation of the NOLA Motorsports Park is a significant source of ambient noise in the area. With the onset of construction along the perimeter of the developed area, the adverse effects of noise created by construction activities would be introduced. Noise would be created from high-powered machinery and human activities within the project area and emanate various distances beyond the project site until the noise energy dissipates. Because of the proximity of the construction site to the developed area, and the density of the vegetative buffer, the number of residential and commercial properties exposed to the adverse impacts of noise is minimal.

There are two major thoroughfares, Lapalco Blvd and Highway 18, located north of the project area. Noise is produced by consistent and sporadically heavy traffic on these roads. The Outer Lake Cataouatche Canal is located south of the project area and sporadic boat traffic may produce noise levels that exceed 55 dBA within the area.

3.2.3.11 Hazardous, Toxic, and Radioactive Waste

One Recognized Environmental Condition (REC), an active producing oil well, was found within the recommended Avondale Gardens PS BLH-Dry Enhancement Project. A petroleum product pipeline crosses the features and may be considered a potential REC. Three plugged and abandoned dry hole oil wells are also located in the Avondale Gardens project area.

3.2.3.12 Socioeconomics/Land Use, Environmental Justice, Transportation, Navigation, and Commercial Fisheries

The project is located on the west bank of the Mississippi River in Westwego, LA. All of the forested site is privately-owned. According to 2010 U.S. Census data, there are no residents located within the boundaries of the Avondale Gardens PS BLH-Dry Enhancement Project. The nearest residential area is located approximately one-half mile from the project site. There are no commercial/industrial properties, public facilities, or transportation infrastructure within the project boundaries. The nearest major thoroughfare is Avondale Garden Road.

3.2.3.13 Prime and Unique Farmland

No prime farmlands are located at this site.

3.2.3.14 Natural & Scenic Rivers

Bayou Segnette State Park is a state protected land. There are no state recognized scenic streams in the vicinity of the project area.

4. ENVIRONMENTAL CONSEQUENCES OF THE FINAL ARRAY OF MITIGATION PROJECTS

4.1 INTRODUCTION

This section describes the direct, indirect and cumulative effects of the potential replacement project for the PS BLH-Dry feature. Table 4-1 shows those significant resources found within the

WBV mitigation basin, and notes whether they would be impacted (adversely or beneficially) by implementation of the project. The period of impact analysis begins when project construction begins and generally extends 50 years for USACE projects.

Table 4-1: Significant Resources in the Project Study Area

Significant Resource	Impacted	Not Impacted
Wetlands		X
Fisheries and EFH		X
Wildlife	X	
Threatened or Endangered Species		X
Water Quality		X
Cultural Resources	X	
Recreational Resources		X
Air Quality	X	
Aesthetics	X	
Socioeconomic Resources: Land Use, Transportation and Environmental Justice		X
Prime Farmland		X

Direct impacts are those that are caused by the action 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 action 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.

The impacts analysis for the Lake Boeuf and Jean Lafitte projects are discussed in PIER #37 and PIER #37, TIER 1 EA respectively and therefore will not be discussed in detail in this document. A summary table is provided below.

Table 4-2: Impacts of Significant Resources by Lake Boeuf and Jean Lafitte Projects

Resource	Lake Boeuf Projects	Jean Lafitte Projects
Wetlands	Not impacted	Beneficial impact
Fisheries and EFH	Not impacted	Temporary adverse impacts Long term benefit
Wildlife	Potential temporary adverse impacts Long term benefit	Potential temporary adverse impacts Long term benefit
Threatened and Endangered Species	Not impacted	Not impacted
Water Quality	Not impacted	Temporary adverse impacts
Cultural Resources	Potential for impact	Not impacted
Recreational Resources	Not impacted	Temporary impacts Long term switch in recreational use

Air Quality	Temporary impacts	Temporary impacts
Aesthetics	Temporary adverse impact long term benefit	Not impacted
Socioeconomic Resources: Land Use, Transportation and Environmental Justice	Impacted	Temporary adverse and beneficial impacts
Prime Farmland	Impacted	Not impacted

The following resources would not be impacted by the project and therefore will not be discussed further: Threatened and endangered species, fisheries and water quality, essential fish habitat, recreation, navigation, commercial fisheries, prime and unique farmlands and natural and scenic rivers.

4.2 MITIGATION FOR GENERAL PS BLH-DRY IMPACTS: Avondale Gardens Enhancement Project

4.2.1 Wetlands and other Surface Waters

Direct Impacts

There could be a beneficial impact to wetlands depending on which site is utilized for the project. BLH-East would be planted with BLH-Wet species due to the elevations and hydrology of that specific site. Approximately 920 acres of existing early successional BLH species and invasive species would be replaced with high quality BLH species. BLH-West would not offer benefits to wetlands as the elevation and hydrology of that specific site is conducive to the support of BLH-Dry species.

Indirect and Cumulative Impacts

Implementation of this project would reduce the conversion of BLH to nonnative species. This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin could help retard the loss of wetland bottomland hardwood species.

4.2.2 Wildlife

Direct Impacts

Any wildlife present at the time of construction would be temporarily displaced to adjacent habitat due to noise, movement and vibration. Slower moving species may perish during construction. Wildlife species would return once construction is complete.

Indirect Impacts

Beneficial impacts would be the enhancement of approximately 920 acres of BLH habitat which would offer better shelter and foraging grounds for various species such as deer, rabbit, squirrel, songbirds and raptors. If bald eagle nests are discovered, the National Bald Eagle Management Guidelines (appendix G) would be followed to avoid and minimize impacts.

Cumulative Impacts

This project would prevent an overall loss in the basin of BLH 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 help retard the loss of wildlife and overall decline of wildlife species within the basin and would be beneficial to preserving the species bio-diversity.

4.2.3 Cultural Resources

Direct Impacts

A review of the Louisiana Division of Archaeology Cultural Resources Map and Cultural Resources Management Bibliography showed that previous research in the project area has identified cultural resources that could be directly impacted by the project. Several surveys have been conducted in the project area, but there is a potential that additional cultural resources could exist within portions of the project area that have not previously been surveyed. Activities associated with this project have the potential to directly impact previously undocumented cultural resources. The stipulations of the Programmatic Agreement executed on June 18, 2013 would be followed. As individual project features are developed, survey strategies and the Area of Potential Effect will be coordinated with the LA SHPO, federally-recognized Indian tribes, and other interested parties as required by the Programmatic Agreement. Identified cultural resources that are determined to be eligible for listing or are listed on the NRHP would be avoided. If avoidance is not possible, mitigation strategies would be developed in accordance with the stipulations of the Programmatic Agreement.

Indirect and Cumulative Impacts

The erosion caused by natural forces and human activity would continue to impact cultural resources in the project area. Erosion within the project area could threaten the existence and integrity of cultural resources. The implementation of measures to restore ecosystems and habitat could work to reduce continued erosion, and prevent exposure and impact to significant cultural resources.

Implementation of this project would work synergistically with other ecosystem restoration projects in coastal Louisiana to restore degraded habitats to their historic conditions. Cumulative impacts to cultural resources would be the additive combination of impacts by this and other Federal, state, local, and private restoration efforts. Additional evaluations of such impacts would be completed following the cultural resources investigations.

4.2.4 Aesthetic Resources

Direct Impacts

The introduction of bottomland hardwoods will greatly enhance the visual resources of the Avondale Gardens project region. Public view sheds of the new plantings will be extremely limited.

Indirect and Cumulative Impacts

Temporary impacts could potentially occur due to construction efforts in the area. Increased traffic due to construction vehicles, dust, debris and increased noise volumes could affect residents of the area. These temporary impacts should return to normal upon completion of the project.

The project would not add measurably to cumulative impacts to visual resources in the study area. Cumulative impacts would be the incremental direct and indirect impacts of implementing the recommended action combined with the continued activities of growth and development in the area. These incremental direct and indirect impacts would be in addition to the direct and indirect impacts of visual resources in the region, Louisiana and the Nation caused by other restoration projects, destruction of natural habitats due to human development and the evolution of the landscape due to natural processes.

4.2.5 Air Quality

Direct Impacts

During construction of this project, an increase in air emissions could be expected. These emissions could include 1) exhaust emissions from operations of various types of non-road construction equipment such as a hydro axe, skidder, ATV etc. and 2) fugitive dust due to earth disturbance. Emission of fugitive dust near the construction area is not anticipated to be a problem as the majority of the work is anticipated to be completed by hand and the neighborhoods to the north and east are buffered by forest.

Any site-specific construction effects would be temporary and dust emissions, if any, would be controlled using standard BMPs. Air quality would return to pre-construction conditions shortly after the completion of construction activities. Because the project area is in Jefferson parish which is in attainment of NAAQS, a conformity analysis is not required.

Indirect Impacts

Any impacts to air quality would be localized in and near the project area. Emissions and dust would quickly dissipate. Impacts beyond the project area would be negligible.

Cumulative Impacts

Cumulative impacts to air quality in the project area due to construction of this project in addition to the other construction activities within the WBV basin that may be occurring concurrently would be temporary and would be very minimal, especially considering there would be no placement of dredged material to create fugitive dust. After the construction period, there would be no incremental contribution to cumulative air quality impacts.

4.2.6 Noise

Direct and Indirect Impacts

Backhoes, hydro-axes, gyro-tracks, mulchers, and dump trucks would be the primary pieces of equipment used for construction of this project. These pieces of equipment exceed noise levels above 55 dBA at 50 feet. Noise levels may result in wildlife avoiding the project area during construction; however, movement of equipment during construction would result in the same

avoidance behaviors from wildlife species. In addition, noise levels quickly drop off once a buffer (e.g. vegetation) is established between the noise source and the receptor. No impact to human populations is anticipated as noise levels would quickly drop off due to the vegetative buffer surrounding the project area.

Cumulative Impacts

Construction of this project is not anticipated to add significantly to the cumulative effect of noise in the WBV basin as the construction activities would be temporary, the area is buffered by vegetation, and wildlife would avoid the project area would occur due to the movement of machinery in the area even without the additional noise.

4.2.7 Hazardous, Toxic, and Radioactive Waste

Direct, Indirect and Cumulative Impacts

One REC and one potential REC are located in the Avondale Gardens Enhancement Project area. Mitigation project construction will mainly involve eradicating Chinese tallow trees and replanting of native BLH species. As long as the construction traffic involved in the mitigation process follows proper precautions, there is a low probability of encountering HTRW or petroleum products in the recommended mitigation area. Project construction will not contribute HTRW to the site. Oil and gas exploration and additional land development in the area could contribute to cumulative impacts but there are no known exploration or development projects scheduled for this area.

4.2.8 Socioeconomics/Land Use, Environmental Justice and Transportation

Direct, Indirect and Cumulative Impacts

According to 2010 U.S. Census data, there is a residential community located a half mile from the Avondale Gardens PS BLH-Dry Enhancement project site. Impacts associated with construction activities are not expected to cause adverse EJ impacts to the residents as they are not within 1,000 feet of the site (see noise section 4.2.2.7) and are buffered by dense vegetation. There also would not be any adverse transportation impacts to an EJ community as delivery of plant material and construction equipment will take place on a four-lane, principal arterial road, Highway 90. Additionally, the number of truck trips is expected to be minimal and the trucks would not use any minor arterial nor urban or local roads. There are no commercial/industrial properties, public facilities, or transportation infrastructure within the project boundaries. Therefore, there would be no conversion of land use from on purpose to another. However, the construction of a mitigation project on this area will forever prevent its development for another purpose. Minimal indirect land use impacts may occur when privately owned land is converted to public use. No impacts to employment, businesses, industry, public facilities and services, community and regional growth community cohesion, or tax revenues and property values are anticipated to occur with construction of this project.

There would be no direct and only minimal indirect impacts to transportation in nearby residential areas during construction due to heavy vehicle traffic in the vicinity of the restoration site during mobilization and demobilization phases. It is expected that once the necessary construction equipment is on site that no additional transportation impacts would occur until the project construction is complete and the equipment is removed from the site.

The cumulative impacts of the projects, when added to other past, present, and reasonably foreseeable ecosystem restoration, mitigation and construction projects in the basin would minimally and temporarily affect socio-economic resources. Due to the relatively small size of the Avondale Gardens PS BLH-Dry Enhancement Project, the temporary nature of the project activities and the duration of enhancement projects, the Avondale Gardens PS BLH-Dry Enhancement Project would add very little and only temporary impacts to any other impacts resulting from past, present and reasonably foreseeable projects in the WBV basin and would not contribute significantly to cumulative impacts to socio-economic resources in the basin.

5. ENVIRONMENTAL CONSEQUENCES OF MITIGATION PLAN ALTERNATIVES

5.1 INTRODUCTION

This section describes the direct and indirect effects of the recommended projects when combined to make up the MMPAs.

Although this SPIER is programmatic in nature, one of the individual mitigation projects in each of the MMPAs has sufficiently detailed design as to be fully assessed and would not require additional NEPA documentation. This mitigation project is termed the "Constructible Feature" in each alternative. The purchase of mitigation bank credits for PS BLH-Wet/Dry impacts was evaluated and included in the RMP in PIER #37 and mitigation bank credits were purchased for PS BLH-Wet impacts. This constructible feature is included as part of all MMPAs discussed below.

In the event sufficient credits to mitigate the PS BLH-Dry requirement become available in the WBV basin prior to implementation of a Corps-constructed mitigation project, CEMVN would evaluate whether to purchase credits consistent with the PIER #37 RMP based on relative costs and schedule.

The Programmatic Features of the mitigation plan require further design at a feasibility level for which the details and impacts would be released in subsequent tiered NEPA documents. PIER #37, TIER 1 EA has been prepared in collaboration with the National Park Service (NPS) to evaluate implementation of the features of the mitigation plan located on Jean Lafitte National Historic Park and Preserve (JLNHPP), thereby making them constructible. The TIER 1 EA was released for public review from October 13, 2015 through November 12, 2015. The PIER #37 TIER 1 EA has a finding of no significant impact which was signed by the District Commander on December 18, 2015.

5.2 ALTERNATIVES

Natural and scenic rivers would not be impacted by any of the alternatives and therefore will not be discussed further in this section.

5.2.1 No Action Alternative

Explanation of the No Action Alternative: The Decision Record for PIER #37 recommended a comprehensive mitigation plan to compensate for impacts to all habitat types; it approved the purchase of mitigation bank credits to compensate for impacts to PS BLH-Wet/Dry for implementation. The remaining features of the plan were to be further assessed through additional NEPA evaluation. However, the purchase of credits to mitigate for PS BLH-Dry impacts was not implementable due to a lack of available credits in the WBV basin. Credits were purchased to

satisfy the PS BLH-Wet requirements. Consequently, the PS BLH-Dry requirement is still outstanding. Because the purchase of credits to compensate for PS BLH impacts was approved after a complete NEPA evaluation, that feature of the RMP is considered the "no action" alternative.

PIER #37 fully evaluated the "No Action" alternative formulated as not compensating for habitat losses caused by construction of the WBV HSDRRS. That analysis is incorporated by reference.

Direct and Indirect Impacts

The MP approved in PIER #37, the purchase of in-basin BLH-Wet mitigation bank credits to compensate for PS BLH-Dry impacts, would be implemented. The impacts would be the same as discussed in PIER #37. None of the resources would incur new impacts by the purchase of BLH credits from a mitigation bank within the WBV basin as the mitigation banks exist as part of the baseline conditions in the future without project condition.

However, there currently are not sufficient in-basin mitigation bank credits to satisfy the PS BLH-Dry mitigation requirements. Consequently, the purchase of credits to compensate for PS BLH-Dry impacts is not currently feasible.

5.2.2 Modified Mitigation Plan Alternative (MMPA)

The MMPA (Table 5.1) contains all the projects in PIER #37's RMP and PIER #37, TIER 1 EA except for the project selected for the PS BLH-Dry feature. Although this is a programmatic NEPA document, one of the projects that makes up the MMPA is fully assessed and is recommended for implementation. This project, termed "Constructible Feature" (or "constructible portion"), mitigates general (e.g. non-park/404c) BLH-Dry impacts and would consist of the Avondale Gardens BLH-Dry enhancement project. The projects that comprise the remainder of the WBV HSDRRS MMPA are termed "Programmatic Features". These programmatic features require further design at a feasibility level for which the details and impacts will be released in a forthcoming NEPA document that will tier from this programmatic NEPA document. A joint EA has been prepared in collaboration with the National Park Service to evaluate mitigation projects in the Jean Lafitte National Historic Park and was signed on December 18, 2015 by the District Commander.

Table 5-1: Projects that make up the MMPA

Habitat Type	Mitigation Projects in MMPA	Constructible/Programmatic
General PS BLH-Wet/Dry	Avondale Gardens BLH-Dry Enhancement	Constructible
General FS BLH-wet	Lake Boeuf BLH-Wet Restoration	Programmatic
General FS Swamp	Lake Boeuf Swamp Restoration	Programmatic
General FS Marsh	Jean Lafitte Marsh Restoration	Approved
Park/404(c) FS BLH-Wet	Jean Lafitte BLH-Wet Restoration	Approved
Park/404(c) FS Swamp	Jean Lafitte Swamp Restoration	Approved
Park/404(c) FS Fresh Marsh	Jean Lafitte Fresh Marsh Restoration	Approved

5.2.2.1 Wetlands and other Surface Waters

5.2.2.1.1 Programmatic Features

Direct and Indirect Impacts

Approximately 222 acres of agricultural land would be converted to BLH-Wet at the Lake Boeuf project site. Approximately 320 acres of agricultural land would be converted to swamp at the Lake Boeuf project site.

5.2.2.1.2 Constructible Feature

Direct Impacts

There would no impact to wetlands as approximately 920 acres of existing early successional upland BLH habitat would be replaced with high quality BLH species at the upland Avondale Gardens project site.

Indirect Impacts

This plan, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help retard the loss of BLH species.

5.2.2.2 Wildlife

5.2.2.2.1 Programmatic Features

Direct Impacts

Approximately 222 acres of agricultural land would be converted to BLH-Wet at the Lake Boeuf project site. Approximately 320 acres of agricultural land would be converted to swamp at the Lake Boeuf project site. Any wildlife present at the time of construction would be temporarily displaced to adjacent habitat due to noise, movement and vibration. It is anticipated those species would return to an improved habitat type once construction is complete. *Indirect Impacts*

The conversion of agricultural fields to BLH and swamp habitat would offer better shelter and foraging grounds for wildlife such as squirrels, rabbits, deer, raccoon, songbirds and raptors. It is anticipated that species diversity would improve with the conversion of agricultural land to BLH and swamp habitat.

5.2.2.2.2 Constructible Feature

Direct Impacts

Approximately 920 acres of existing early successional BLH habitat would be replaced with high quality BLH species at the Avondale Gardens project site. Any wildlife present at the time of construction would be temporarily displaced to adjacent habitat due to noise, movement and vibration. It is anticipated those species would return once construction is complete.

Indirect Impacts

Beneficial impacts would be the enhancement of approximately 920 acres of BLH habitat which would offer better shelter and foraging grounds for wildlife such as squirrels, rabbits, deer, raccoon, songbirds and raptors. It is anticipated that species diversity would improve with the conversion of agricultural land to BLH and swamp habitat.

5.2.2.3 Threatened and Endangered Species

5.2.2.3.1 Programmatic Features

Direct and Indirect Impacts

None of the animals under USFWS and/or NMFS jurisdiction are expected to be found in the project area either before, during or after construction; therefore no impacts are anticipated.

5.2.2.3.2 Constructible Feature

Direct and Indirect Impacts

None of the animals under USFWS and/or NMFS jurisdiction are expected to be found in the project area either before, during or after construction; therefore no impacts are anticipated.

5.2.2.4 Fisheries, Aquatic Resources and Water Quality

5.2.2.4.1 Programmatic Features

Direct and Indirect Impacts

There would be no direct or indirect impacts to fisheries or aquatic resources due to the construction of this plan since the project sites presently do not contain fisheries or aquatic resources. There would be no direct or indirect impacts to water quality as the project site does not contain open water nor is it connected to a water body.

5.2.2.4.2 Constructible Feature

Direct and Indirect Impacts

There would be no direct or indirect impacts to fisheries or aquatic resources due to the construction of this plan since the project site presently does not contain fisheries or aquatic resources. There would be no direct or indirect impacts to water quality as the project site does not contain open water nor is it connected to a water body.

5.2.2.5 Essential Fish Habitat

5.2.2.5.1 Programmatic Features

Direct and Indirect Impacts

There would be no direct or indirect impacts to EFH due to the construction of this project since the area presently does not currently contain EFH.

5.2.2.5.2 Constructible Feature

Direct and Indirect Impacts

There would be no direct or indirect impacts to EFH due to the construction of this project since the area presently does not contain EFH.

5.2.2.6 Cultural Resources

5.2.2.6.1 Programmatic Features

Direct Impacts

Activities associated with implementation of the Programmatic Features could have a direct impact on existing or as yet undiscovered cultural resources. Additional analysis for impacts to cultural resources would be conducted and documented in supplemental NEPA documents for the Programmatic Features. The stipulations of the Programmatic Agreement executed on June 18, 2013 would be followed. As individual project features are developed for the Programmatic Features, survey strategies and the Area of Potential Effect will be coordinated with the LA SHPO, Federally recognized Tribes, and other interested parties as required by the Programmatic Agreement. Identified cultural resources that are determined to be eligible for listing or are listed on the NRHP would be avoided. If avoidance is not possible, mitigation strategies would be developed in accordance with the stipulations of the Programmatic Agreement.

Indirect Impacts

The erosion and land loss caused by natural forces and human activity would continue to impact cultural resources in the WBV basin. The loss of land would continue to threaten the existence and integrity of cultural resources sites. The implementation of measures to restore ecosystems and habitat could work to reduce continued land loss and erosion, and prevent exposure and impact to significant cultural resources.

Implementation of this project would work synergistically with other ecosystem restoration projects in coastal Louisiana to stop the erosion and land loss that generally threatens cultural resources. Cumulative impacts to cultural resources would be the additive combination of impacts by this and other Federal, state, local, and private restoration efforts.

5.2.2.6.2 Constructible Feature

Direct Impacts

Activities associated with this project have the potential to directly impact cultural resources in the project sites. A review of previous research in the Avondale Gardens BLH-Dry enhancement project area identified cultural resources that could be directly impacted by the recommended project. Several surveys have been conducted in the Avondale Gardens project area, but there is a potential that additional cultural resources could exist within portions of the project area not previously surveyed. Activities associated with this project have the potential to directly impact cultural resources in the project area.

The project would be assessed for its effect on historic properties, and survey strategies and the Area of Potential Effect would be coordinated with the LA SHPO, tribes, and other interested

parties as in accordance with the stipulations of the Programmatic Agreement as executed on June 18, 2013. Identified cultural resources that are determined to be eligible for listing or are listed on the NRHP will be avoided. If avoidance is not possible, mitigation strategies would be developed in accordance with the stipulations of the Programmatic Agreement.

Indirect Impacts

The erosion and land loss caused by natural forces and human activity would continue to impact cultural resources elsewhere in the project area. The loss of land threatens the existence and integrity of cultural resources. The implementation of these measures to restore ecosystems and habitat could work to reduce continued land loss and erosion, and prevent exposure and impact to significant cultural resources.

5.2.2.7 Recreational Resources

5.2.2.7.1 Programmatic Features

Direct and Indirect Impacts

Conversion of private land to public land may allow opportunities for public recreational activities depending on the how the land is managed in the future. However, these areas are not currently used for recreation and future management is unpredictable. No direct or indirect impacts are anticipated.

5.2.2.7.2 Constructible Feature

Direct and Indirect Impacts

Conversion of private land to public land may allow opportunities for public recreational activities depending on the how the land is managed in the future. However, these areas are not currently used for recreation and future management is unpredictable. No direct or indirect impacts are anticipated.

5.2.2.8 Aesthetic Resources

5.2.2.8.1 Programmatic Features

Direct and Indirect Impacts

The introduction of BLH and swamp would greatly enhance the visual resources of the project region. Temporary impacts could potentially occur due to construction efforts in the area.

5.2.2.8.2 Constructible Feature

Direct and Indirect Impacts

The enhancement of BLH would enhance the visual resources of the project region. Temporary impacts could potentially occur due to construction efforts in the area.

5.2.2.9 Air Quality

5.2.2.9.1 Programmatic Features

Direct Impacts

During construction of the Lake Boeuf Restoration project features, an increase in air emissions could be expected. These emissions could include 1) exhaust emissions from operations of material delivery and removal/dump trucks and various types of non-road construction equipment such as loaders, excavators, etc. and 2) fugitive dust due to earth disturbance. The principal air quality concern associated with the proposed activities is emission of fugitive dust near construction areas due to anticipated earth work. The on-road trucks and private autos used to access the work area would also contribute to construction phase air pollution in the project neighborhood when traveling along local roads.

Indirect Impacts

Any site-specific construction effects would be temporary and dust emissions, if any, would be controlled using standard BMPs. Air quality would return to pre-construction conditions shortly after the completion of construction activities. Because the project area is in a parish which is in attainment of NAAQS, a conformity analysis is not required.

5.2.2.9.2 Constructible Feature

Direct Impacts

During construction of the Avondale Gardens BLH Dry an increase in air emissions could be expected. These emissions could include 1) exhaust emissions from operations of material delivery and removal/dump trucks and various types of non-road construction equipment such as loaders, excavators, etc. and 2) fugitive dust due to earth disturbance. The principal air quality concern associated with the recommended activities is emission of fugitive dust near construction areas due to anticipated earth work. The on-road trucks and private autos used to access the work area would also contribute to construction phase air pollution in the project neighborhood when traveling along local roads.

Indirect Impacts

Any site-specific construction effects would be temporary and dust emissions, if any, would be controlled using standard BMPs. Air quality would return to pre-construction conditions shortly after the completion of construction activities. Because the project areas are in parishes in attainment of NAAQS, a conformity analysis is not required.

5.2.2.10 Noise

5.2.2.10.1 Programmatic Features

Direct and Indirect Impacts

Backhoes would be the primary pieces of equipment used for construction of most of the alternatives. Additional construction equipment includes hydro-axes, gyro-tracks, mulchers and dump trucks. These pieces of equipment exceed noise levels above 55 dBA. See Appendix B-8

for list of equipment and associated dBA. Noise levels may result in wildlife avoiding the project area during construction; however, movement of equipment during construction would result in the same avoidance behaviors from wildlife species. In addition, noise levels quickly drop off once a buffer (e.g. vegetation) is established between the noise source and the receptor. As such, any wildlife in the adjacent habitats should be largely undisturbed by the additional noise from construction of these features.

5.2.2.10.2 Constructible Feature

Direct and Indirect Impacts

Residences and commercial facilities near the Avondale Gardens Project could experience higher than ambient noise levels during construction. However, these levels would be temporary during the period of construction and would be limited to daylight hours.

5.2.2.11 Hazardous, Toxic, and Radioactive Waste

5.2.2.11.1 Programmatic Features

Direct, and Indirect

None of the projects sites identified a high probability of encountering HTRW. There are, however, natural-gas and crude-oil pipelines, an injection well, and one directionally-drilled oil well located in several features of the Lake Boeuf restoration sites that must be avoided during the mitigation work.

There is a very low probability that the restoration of habitat would encounter HTRW or introduce toxic materials into the mitigation areas. The project may proceed without further investigation of HTRW. If the project location or methods change the probability of HTRW may need to be re-investigated.

5.2.2.11.2 Constructible Feature

Direct, and Indirect

One REC and one potential REC are located in the Avondale Gardens Enhancement Project area. Mitigation will mainly involve eradicating Chinese tallow trees and replanting of native BLH species. As long as the construction traffic involved in the mitigation process follows proper precautions, there is a low probability of encountering HTRW or petroleum products in the recommended mitigation area. Cumulative impacts may include additional oil and gas explorations and additional land development but there are no known exploration or development projects scheduled for this area.

5.2.2.12 Socioeconomics/Land Use, Environmental Justice, Transportation, Navigation, and Commercial Fisheries

5.2.2.12.1 Programmatic Features

Direct and Indirect Impacts

According to 2010 U.S. Census data, there are no residents living within the boundaries of the project area. There are no anticipated impacts to population, housing, or minority or low-income areas. There is agricultural property within the constructive area, although there are no commercial/industrial properties, public facilities, or transportation infrastructure within the project boundaries therefore there will be no direct impacts to land use. There will be direct land use impacts when privately owned land is converted to public use.

There would be no direct and only minimal indirect impacts to transportation in nearby residential areas during construction activities from heavy vehicle traffic in the vicinity of the restoration sites. It is expected that once the necessary construction equipment is on site that no additional transportation impacts would occur until the project construction is complete and the equipment is removed from the site.

5.2.2.12.2 Constructible Feature

Direct and Indirect Impacts

There are no commercial/industrial properties, public facilities, or transportation infrastructure within the project boundaries; therefore there will be no direct impacts to those types of land uses. The project site would involve a conversion of privately owned land to public use.

5.2.2.13 Prime and Unique Farmland

5.2.2.13.1 Programmatic Features

Direct and Indirect

Approximately 546.2 acres of Prime Farmland (NRCS, 2013) would be impacted by the TSMPA and the associated mitigation roadways including 160.8 acres of Cancienne silty clay loam, 86.7 acres of Cancienne sity loam, and 298.7 acres of Schriever clay. This total includes a reduction in 9.4 acres of impact (including reduction of 5.9 acres of Cancienne silty clay loam, reduction of 1.8 acres of Cancienne sity loam, and a reduction of 1.7 acres of Schriever clay) due to the overlap in required mitigation roadways between the Lake Boeuf FS BLH-Wet and Lake Boeuf FS Swamp projects.

If both of these projects are mitigated separately, the impacts are as follows: approximately 240.6 of these acres (NRCS, 2013) would be impacted by the Lake Boeuf FS BLH-Wet Restoration Project and the associated mitigation roadways including 79.7 acres of Cancienne silty clay loam, 51.5 acres of Cancienne sity loam, and 109.4 acres of Schriever clay. Approximately 315 acres (NRCS, 2013) would be impacted by the Lake Boeuf FS Swamp Restoration Project and the associated mitigation roadways including 87 acres of Cancienne silty clay loam, 37 acres of Cancienne silty loam, and 191 acres of Schriever clay.

Once these sites are developed for mitigation, these areas could not be used as productive farmland in the future.

The TSMPA would result in impacts to 160.8 acres of Cancienne silty clay loam, 86.7 acres of Cancienne sity loam, and 298.7 acres of Schriever clay, which is less than 0.6% of theses soils currently found in Lafourche Parish, being removed from future potential agricultural development. Since the majority of the 546.2 acres impacted is presently farmed, current agricultural production in the parish would be affected.

5.2.2.13.2 Constructible Feature

Direct and Indirect Impacts

There are no anticipated impacts as to prime and unique farmlands in the Avondale Gardens project area.

6. CUMULATIVE IMPACTS

NEPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impacts of the action. Cumulative impact is defined 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)." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts were addressed for each project and resource in the preceding sections and include both beneficial and adverse impacts depending on the resource. This section provides an overview of other actions, projects, and occurrences that may contribute to the cumulative impacts previously discussed.

Appendix B-9 shows the impacts of other past, present and reasonably foreseeable projects in the WBV and LPV basins on the significant resources documented in this SPIER. The ecosystem restoration type projects in the basins work to enhance and restore historic ecosystem processes within the basins. Although these projects may result in temporal impacts and tradeoffs among the species within the significant resources, their overall effects on the system from a human and natural environmental perspective would be wholly positive. Though impacts to the natural environment from construction of these projects have been avoided to the maximum extent practicable, remaining unavoidable impacts would 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 (e.g. levee systems) in the FWOP has resulted in the protection of cultural sites found within the protection of the levee system. Ecosystem restoration plans in the WBV basin and in the region that improve estuarine habitat also provide benefits to the commercial fishing industry.

As provided in the Council on Environmental Quality-approved NEPA Emergency Alternative Arrangements, CEMVN is preparing a Comprehensive Environmental Document to evaluate the cumulative impacts associated with the construction of the HSDRRS, including the mitigation plans. Phase 1 of the CED was released for public review in 2013. Overall cumulative impacts from implementation of all features in the MMPA will be presented in Phase 2 of the CED which will be released in 2016. The evaluation of cumulative impacts discussed in the CED, Phase 1 is incorporated herein by reference.

6.1 No Action

The No Action Alternative would be the plan previously approved in PIER #37 and PIER #37, TIER 1 EA and the associated Decision Record and FONSI. The impacts would be the same as discussed in the PIER #37 and PIER #37, TIER 1 EA, which are incorporated by reference. Below is a summary of the cumulative impacts of the No Action alternative.

6.1.1 Programmatic Features

The No Action Alternative would prevent an overall loss in the basin of fresh marsh as well as BLH-Wet, BLH-Dry and swamp 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 open water habitat in the WBV basin, but no permanent adverse impacts are anticipated because this habitat is prevalent throughout the basin. Impacts to SAVs would be mitigated along with the plan mitigating for fresh marsh.

6.1.2 Constructible Features

No new cumulative impacts to any resource would be incurred from the purchase of credits from a previously approved mitigation bank for the HSDRRS mitigation under the No Action Alternative. 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, the constructible feature would only have new potential impacts on the availability of mitigation bank credits for BLH-Wet in the basin.

Implementation of the no action alternative in consideration of the impacts of all other past, present, and reasonably foreseeable projects have on the significant resources in the basin would be cumulatively neutral as it would offset the loss of 261.96 AAHUs of BLH habitat within the WBV basin without incurring any new adverse impacts.

6.2 MMPA

6.2.1 Programmatic Features

The MMPA would prevent an overall loss in the basin of BLH-Wet, and swamp 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.

6.2.2 Constructible Features

The MMPA would prevent an overall loss in the basin of BLH 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.

6.2.2.1 Wetlands and Other Surface Waters

The MMPA would prevent an overall loss in the basin of fresh marsh as well as BLH-Wet, BLH-Dry and swamp 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 open water habitat in the WBV basin, but no permanent adverse impacts are anticipated because this habitat is prevalent throughout the basin. Impacts to SAVs would be mitigated along with the TSMPA mitigating for fresh marsh.

6.2.2.2 Wildlife

The MMPA would prevent an overall loss in the basin of wetland habitat necessary for many wildlife species. This project, in conjunction with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help retard the overall decline of wildlife species within the basin and would be beneficial in preserving species bio-diversity.

6.2.2.3 Threatened and Endangered Species

Potential cumulative impacts to the threatened or endangered species (manatee and Pallid sturgeon) that could occur in the vicinity of the project area from construction of the MMPA would involve the combined adverse effects on each species from the other projects within the WBV basin. Due to the large size of the lakes, the relatively small size of the borrow areas, the temporary nature of the borrow activities, the sediments in the borrow area, the depth of excavation, the use of cutterhead dredges for borrow procurement, the duration of dredging, the ability of benthic species to quickly re-colonize the borrow areas, the ability of T&E species to avoid the project area during the construction period, and the use of protection measures the MMPA would add very little and only temporary impacts to any other impacts resulting from past, present and reasonably foreseeable projects in the basin and would not contribute significantly to cumulative impacts to threatened and endangered species or their habitat in the basin.

6.2.2.4 Fisheries, Aquatic Resources, and Water Quality

Although there would be a loss of open water from construction of the mitigation plan, these habitats are found in abundance throughout the WBV 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 WBV basin because these projects offset losses due to construction of the WBV HSDRRS. Though construction of these projects would result in the loss of fisheries habitat, some fish, and temporary impacts to water quality and benthic habitat, this habitat is abundant throughout the basin, impacts to existing fisheries are minimal, and water quality and benthic species would rebound once project construction is complete. As such, construction of the mitigation project would result in minimal loss to fisheries, aquatic resources, and water quality experienced in the basin from the past, present and reasonably foreseeable projects in the basin. The reinstitution of BLH, fresh marsh and swamp in areas that are currently open water could provide indirect benefits to fisheries in the future by providing nutrients to the system in the form of detritus. As a result of borrow placement and the type of containment utilized for this project, land adjacent to the mitigation project may receive material suspended in the dredge effluent. This would nourish adjacent marsh habitat and may cause adjacent shallow open water to become shallower or be filled; encouraging the existing habitat to move through early successional phases faster.

These temporary impacts to water quality would add incrementally to similar cumulative impacts throughout the WBV basin as other projects are constructed, causing temporary decreases in water quality throughout the basin. However, those projects that include marsh restoration as well as the recommended action for HSDRRS Mitigation could have the long-term beneficial impact of increased dissolved oxygen and increased filtration which helps control local turbidity. The temporary water impacts from placement and borrow excavation are not anticipated to be substantial enough to cause water quality impairment under the standards of Louisiana Administrative Code, Title 33, Part IX, Chapter 11. Although there would be a loss of open water from construction of the mitigation projects, open water is found in abundance throughout the WBV basin.

6.2.2.5 Essential Fish Habitat

This project would cause one type of EFH in the WBV basin to be replaced by another type of EFH. The switching of EFH types from construction of the recommended project is not anticipated to have a significant impact to the overall quantity of EFH in the WBV basin. Impacts to cover and foraging for managed species are not anticipated to cause significant increases in cumulative impacts to managed species from the implementation of FWOP condition projects as the borrow area is small in size compared to the available EFH habitat in the basin providing similar habitat. The conversion of EFH to non EFH would be mitigated for and as such not cause a cumulative impact.

6.2.2.6 Cultural Resources

Cumulative impacts to cultural resources would be the additive combination of impacts by this and other Federal, state, local, and private restoration efforts. Additional evaluations of such impacts would be completed following the cultural resources investigations. Cumulatively, water resource and other development projects have the potential to impact cultural resources in both positive and negative ways. Beneficial impacts may include protection from continued erosion, soil loss and subsidence. Negative impacts may include disturbance due to construction activities. Habitat restoration projects such as these cumulatively may result in greater protection to cultural resources by protecting the restoration sites from natural erosion and from human development activity.

6.2.2.7 Recreational Resources

Restoration/enhancement of fish and wildlife habitat would increase use of the project sites by desirable species which would consequently provide a better recreational experience. Recreational impacts could be considered cumulatively beneficial when added to the recreational opportunities provided at adjacent refuges and other existing recreational areas in the basin. However, since this is mitigation, which replaces impacted habitats, recreational resources dependent on these habitats would merely shift from the area of impact to the area of mitigation, preventing the loss of recreational resources in the basin. The impacts associated with utilization of the borrow sites for construction of the mitigation projects would be short term and not result in a significant increase in cumulative impacts to recreational resources in the basin.

6.2.2.8 Aesthetic Resources

Approximately 100 acres of open water would be converted to fresh marsh, BLH-Wet, and swamp thus increasing the types of land mass, vegetation and wildlife that is viewable. Overall, this impact is expected to be minor since there are approximately 124,000 acres of water in the WBV Basin. Additionally, restoration/enhancement of fish and wildlife habitat would increase use of the project sites by desirable species which would consequently provide a better viewing experience at adjacent recreational areas, major roadways, and private lands. The impacts associated with utilization of the borrow sites for construction of the mitigation projects would be short term and not result in a significant increase in cumulative impacts to visual resources in the basin.

6.2.2.9 Air Quality

Cumulative impacts to air quality in the project area due to construction of MMPA in addition to the other construction activities within the WBV basin that may be occurring concurrently would

be temporary and would be very minimal, especially considering that placement of dredged material would not create fugitive dust. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the recommended action. All project areas are located in parishes in attainment of NAAQS.

6.2.2.10 Noise

Construction of the MMPA is not anticipated to add significantly to the cumulative effect of noise in the WBV basin as the construction activities would be temporary and restricted to daylight hours. Most of the projects are situated in remote areas and noise from construction activities buffered by vegetation.

6.2.2.11 Hazardous, Toxic, and Radioactive Waste

No cumulative impacts are anticipated.

6.2.2.12 Socioeconomics/Land Use, Environmental Justice, Transportation, Navigation, and Commercial Fisheries

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 cumulative impacts to socioeconomics/land use, environmental justice, transportation, navigation and commercial fisheries would be incurred from the purchase of these credits for the HSDRRS mitigation. However, depending on the amount of BLH-Dry, BLH-Wet and swamp mitigation bank credits available at the time of credit purchase for the HSDRRS mitigation, use of mitigation bank credits to offset HSDRRS BLH-Dry, BLH-Wet and swamp impacts may significantly reduce the number of credits available to permittees to compensate for BLH and swamp impacts authorized by Department of the Army Section 10/404 permits. In the event sufficient credits are not available to offset impacts associated with a proposed permit, the district engineer would determine appropriate permittee responsible compensatory mitigation based on the factors described in 33 CFR Part 332.3(b).

Impacts from restoration projects can temporarily disrupt transportation, navigation and commercial fishing in project areas during construction activities including dredging and material placement in the restoration areas. Land use impacts, such as impacts to commercial/industrial properties and public facilities impacts are not anticipated as TSMPs are typically located in unpopulated areas. However, agricultural land in the Lake Boeuf Restoration area would be directly impacted as it is proposed to be converted from private to public use. Additionally, development of the Avondale Gardens project is recommended on one of the few remaining large undeveloped tracts in Jefferson Parish. Construction of that project would leave less undeveloped land available for future development for other purposes.

The cumulative impacts of the projects, when added to other past, present, and reasonably foreseeable ecosystem restoration, mitigation or construction projects in the basin would minimally and temporarily affect socio-economic resources. Due to the relatively small number of mitigation bank credits to be purchased, the remote and generally unpopulated areas where the projects would be constructed, the temporary nature of the project construction activities and the duration of enhancement projects, the TSMPA would add very few and only temporary adverse impacts to any other impacts resulting from past, present and reasonably foreseeable projects in the region and would not contribute significantly to cumulative impacts to socio-economic resources in the basin.

6.2.2.13 Prime and Unique Farmland

Since the majority of the Lake Boeuf PS BLH-Wet and Swamp project areas are presently farmed, a loss of agricultural production in the parish would occur. However, the cumulative impacts to prime and unique farmland in the project area due to construction of the MMPA would affect such a small amount of prime farmland as to have a negligible effect on agricultural production in the parish.

6.2.2.14 Natural and Scenic Rivers

No scenic streams are located in the project area.

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

General success criteria and monitoring including planting guidelines for the mitigation projects can be found in Appendix H. Specific success criteria and monitoring for the Lake Boeuf FS BLH-Wet and Swamp Restoration Project and the Avondale Gardens PS BLH-Dry Enhancement project can be found in Appendix E.

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 (AM) 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 AM 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. See Appendix F for the AM Plan.

Each Corps constructed MP would have a contingency plan for taking corrective actions in cases where monitoring demonstrates that the mitigation feature is not achieving ecological success in accordance with its success criteria. For the MP feature where credits would be purchased from a mitigation bank, the mitigation bank must be in compliance with the requirements of the USACE Regulatory Program and its MBI, which specifies the management, monitoring, and reporting required to be performed by the bank. Purchase of mitigation bank credits relieves the CEMVN and NFS of the responsibility for monitoring and of demonstrating mitigation success.

An effective monitoring program is required to determine if the project outcomes are consistent with the identified success criteria (WRDA 2007, Section 2036). A Monitoring Plan has been developed for the Corps constructed feature within the MMPA (Appendix E). 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 including transects, sampling plots, gage locations, and monitoring frequency would be developed once designs are complete. The detailed monitoring plan for the MMPA is located in Appendix E. The detailed AM Plan for the MMPA is located in Appendix F.

The recommended mitigation action could include construction, with the NFS responsible for operation and maintenance of functional portions of work as they are completed. On a cost shared basis, USACE would monitor completed mitigation to determine whether additional

construction, invasive species control and/or planting are necessary to achieve mitigation success. USACE would undertake additional actions necessary to achieve mitigation success in accordance with cost sharing applicable to the project and subject to the availability of funds. Once USACE determines that the mitigation has achieved initial success criteria, monitoring would be performed by the NFS as part of its OMRR&R obligations. If, after meeting initial success criteria, the mitigation fails to meet its intermediate and/or long-term ecological success criteria, USACE would consult with other agencies and the NFS to determine whether operational changes would be sufficient to achieve ecological success criteria. If, instead, structural changes are deemed necessary to achieve ecological success, USACE would implement appropriate adaptive management measures in accordance with the contingency plan and subject to cost sharing requirements, availability of funding, and current budgetary and other guidance.

8. COORDINATION AND CONSULTATION

8.1 PUBLIC INVOLVEMENT

Extensive public involvement has been sought in planning the mitigation for HSDRRS impacts. A public notice of the NEPA Alternative Arrangements was published in the Federal Register on 13 March 2007 (Federal Register Volume 72, No. 48) which included a commitment to analyze alternatives to determine appropriate mitigation. The notice is also available on the website www.nolaenvironmental.gov.

The following public meetings were held to obtain public input on the planning process for WBV HSDRRS mitigation, to obtain any suggestions on potential projects to mitigate WBV HSDRRS impacts, and to update the public on the project status:

1. 31 August 2009 at U.S. Army Corps of Engineers Office in New Orleans, LA
2. 13 May 2010 at Delgado Community College Westbank in Algiers, LA
3. 17 May 2010 at Westwego Tassin Senior Center in Westwego, LA
4. 19 May 2010 at NP Trist Middle School in Meraux, LA
5. 9 December 2010 at Westwego Tassin Senior Center in Westwego, LA
6. 31 July 2012 at Westwego Tassin Senior Center in Westwego, LA
7. 21 May 2014 at Mathews Government Complex in Mathews, LA

Public notices for each meeting ran in local newspapers and press releases were disseminated to the media in advance of each meeting. The public was able to provide verbal comments during the meetings, written comments after each meeting in person, by mail, and via www.nolaenvironmental.gov. Additional, public comments are accepted anytime during the IER process via www.nolaenvironmental.gov. The presentations given at all of these meetings can be found at www.nolaenvironmental.gov.

Draft PIER #37 was distributed for a 30-day public review and comment period on April 2, 2014 and the Decision Record was signed on June 13, 2014. During the public review of PIER #37, the community expressed concerns about the use of condemnation of private lands for mitigation associated with the Lake Boeuf alternative. Concern has also been expressed that conversion of agricultural land to forested wetlands would impact the community and its economy.

PIER #37, TIER 1 EA was distributed for a 30-day public review and comment period from October 13, 2015 through November 12, 2015. The TIER 1 EA was finalized with an approved FONSI December 18, 2015.

The Draft SPIER #37a was distributed for a 30-day public review and comment period.

8.2 AGENCY COORDINATION

Preparation of this SPIER #37a 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 for this project in which Federal and state agency staff played an integral part in the project planning and alternative project analysis phases of the project (members of this team are listed in Appendix I). This interagency environmental team was integrated with the PDT to assist in the planning of this project and to complete a determination of the potential direct and indirect impacts of the recommended action. The following agencies, as well as other interested parties, received copies of the draft SPIER #37a:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, National Park Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, NMFS
U.S. Natural Resources Conservation Service
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
Coastal Protection and Restoration Authority Board

Coordination with resource agencies will be on going as CEMVN develops the NEPA document(s) for each programmatic feature.

The Corps submitted a consistency determination to LDNR on 14 July 2015 per section 307 of the Coastal Zone Management Act of 1972 (16 USC 1451). Consistency was received on 07 December 2015 (Appendix J).

Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of an undertaking on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment prior to approval of an undertaking. The CEMVN has elected to fulfill its obligations under Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, through the execution and implementation of a Programmatic Agreement. The Programmatic Agreement was developed in consultation with the Advisory Council on Historic Preservation, the Louisiana State Historic Preservation Officer (LA SHPO), federally-recognized Indian tribes, and other identified interested parties. The Programmatic Agreement was executed on 18 June 2013 (Appendix J), and the CEMVN will comply with the agreed upon stipulations.

Eleven Federally-recognized tribes that have an interest in the region have been given the opportunity to review the action proposed in the draft SPIER.

Coordination with the USFWS on the Alternative Arrangements process was initiated by letter on 13 March 2007, and concluded on 6 August 2007. A draft Fish and Wildlife CAR for the SPIER #37a was provided by the USFWS on 29 Dec 2015. The final CAR concluded that the USFWS

does not object to the construction of the project provided that fish and wildlife conservation recommendations are implemented concurrently with project implementation. A copy of the final report is provided in Appendix J. The USFWS project-specific recommendations for the SPIER #37a recommended action are listed below:

The Service supports the Corps' current mitigation features and recognizes that additional Tiered IERs may be need to address individual mitigation features that are still in early design phases. We support the Corps' plan to mitigate impacts to fish and wildlife resources associated with WBV HSDRRS provided that the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation and outstanding issues are adequately resolved via ongoing planning efforts:

1. Prior to beginning work on IERs tiered off of this SPIER the Corps should coordinate with the natural resource agencies to ensure that necessary information to conduct detailed project planning/design and finalize the WVA analysis is developed and available. Final sizing of mitigation must be based on revised WVAs conducted on advanced project designs

   CEMVN Response 1: Concur. Coordination with the natural resource agencies to ensure that necessary information to conduct detailed project planning/design and finalize the WVA analysis will occur as early in the process as possible. Final sizing of mitigation would be based on revised WVAs conducted on advanced project designs.

2. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, Water Control Plans, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

   CEMVN Response 2: The USFWS and other resource agencies would be provided an opportunity to review and comment on the proposed HSDRRS mitigation plans during the project feasibility study and Pre-Construction Engineering and Design.

3. Impacts to Essential Fish Habitat (EFH) should be avoided and minimized to the greatest extent possible. Because impacts to designated EFH habitat may need to be mitigated the Corps should coordinated with the NMFS regarding this need and maintain an account of all EFH habitats (e.g., openwater, marsh) impacted and mitigated.

   CEMVN Response 3: Concur. The USACE would seek to avoid impacts to EFH and would coordinate with NMFS on any unavoidable impacts.

4. Impacts to wetland habitat (including SAV habitat) and non-wet BLH associated with the construction of the mitigation features should be avoided and minimized to the greatest extent possible. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet BLH caused by mitigation features through sizing (i.e., boundary adjustments) of the mitigation features in close coordination with the natural resource agencies.

   CEMVN Response 4: Concur

5. If applicable, a General Plan for mitigation lands should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA.

   CEMVN Response 5: Concur

6. A fully defined mitigation plan should be included in the authorizing report and Decision Record. The mitigation plan should be developed including locations and AAHUs vetted through the natural resource agencies. Only existing mitigation banks and existing credits released by Corps Regulatory Branch may be considered.

   CEMVN Response 6: Concur; however, the Corps may also consider the purchase of credits from the Corps-approved State of Louisiana In Lieu Fee Program.

7. We recommend that the Corps consider the availability of credits at a bank and within a hydrologic unit when evaluating the mitigation bank alternative to avoid exhausting credits available for individual landowners/permittees within a particular hydrologic unit.

   CEMVN Response 7: Acknowledged

8. If mitigation credits are purchased from a mitigation bank the Service requests that a copy of the letter from the banker acknowledging the acquisition is provided to the Service for our files.

   CEMVN Response 8: Concur

9. If mitigation lands are purchased for inclusion within publicly managed lands, those lands may need to meet certain requirements. Land-managing natural resource agencies may have requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements. The local sponsor should also be made aware of the above requirements should it be their responsibility to transfer mitigation lands to the land-managing agency.

   CEMVN Response 9: If mitigation lands are purchased for inclusion within publicly managed lands, the CEMVN would work to meet the basic mitigation land requirements to the maximum extent possible. The Non-Federal Sponsor is responsible for operation and maintenance of the HSDRRS project, including the mitigation features. Where mitigation features are located on Federal lands, the appropriate agency and the Non-Federal Sponsor would need to coordinate management of the mitigation project. Where mitigation projects are to be constructed on lands within a Federal agency's jurisdiction, that agency will be consulted regarding any requirements that will be applicable to those lands.

10. The Corps should continue to coordinate with land managing agencies during planning of mitigation features that may be built on their lands or lands to be turned over to them for management. Coordination should continue until construction of the projects are complete and prior to any subsequent maintenance. Please contact Mr. John Lavin at 1-888-677-1400 regarding work on the Bayou Segnette State Park which is operated by the Louisiana Department of Culture, Recreation and Tourism, Office of State Parks areas.

CEMVN Response 10: Concur.

11. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation and/or maintenance of mitigation lands, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest

    CEMVN Response 11: Project Partnership Agreements (PPAs) between the Federal government and the Non-Federal Sponsor (CPRA in this case) have been executed for the LPV and WBV HSDRRS projects, and these PPAs provide the requisite high level of confidence that the Non-Federal Sponsor will fulfill its obligations to operate and to maintain the HSDRRS mitigation projects. In the event that the Non-Federal Sponsor fails to perform, CEMVN has the right to complete, operate, maintain, repair, rehabilitate, or replace any project feature, including mitigation features. However, such an action would not relieve the Non-Federal Sponsor of its responsibility to meet its obligations and would not preclude the Federal government from pursuing any remedy at law or equity to ensure the Non-Federal sponsor's performance.

12. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

    CEMVN Response 12: Concur

13. The Service encourages the Corps to finalize mitigation plans and proceed to mitigation construction so that it will be concurrent with project construction. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.

    CEMVN Response 13: The USACE shares your goal of implementing mitigation as quickly as possible. If delays are experienced such that mitigation project implementation takes longer than what was previously estimated, the USACE would work with the resource agencies to determine whether such delays could necessitate extending the current period of analysis associated with the habitat impacts and whether additional temporal loss to the habitats in question would result in a larger mitigation requirement.

14. The Service recommends that the Corps immediately finalize selection and approval of mitigation and augmentation features in coordination with federal and state natural resource agencies and with required approval from EPA. All necessary studies for the mitigation and augmentation features have been completed and agencies have reached agreement on those features. Further, the Service recommends that all such mitigation and augmentation features be implemented as soon as possible. All terms and conditions specified in the EPA 2009 Modification to the Bayou aux Carpes CWA Section 404(c) Final Determination should be followed with regard to mitigation and augmentation requirements.

    CEMVN Response 14: The CEMVN continues to work in coordination with the IET to finalize selection of the augmentation features. The CEMVN is working to include the augmentation features in the TIER addressing WBV HSDRRS impacts to the JLNHPP and 404(c) area. The USACE will comply with the terms and conditions of the EPA

Bayou aux Carpes 404(c) modification and will fulfill its obligations under that modification as quickly as possible given agency resource constraints.

15. The Corps should immediately develop a long-term monitoring plan for the Bayou aux Carpes 404(c) area, as required under the EPA 2009 Modification to the Bayou aux Carpes CWA Section 404(c) Final Determination. The plan should be coordinated with the natural resources agencies and approved by EPA. All terms and conditions specified in the EPA 2009 Modification to the Bayou aux Carpes CWA Section 404(c) Final Determination with regard to the long-term monitoring and operation plan should be followed. Once approved, that plan should be implemented as soon as possible.

    CEMVN Response 15: Concur, development of long-term monitoring plan for the Bayou aux Carpes 404(c) area, as required under the EPA 2009 Modification to the Bayou aux Carpes CWA Section 404(c) Final Determination will proceed as quickly as possible and will be coordinated with coordinated with the natural resources agencies and approval sought by EPA.

16. The Service recommends that all of the terms and conditions outlined in the EPA Bayou aux Carpes 404(c) 2009 modification be implemented without delay. The Corps is responsible for funding all mitigation and augmentation features in this agreement. A link to the 2009 final modified determination may be found at www.nolaenvironmental.gov under the EPA heading for IER 12.

    CEMVN Response 16: Concur.

17. The Service recommends that the Corps work with the natural resource agencies to refine the "GUIDELINES – WET BLH HABITAT ENHANCEMENT, SWAMP HABITAT RESTORATION, AND SWAMP HABITAT ENHANCEMENT" and incorporate all changes in the Mitigation Success Criteria and Mitigation Monitoring: Marsh Mitigation Features from the LPV PIER 36 and the Bayou Sauvage Task Force Guardian BLH mitigation monitoring plan.

    CEMVN Response 17: The guidelines cited by USFWS, which actually now include guidelines for fresh marsh and intermediate marsh mitigation (Appendix L in PIER 37), were originally developed as very generalized guidelines for use in developing and evaluating potential LPV and WBV HSDRRS mitigation projects that would be Corps-constructed. The main objective for these guidelines was to help ensure consistency between LPV and WBV mitigation projects as regards things such as future with project WVA models, mitigation design concepts, and estimated mitigation costs (construction, implementation, maintenance, monitoring and reporting, etc.).

    See appendices D and E for project-specific information pertaining to the proposed mitigation work plan, mitigation success criteria, mitigation monitoring and reporting, mitigation management/maintenance, and proposed adaptive management plan for each TSMP. The project-specific mitigation information developed would supersede the cited general guidelines and would incorporate lessons learned from the Bayou Sauvage project.

18. The Service recommends a two month period between herbicide application and mechanical clearing of invasive species. The proposed one month period may not allow sufficient time for herbicides to travel into the root system and work, thus

encouraging greater stump sprouting which may increase the amount of future herbicide applications.

CEMVN Response 18: Concur. The plans will reflect a two month period between herbicide applications.

19. The Service recommends that the Corps maintain full responsibility for any BLH mitigation project for a minimum of 4-years post planting. Documentation should be provided to demonstrate funding obligation for the Corps to fulfill initial success criteria at a minimum.

    CEMVN Response 19: Presently, the USACE intends to issue a Notice of Construction Completion (NCC) for authorized Corps-constructed mitigation projects to the Non-Federal Sponsor (NFS) for functional portions of the mitigation as they are complete (e.g. project would shift from the "construction" phase to the "operation, maintenance, repair, replacement, and rehabilitation" or OMRR&R phase at this point). However, the USACE would if necessary undertake certain mitigation activities necessary to meet the project's initial success criteria. These activities would vary depending on the specifics of the mitigation plan and its associated success criteria. Note that while the USACE would complete mitigation construction and certain activities after the NCC is issued, all these activities would be subject to standard cost-sharing provisions and the availability of funds.

20. The Service recommends that all mitigation planning documents should describe in detail actions needed by the Corps and/or the local sponsor if mitigation is not succeeding as planned.

    CEMVN Response 20: Concur. See appendices E and F.

21. The Corps should avoid adverse impacts to bald eagle and osprey nesting locations and wading bird colonies through careful design 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.

    CEMVN Response 21: The clearing of forested wetlands would be conducted in the fall or winter, if practicable, to avoid and minimize impacts to nesting migratory birds. If colonial-nesting wading birds (CNWBs) are anticipated to nest in forested areas slated for clearing during the nesting season, the USACE would likely employ other measures to avoid impacts to active CNWB nests, viable eggs in such nests, and nesting young, such as implementation of a CNWB nesting prevention/abatement plan. Any such plan would first be coordinated with USFWS.

22. We recommend that the Corps re-initiate ESA consultation with this office 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 reinitiated should the proposed project features change significantly or are not implemented within one year of the last ESA consultation with this office.

    CEMVN Response 22: Concur. The USACE would fulfill its consultation responsibilities as required under the ESA.

9. COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Environmental compliance has been achieved by coordination of this SPIER #37a with appropriate agencies, organizations, and individuals for their review and comments; resolution of all Fish and Wildlife Coordination Act recommendations and LDNR concurrence with the determination that the proposed action is consistent, to the maximum extent practicable, with the LCRP established under section 307 of the Coastal Zone Management Act of 1972 (16 USC 1451). Further coordination would be completed to achieve environmental compliance as future NEPA documents are being developed.

The following coordination and analysis has been finalized:

- Endangered Species Act: USFWS and NMFS concurrence that the Lake Boeuf FS Swamp and BLH-Wet Restoration and the Avondale Gardens PS BLH-Dry Enhancement Projects would have no effect on any endangered or threatened species or completion of ESA section 7 consultation; In a letter dated July 27, 2015, the USFWS concurred that the proposed plan would have "no effect" on T&E resources.

- Coastal Zone Management Act: LDNR concurrence with the determination that the Hwy 307 Bayou Boeuf FS BLH-wet and Swamp Restoration and Avondale Gardens PS BLH-Dry Projects are consistent, to the maximum extent practicable with the LCRP; a coastal zone determination was submitted to LDNR on July 15, 2015; LDNR requested a 15 day extension on September 15, 2015 and the Corps requested a 45 day extension on October 1, 2015. Consistency was received December 7, 2015.

- Clean Air Act: Louisiana Department of Environmental Quality concurrence or resolution of all LDEQ comments on the air quality impact analysis received on Feb 10, 2016

- Magnuson-Stevens Fishery Management Act: There is no EFH within the recommended project area.

The following coordination and analysis is ongoing:

- National Historic Preservation Act, Section 106 - CEMVN compliance with stipulations agreed to in the programmatic agreement executed June 18, 2013.

10. FUTURE MITIGATION NEEDS

Once As-Builts (final plans documenting what was actually built) for all HSDRRS contracts are complete, the mitigation PDT, along with the resource agencies, would revisit the impacts to all habitat types from the HSDRRS construction (including open water). Completion of this effort would result in a final computation of impacts and may necessitate the expansion of the proposed HSDRRS mitigation projects in order to fully mitigate all HSDRRS impacts. For any habitat type where mitigation has already been constructed, an expansion of that mitigation project would be considered. Other options to that expansion providing adequate compensatory mitigation, such as mitigation banks, would also be analyzed. Any expansion, and option to that expansion, would be presented to the public in the CED, Phase 2.

11. CONCLUSION

11.1 RECOMMENDED DECISION

Recommend approval of the constructible portion of the WBV HSDRRS Mitigation MMPA: The Avondale Gardens PS BLH-Dry enhancement project to fulfill the general PS BLH- Dry mitigation requirements. Currently, the preferred and anticipated site for project implementation is BLH West. However, if conditions at the BLH West site are not favorable for construction and/or for the long-term success and sustainability of the project or if negotiations with landowner(s) favor purchase of the East site, the project may be implemented at the BLH East site.

Additionally, CEMVN recommends further evaluation and agency coordination for the programmatic features of the MMPA. A joint EA, PIER #37, TIER 1 EA, has been prepared in collaboration with the NPS to complete the evaluation of those features. The FONSI was signed on December 18, 2015.

11.2 PREPARED BY

The point of contact for this SPIER #37a is Tammy Gilmore, USACE New Orleans District CEMVN-PDN-CEP. Table 11-1 lists the preparers of relevant sections of this report. Ms. Gilmore can be reached at the U.S. Army Corps of Engineers, New Orleans District; Coastal Environmental Planning Section, P.O. Box P.O. Box 60267, 7400 Leake Avenue; New Orleans, LA 70118.

Table 11-1: SPIER Preparation Team

Position/SPIER Section	Team Member
RPEDS Sr. Environmental Lead and /DQC reviewer	Sandra Stiles, USACE
Environmental Project Manager	Tammy Gilmore & Elizabeth Behrens, USACE
Fisheries, Aquatic Resources, EFH, and Water Quality	Nathan Dayan, USACE, Christina Saltus, USACE-ERDC
Wetlands and other surface waters, Wildlife, and Threatened and Endangered Species	Tammy Gilmore, USACE
Socioeconomics/Land Use/Environmental Justice, Transportation, Navigation, and Commercial Fisheries	Andrew Perez and Joseph Mann, USACE
Air	Joseph Musso, USACE-ERDC
Noise	Patricia Leroux, USACE
Cultural Resources	Eric Williams, USACE
Recreation	Deborah Wright, USACE
Aesthetics	Kelly McCaffrey, USACE
HTRW	Joseph Musso, USACE
Mitigation Plan, Success Criteria, Planting Plan	Clay Carithers, USACE
Document Organization and Formatting	Tammy Gilmore, USACE

12. REFERENCES

Alperin, Lynn. 1983. History of the Gulf Intracoastal Waterway. Navigation History NWS-83-9,

National Waterways Study, U.S. Army Engineer Water Resources Support Center, Institute for Water Resources. Available on the Internet. http://www.gicaonline.com/media/about/alperin.pdf

American Canal Society, 1979. The American Canal Guide, The Lower Mississippi And Gulf States. Part 3, pp.24 http://www.americancanals.org/Am_Canal_Guides/Am_Canal_Guides_files/guide%203%20rvsd.pdf

---. 2012a. Gulf Intracoastal Waterway in Louisiana. Retrieved March 20, 2012 from http://www.americancanals.org/Data_Sheets/Louisiana/Gulf ICWW.pdf

---. 2012b. Empire Lock, Plaquemines Parish, Louisiana. Retrieved March 20, 2012 from http://www.americancanals.org/Data_Sheets/Louisiana/Empire Lock.pdf

---. 2012c. Harvey Lock, Jefferson Parish, Louisiana. Retrieved March 20, 2012 from http://www.americancanals.org/Data_Sheets/Louisiana/Harvey Canal and Lock.pdf

Barras, J.A. 2006. Land area change in coastal Louisiana after the 2005 hurricanes-a series of three maps: U.S. Geological Survey Open-File Report 06-1247.

Coastal Protection and Restoration Authority, 2015. Fiscal Year 2016 Annual Plan: Integrated Ecosystem Restoration and Hurricane Protection in Coastal Louisiana. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Coastal Protection and Restoration Authority (CPRA). 2013. Coastal Impact Assistance Program, Louisiana. September 2013 Program Update, Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

---. 2013b. Coastal Protection and Restoration Authority Quarterly Progress Report, October 2013, Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

---. 2012a. Fiscal Year 2013 Annual Plan: Integrated Ecosystem Restoration and Hurricane Protection in Coastal Louisiana. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA. http://www.lacpra.org/assets/docs/2012%20Plans/Final_FY_2013_Annual_Plan_3-19-2012_Web_Format.pdf

---. 2012b. Coastal Impact Assistance Program, Louisiana. February 2012 Program Update. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA. Available on the Internet. http://www.lacpra.org/assets/docs/CIAP%20News/February%202012%20Louisiana%20CIAP%20Newsletter.pdf

---. 2010. Louisiana Coastal Impact Assistance Plan, Louisiana, Version 3.0. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA. http://www.lacpra.org/assets/docs/Final%20CIAP%20Plan%20V3%20(2).pdf

Harris, Nicole, 2015. NOV levee project status. Email to Christina Saltus, 06 May 2015.

Harper, Timothy, 2012. Lafitte Tidal Protection Surplus 2007 projects. Email to Christina Saltus, 9 April 2012.

Jones, Kenneth, Rhonda Smith, and Benjamin Maygarden. 1997. Cultural Resources Survey of the Westwego to Harvey Canal Hurricane Protection Project, Lake Cataouatche Area, Jefferson Parish, Louisiana (Report #22-2049). Earth Search, Inc., New Orleans. Submitted to the U.S. Army Corps of Engineers, New Orleans District.

Kryter, K. D. 1994. The Handbook of Hearing and the Effects of Noise: Physiology, and Public Health. McGraw Hill, New York.

Louisiana Coastal Wetlands Conservation and Restoration Task Force (LCWCRTW) & Wetlands Conservation and Restoration Authority (WCRA). 1999. Coast 2050: Toward a Sustainable Coastal Louisiana. Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority.

McMenis, James. 2012. East of Harvey Canal Interim Hurricane Protection. Email to Christina Saltus, 4 April 2012.

Minton, Angela. 2011. FWOP WBV status. Email to Christina Saltus, Elizabeth Behrens, and Clay Carithers, 23 May 2011.

National Marine Fisheries Service (NMFS) Galveston Lab. 1998. EFH Mapping. Accessed http://galveston.ssp.nmfs.gov/efh .

National Oceanic and Atmospheric Administration (NOAA) NMFS). 2006. "Recommendations for the Contents of Biological Assessments and Biological Evaluations." Protected Resources Division, St. Petersburg, FL. January.

Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed [12/16/2013].

Saint Charles Parish, 2015. St Charles West Bank Hurricane Protection Levee (BA-85). St Charles Parish Government. Email to Christina Saltus, 04 May 2015 from Holly Fonseca.

Saint Charles Parish Government. (2013, November 25). West Bank Hurricane Protection Levee Updates. Retrieved from http://www.stcharlesparish-la.gov/index.aspx?page=957

Salaam, Tutashinda, 2015. WBV HSDRSS construction info. USACE WBV Project Manager Email to Christina Saltus, 01 May 2015.

Schiltz, Greg. 2012. Personal Communication. St. Charles Parish Non-federal Levees. 27 March 2012.

---. 2011. St. Charles Parish Levees. Email to Christina Saltus, 20 May 2011.

Shaffer, Gary P. Thais E. Perkins, Susanne Hoeppner, Susan Howel, Heath Bernard and Carol Parsons. 2003. Ecosystem Health of the Maurepas Swamp: Feasibility and Projected Benefits of a Freshwater Diversion, Prepared for EPA Region 6.

Southeast Louisiana Flood Protection Authority West (SLFPW). 2012. MRL/WBV Levee Construction.

E-mail to Christina Saltus, 27 March 2012.

U.S. Army Corps of Engineers (USACE). 2013. Comprehensive Environmental Document Phase I, Greater New Orleans Hurricane and Storm Damage Risk Reduction System.

U.S. Army Corps of Engineers (USACE). 2014. Programmatic Individual Environmental Report #37, West Bank and Vicinity (WBV) Hurricane and Storm Damage Risk Reduction System (HSDRRS) Mitigation, Jefferson, Lafourche, Plaquemines and St. Charles Parishes, Louisiana. New Orleans District, New Orleans, Louisiana.

U.S. Army Corps of Engineers (USACE). 1985. Larose to Golden Meadow, Louisiana, Hurricane Protection Project. Final Supplemental Environmental Impact Statement. New Orleans District, New Orleans, Louisiana.

---. 2004a. The Mississippi River and Tributaries Project. Retrieved March 21, 2012 from http://www.mvn.usace.army.mil/pao/bro/misstrib.htm

---. 2009. "Plaquemines Parish Hurricane Risk Reduction." Riverside 2009 Special Edition. 12pp.

---. 2011a Final Environmental Impact Statement New Orleans to Venice, Louisiana, Hurricane Risk Reduction Project: Incorporation of Non-Federal Levees from Oakville to St. Jude, Plaquemines Parish, Louisiana. Vicksburg District, Vicksburg, Louisiana.

---. 2011b. Final Supplemental Environmental Impact Statement New Orleans to Venice Federal Hurricane Protection Levee, Plaquemines Parish, Louisiana. Vicksburg District, Vicksburg, Mississippi.

---. 2012a. Unpublished. Comprehensive Environmental Document. Greater New Orleans Hurricane and Storm Damage Risk Reduction System. Vol. I and II. Revised Review Draft. New Orleans District, New Orleans, Louisiana.

U.S. Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Office of Noise Abatement and Control. USEPA Report No. 550/9-74-004. Washington, D.C.

Wells, Douglas C, Sara A. Hahn and Thruston H.G. Hahn III, 2010. Cultural Resources Survey and Testing of Items Related to the West Bank and Vicinity Hurricane Protection Levees, Jefferson, Orleans, Plaquemines, and St. Charles Parishes, Louisiana, Report #22-3560.

Wilson-Prater, Tawanda, 2015. RE_Larose to Golden Meadow. Email to Christina Saltus, 8 May 2015.