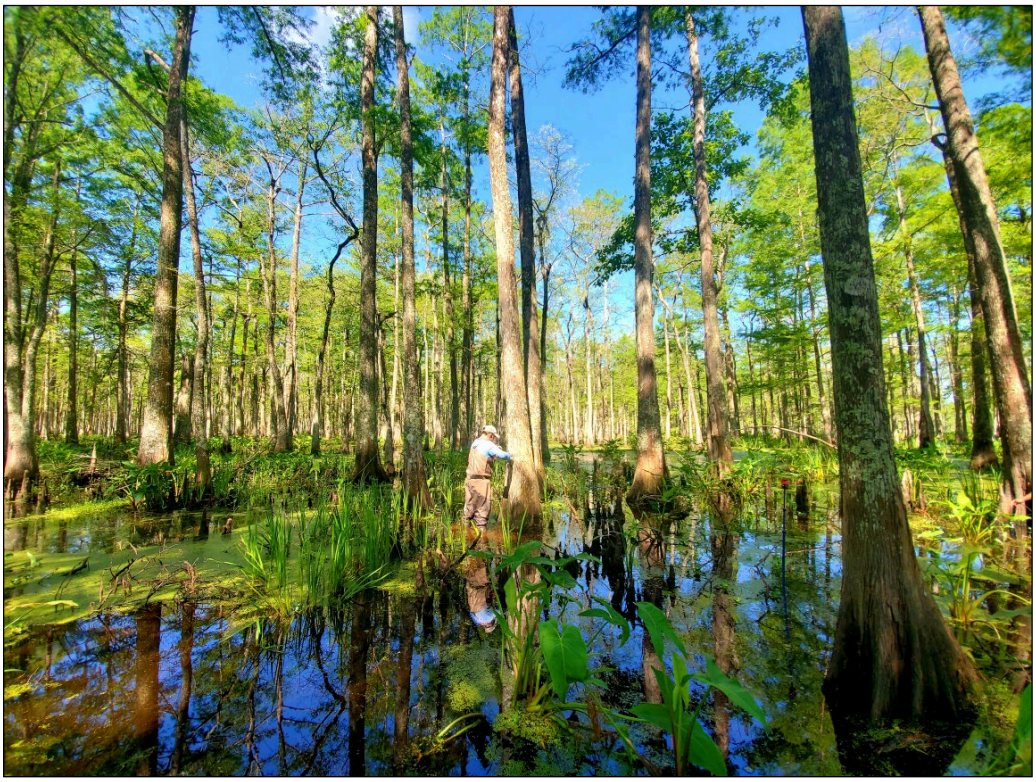
Mississippi Valley Division,
Regional Planning and Environment Division South

Final Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study



Final Mitigation Plan Update

December 2022

Mississippi Valley Division,
Regional Planning and Environment Division South

Errata:

Final Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study

December 2022

December 2022

Errata Sheet

Major Differences Between:

Draft Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study

Draft Mitigation Plan Update,

March 2022

And

Final Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study

Final Mitigation Plan Update

December 2022

The following list includes main refinements and updates that occurred between the draft SEIS and the final SEIS.

1. An Addendum: 1) provides a brief and concise summary of the history and status of the originally authorized West Shore Lake Pontchartrain (WSLP) Hurricane and Storm Damage Risk Reduction project; 2) document a proposed change in the swamp mitigation being used to meet the compensatory mitigation requirements of the WSLP project; and 3) document known significant changes to the scope of the WSLP project. The addendum includes cost comparisons between the originally authorized WSLP and the proposed change in swamp mitigation using the Maurepas Diversion.

2. Appendix D- Plan formulation appendix was intentionally removed because it included outdated content.

3. The Real Estate Plan was added as Appendix Q.

4. Scope of SEIS was further clarified to acknowledge this was not a full plan formulation of all possible alternatives but was limited to looking at the additional alternative proposed by the Non-Federal Sponsor (Executive Summary and Section 2 Plan Formulation).

5. Clarification of Selection of the TSP (Executive Summary and Section 2.8 Tentatively Selected Alternative (TSA))

   The alternatives were evaluated and compared based on cost effectiveness, adverse and beneficial environmental impacts, risk and reliability, watershed and ecological site considerations. The TSA was ultimately selected based on the USACE Principles and Guidelines Criteria of completeness, efficiency, effectiveness, and acceptability.

   Based on the alternative evaluation process, the BBA Alternative (No Action Alternative) remains the federally selected plan to meet the WSLP project mitigation needs. However, following the confirmation of the federally selected plan, the NFS requested that the MSA-2 be pursued because it could be integrated with the implementation of the WSLP project, saves the NFS time and money, provides mitigation immediately adjacent to the impacts, and would increase system resiliency around the WSLP project.

   In conjunction with the request, the NFS offered that it would agree to be solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, pursuant to a Non-traditional Cost Sharing amendment to the Project Partnership Agreement (PPA) if MSA-2 were to be selected as the recommended swamp mitigation.

   The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs. As the NFS would be responsible for the construction of MSA-2, the total combined lands,

easements, rights-of-way, and disposal (LERRD) and Work-in-Kind Credits which the NFS would be able to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Thus based upon the above, the NFS-preferred alternative, MSA-2, was recommended as the Tentatively Selected Alternative with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative.

6. Additional information was added regarding compliance with the mitigation laws, policies, and standards (Section 2.1.1 Evaluation of the MSP to Determine if it is a Viable Mitigation Alternative).

7. Additional information was added to clarify the differences between the primary, secondary, and tertiary benefit areas and their real estate interests (Section 2.5 and Figures 2-5 and Figure 2-6).

8. Additional information regarding the evaluation and comparison of alternatives was added to the following sections:

    2.6 Cost Analysis and Incremental Cost Analysis
    2.7 Evaluation and Comparison

9. Additional information related to Risk and Uncertainty was added to Section 2.8.4 Data Gaps, Risk and Uncertainty Analysis, and Areas of Controversy

10. New Section added - 2.8.5 Real Estate

11. New Content added to Section 3.1.4 Ecological Resources to further describe the ecological resources and the data sources used to determine their significance.

12. Costs for the Monitoring and Adaptive Management Plans were added to Section 6 Adaptive Management.

13. Section 7 Coordination and Consultation was updated to reflect current status. A summary of comments received during the 45-day public review is included in the SEIS and Appendix O.

14. Section 8 Compliance with Environmental Laws and Regulations was updated to reflect the current status.

15. Section 9 Conclusion was updated to add Section 9.2 Unavoidable Adverse Effects, Section 9.3 Relations of Short-Term Uses and Long-Term Productivity and Section 9.4 Irreversible and Irretrievable Commitment of Resources

16. Appendix P HTRW was updated.

Mississippi Valley Division,
Regional Planning and Environment Division South

Addendum:

Final Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study

December 2022

CONTENTS

List of Tables

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Section 1
Overview

The purpose of this addendum is to: 1) provide a brief and concise summary of the history and status of the originally authorized West Shore Lake Pontchartrain (WSLP) Hurricane and Storm Damage Risk Reduction project; 2) document a proposed change in the swamp mitigation being used to meet the compensatory mitigation requirements of the WSLP project; and 3) document known significant changes to the scope of the WSLP project.

1.1 DESCRIPTION OF THE AUTHORIZED PROJECT

1.1.1 West Shore Lake Pontchartrain (WSLP) Authorized Project

On June 12, 2015, a Chief's Report was submitted to Congress to provide a plan for hurricane and storm-damage risk reduction in St. Charles, St. John the Baptist, and St. James Parishes. The 2015 Chief's Report was submitted in response to resolutions adopted by the Committee on Public Works of the United States House of Representatives (July 29, 1971) and the Committee on Public Works of the United States Senate (September 20, 1974). The guidance in this resolution directed for the evaluation of additional levees for hurricane risk reduction and flood control in these three parishes.

The recommended plan in the 2015 Chief's Report includes the construction of an approximate 18-mile earthen levee system and floodwalls around the communities of Montz, Laplace, Reserve, and Garyville based on the 1 percent probability storm level of risk reduction. The plan also includes the addition of four floodgates, a drainage canal running parallel to the levee, a flood-side ditch to maintain hydraulic connectivity between wetlands north and south of the system, two drainage structures, and four pump stations along the alignment. Structures throughout the project area were designed to the 2070 elevation, which incorporates the intermediate sea level rise condition.

Recommendations for St. James Parish in the 2015 Chief's Report are to include a berm set to a 6.5 feet NAVD 88 around the communities of Gramercy and Lutcher, extending approximately 10,000 linear feet (lf); a berm set to 6.5 feet NAVD 88 around the community of Grand Point North, extending approximately 10,000 lf; installation of one-way flap gates to existing culvers under Highway 3125 (currently estimated to require 145 one-way flap gates); small ring berms around an estimated four non-residential structures; and an estimated five light industry/warehouse structures; and nonstructural elevation of an estimated 14 residential structures.

The Coastal Protection and Restoration Authority Board of Louisiana (CPRAB) and the Pontchartrain Levee District (PLD) are the non-Federal cost-sharing sponsor for these stated features. Cost sharing is 65 percent Federal share and 35 percent non-Federal share.

1.1.2 WSLP Authorized Mitigation

When unavoidable impacts occur, the U.S. Army Corps of Engineers (USACE) is required to offset those impacts through compensatory mitigation by replacing the lost habitat's functions and services equally and in-kind.

Compensatory mitigation for impacts due to construction of the WSLP project were described previously in the 2014 WSLP Environmental Impacts Statement (EIS) and revised in Environmental Assessment (EA) #576. EA #576 addressed mitigation for multiple habitat impacts associated with each of the New Orleans District's (hereafter identified as CEMVN) Bipartisan Budget Act (BBA) of 2018 funded risk reduction projects (i.e., the WSLP project, Comite River Diversion Project, and the East Baton Rouge (EBR) Parish Watershed Flood Risk Management Project) since all these projects occurred in the same watershed and impacted similar habitats. The record of decision (ROD) for the WSLP environmental impact statement (EIS) was signed September 14, 2016, and the finding of no significant impact (FONSI) for EA #576 was signed on April 13, 2020. Subsequent to the signing of EA #576, in coordination with the resource agencies, the Joyce project that was included as part of the federally selected plan was dropped from the BBA mitigation plan for swamp because recent results of monitoring for similar projects called into question the success and sustainability of the project and a high risk of failure was anticipated. In addition, the St. James project was misidentified as a BLH out of CZ project in EA #576. During public review of the draft EA, the Department of Natural Resources commented that the St. James project was in fact within the CZ (see WSLP SEIS appendix J). Since the St. James project does fall within the CZ and has elevations that could be used or modified for a swamp project, it was moved to become one of the swamp features of the BBA mitigation plan. Since the St. James project falls within the Lake Pontchartrain Basin (LPB), it outranks the out of basin swamp projects in the original plan. Additionally, since the St. James project is less costly and has less impacts compared to the Pine Island project, it became the highest ranked project in the swamp feature of the BBA Mitigation Plan. With the addition of the St. James project into the swamp feature, out of watershed projects were no longer needed so that the BBA mitigation plan for swamp is now completely within the LPB. This decision was captured in a Memorandum for Record and coordinated with the resource agencies (see WSLP SEIS appendix J). As such, the federally selected plan for EA #576 includes the purchase of in-kind mitigation bank credits, the St. James project, and the Pine Island project.

Based on the WVA modeling, the St. James and Pine Island projects within the BBA Alternative have the potential to generate approximately 1,286 AAHUs for swamp. Additional AAHUs could be generated by the purchase of mitigation bank credits. As of November 2022, the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) ledger indicates 64.1 Coastal Zone (CZ) Swamp credits (approximately 32 AAHUs) are available for purchase in the Lake Pontchartrain Basin. There is the potential for an additional credit release of 43.7 CZ Swamp credits (22.04 AAHUs) within the next 12 months, contingent on the necessary criteria being met to grant credit release.

The St. James site would provide up to 1,246 acres and up to 511 AAHUs

The St. James site is currently existing agricultural land within the CZ in St. James Parish, and contains no wetland resources. Historically, before conversion to agricultural fields, this area supported BLH and swamp habitats.

This project consists of converting agricultural land to swamp habitat. This project would require a reduction of site elevations, that would be accomplished by removing the top 6 inches to 1 foot of soil. The removed earthen material would be used to fill depressions at the site to achieve uniform target elevations throughout the site or would be hauled off by a contractor to a government approved disposal area. Additional construction activities would likely consist of construction of new access roads, clearing and grubbing, backfilling of existing ponds/ditches, demolition of onsite structures, leveling/harrowing soil to receive planting, and planting of canopy and mid-story plant species required to establish swamp habitat.

The Pine Island project consist of converting shallow open water to swamp habitat. The project area, consisting of the borrow site and the swamp restoration site is located within the CZ along the northern shoreline of Lake Pontchartrain with water depths of approximately 9 feet and 2 feet, respectively. Historically, the shorelines of the lake were bordered by cypress/tupelo gum swamps, fresh to intermediate marshes, and bands of BLH forests bordering natural drainages and the lake rim in some areas. This site would provide up to 1,965 acres and up to 775 AAHUs. This project would require such construction activities as construction of containment dikes, hydraulic dredging and placement of fill material, planting of canopy and mid-story plant species required to establish swamp habitat, and gapping or degrading of containment dikes after the fill material has settled to the target elevation.

Public and agency comments on EA #576 included requests by the CPRAB and others that the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) PO-0029 River Reintroduction into Maurepas Swamp Project, (hereafter MSP), a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. The MSP is a 2,000 cubic foot per second (cfs) freshwater diversion that would reconnect the Mississippi River to the Maurepas Swamp, strategically delivering nutrient-laden river water to restore a degraded Cypress-Tupelo swamp.

In 2022 a draft supplemental EIS (SEIS) was prepared to assess and evaluate the MSP against the EA #576 projects at the request of the non-Federal sponsor (NFS). Once it was determined that the MSP could be converted into a mitigation alternative that could meet the swamp mitigation needs for the WSLP project, the MSP was then evaluated and compared to the previously identified swamp mitigation plan in EA #576.

The evaluation and comparison confirmed the swamp mitigation plan in EA #576 as the federally selected plan to meet the mitigation needs of WSLP. Through a letter dated August 23, 2021, the NFS acknowledged the federally selected plan but requested MSP be pursued because it could be integrated with the implementation of the WSLP project, saves the NFS time and money, provides mitigation immediately adjacent to the impacts, and would restore

the ecosystem around the WSLP project, which would increase its resiliency. In conjunction with the request, the NFS offered that it would agree to be solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, pursuant to a non-traditional cost sharing amendment to the Project Partnership Agreement (PPA) if MSA-2 were to be selected as the recommended swamp mitigation.

The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs.

As the NFS would be responsible for the construction of MSA-2, the total combined LERRD and WIK Credits which the NFS would be able to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Thus based upon the above, the NFS-preferred alternative, MSA-2, was recommended for implementation with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 any and all increased costs over and above the current estimated BBA Alternative.

Section 2
Authorization

Construction of the WSLP project was originally authorized by Section 1401of the 2016 Water Infrastructure Improvement for the Nation Act (WIIN Act, Public Law 114-322). The WSLP Integrated Feasibility Report and Environmental Impact Statement was transmitted to the 114th Congress, 2d Session in House Document 114-171. Construction funding for the project was included in the BBA of 2018 (BBA 2018, Public Law 115-123). As stated in the Construction heading of Title IV of BBA 2018, funding is to be provided at the full Federal expense; non-Federal cash contributions will be financed over a span of 30 years from the date of completion of the project.

BBA 2018 further stipulates in Title IV that projects receiving funding under this heading are not subject to requirements stipulated in section 902 of the Water Resources Development Act of 1986. Section 902 of the Water Resources Development Act (WRDA), Maximum Cost of Projects, may be increased by the Secretary for modifications that do not materially alter the scope or functions of the project by more than 20 percent of the total cost stated.

When unavoidable impacts occur, the CEMVN is required by 33 USC 2283 to offset those impacts through compensatory mitigation by replacing the lost habitat's functions and values equally and in-kind to the extent possible and shall ensure that the mitigation plan complies with, at a minimum, the mitigation standards and policies established pursuant to the regulatory programs administered by the Secretary (33 CFR 320.4(r), 325, and 332). Compensatory mitigation for unavoidable impacts is also required by the Clean Water Act (CWA) Section 404(b)(1) Guidelines.

Guidance for planning for civil works mitigation is provided in ER 1105-2-100 Appendix C, WRDA 2008 Sec. 2036a Guidance issued on August 31, 2009, and WRDA 2016 Sec. 1162 Guidance issued on February 2, 2018.

Section 3
Funding Since Authorization

Authorized costs disclosed in the Chief's Report and within BBA 2018 are included in the Tables 3-1 and 3-2.

Table 3-1: Authorized Funds for the WSLP Project (000's)

Authorized Funds	Chief's Report, June 12, 2015	BBA 2018 Funding Authorization	Cost Modified as Stated in Project Partnership Agreement (PPA)
Initial Construction	$613,000	$650,000	**$710,000**
Future Levee Lifts	$105,090	$110,000	**$50,000**

The following funding has been provided for the WSLP project since authorization in 2016.

Table 3-2: Allocation of Funds for the WSLP Project (000's)

Fiscal Year	Allocation of Funds	Funds Appropriation Category
2018	$350	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress
2019	$41,470	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress
2020	$81,935	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress
2021	$30,235	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress
2022	$21,553	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress
Total	$175,524	CCS 511 – Construction Flood Control (Projects Specifically Authorized by Congress

Section 4
Changes in Scope of Authorized Project

The scope of the authorized WSLP project has not changed since the 2015 Chief's Report and remains intact to provide hurricane and storm damage risk reduction in St. Charles, St. John the Baptist, and St. James Parishes. The WSLP project will provide a 1 percent level of risk reduction for the communities of Montz, LaPlace, Reserve, and Garyville. No additional developed areas have been added or removed to the project scope.

The scope of activities specified in the 2015 Chief's Report are still in design, design changes are outlined in Section 8 of this Report.

The scope of the WSLP project mitigation features remain consistent with the 2015 Chief's Report and 2016 project authorization. The project continues to mitigate unavoidable impacts to significant resources, including wetlands/swamp and bottomland hardwood (BLH) habitat associated with the construction of the WSLP project. The mitigation scope includes USACE constructed projects and/or the purchase of mitigation bank credits. While overall scope of the needed mitigation has not changed, the number of average annual habitat units (AAHUs) have increased since the 2015 Chief's Report. A change in AAHUs from the original feasibility report is typical as project designs are refined as a project progresses from the feasibility level through pre-construction plans and specifications to actual construction. The change in AAHUs for the WSLP since the 2015 Chief's Report is included in the table below.

Table 4-1: Changes in AAHUs (Direct and Indirect)

Impact AAHUs Identified	BLH	% Change	Swamp	% Change	Marsh	Total	% Change
2014 WSLP Feasibility Report and EIS	99	__	1090	__	0	1,189	__
2016 WSLP EIS and SEA #570	119	20%	1,118	3%	0	1,237	4%
2020 WSLP SEA #571	293	146%	947	15%	0	1,240	0%
2020 EA #576	343	17%	1504	59%	0	1,240	0%
2022 Draft SEIS, Maurepas (negative impacts from implementation of the WSLP St. John the Baptist Parish levee system)	293	15%	947	37%	0	1,240	0%
2022 Draft SEIS, Maurepas (negative impacts from Maurepas Diversion construction and operation)	35.8	__	206.5	__	19.5	261.8	79%

The mitigation plans to fully compensate for all of the WSLP impacts and associated impacts from mitigation implementation are located in different approval documents. See Table 4-2 for a summary of the habitat that require mitigation, along with the approved mitigation plan referenced.

Table 4-2: Summary of AAHUs and Mitigation Plan for Impacts from WSLP and Maurepas Implementation

	WSLP 2015 Chiefs Report (Documented Impacts in AAHUs)	2022 Draft SEIS (Total Impacts from WSLP and Maurepas Diversion Construction in AAHUs)	% Change	Mitigation Plan to address impacts
BLH	99	328.8	232%	EA #576 Mitigation Banks and Constructed St. James
Swamp	1,090	1,153.5	6%	2022 Draft SEIS Constructed Maurepas Diversion
Marsh	0	19.5	___	2022 Draft SEIS Appendix G Mitigation Banks and Constructed Guste Island
Total	**1,189**	**1,501.8**	26%	

Section 5
Changes in Project Purpose

There are no changes in the project purpose or function of the WSLP project, which continues to provide hurricane and storm damage risk reduction to St. Charles, St. John the Baptist, and St. James Parishes.

There are no changes in the project purpose for the swamp mitigation project. The project purpose is still to fully compensate for the swamp impacts from the WSLP project. Unavoidable impacts to swamp are being proposed to be mitigated through the implementation of the Maurepas Diversion rather than the previously approved mitigation plan for swamp as included in EA #576. There are no proposed changes to mitigate for the required BLH. BLH would still be mitigated through USACE constructed projects and/or the purchase of mitigation bank credits as outlined in EA #576.

Section 6
Changes in Local Cooperation Requirements

The original project partnership agreement (PPA) between the Department of The Army, the State of Louisiana and the PLD for the WSLP Hurricane and Storm Damage Reduction Project was executed on February 10, 2019. Should the Maurepas Diversion be selected as the swamp mitigation alternative, the existing PPA would be amended to address the construction of the Maurepas Diversion (for costs beyond the BBA selected swamp plan), update the total project cost, outline the updated cost share, and address acceptance of funds from the NFS. The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs.

As the NFS would be responsible for the construction of MSA-2, the total combined LERRD and WIK Credits which the NFS would be able to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Section 7
Changes in Location of Project

7.1 WSLP PROJECT

There are no significant changes in the location of the WSLP risk reduction construction features. There have been some minor realignments and adjustments to drainage canals that are generally due to the height requirements for the crossings under I-10 and I-55 and other technical requirements. The overall length of the alignment has increased less than 5 percent to account for these technical requirements. Staging area locations have also been finalized. Borrow/sand stockpile locations and access road locations were not specified in the 2015 Chief's Report. Locations for each have been finalized as design has progressed.

7.2 MITIGATION

The location for all proposed WSLP Mitigation features (USACE constructed and/or purchase of mitigation bank credits) remain within the Lake Pontchartrain Basin of the Louisiana coastal zone (LACZ). The Pine Island mitigation feature identified in EA #576 is located on the north shore of Lake Pontchartrain, southwest of the town of Madisonville adjacent to the Tchefuncte River in St. Tammany Parish. The St. James mitigation feature identified in EA #576 is located off the Mississippi River between the towns of Romeville and Union, LA around the Nucrop Plant in St. James Parish. Detailed information on the location of the Pine Island and St. James mitigation features can be found in SEA #571. The MSP mitigation feature identified in the 2022 draft SEIS is located on the East Bank of the Mississippi River in St. John the Baptist Parish, immediately west of Garyville, Louisiana. Detailed information on the location of the MSP can be found in the 2022 SEIS.

Section 8
Design Changes

8.1 WSLP PROJECT DESIGN CHANGES

Since the publication date of the 2015 Chief's Report, there have been three identified potential design changes to the WSLP project. These include 1) the number, location, and design of pump stations, 2) the number, location, and design of the drainage structures, 3) inclusion of wick drains to the levee sections. As a result of more detailed HEC-RAS hydraulic modeling and additional geotechnical data subsequent to the 2015 Chief's Report, further updates to the designs were made to ensure a 1 percent level of risk reduction would be provided in the most cost-efficient manner possible. These designs could continue to be updated as project construction continues. Environmental impacts associated with design updates after the 2015 Chief's report not evaluated under previous Supplemental Environmental Assessments (SEA) are currently being assessed and will be detailed in an SEA. A decision on any potential design updates will not be made until all environmental review and compliance requirements have been completed. Identified potential design updates are reflected in Table 8-1.

Table 8-1: Design Changes to WSLP Project as of August 2022

Design Change	2015 Chief's Report	Current Design	Reason for Update
Pump Stations	4 pump stations for a total capacity of 2,150 cfs	2 pump stations for a total capacity of 4,000 cfs	Optimized based on updated hydraulic modeling and constructability
Drainage Structures	7 drainage structures with 10 gates	7 drainage structures with 25 gates, increased flow	Optimized based on updated hydraulic modeling and constructability
Levee Sections	Earthen levees	Earthen levees to include wick drains	Reduce future settlement and reduce the size of the levee section
St. James Parish	Included flap gates on the existing drainage structures under LA Hwy. 3125 and construction of two ring levees	Current design includes construction of two ring levees. Flap gates are still being investigated/designed	Condition of existing culverts has raised concerns over installation cost and O&M
Levee Alignment	18-mile levee system in St. Charles and St. John Parishes with associated drainage canals	18- mile levee system in St. Charles and St. John Parishes with associated drainage canals, minor realignments increasing the levee length less than 5%	Height requirements for the crossings under I-10/I-55 and other technical requirements

8.2 MITIGATION CHANGES FOR SWAMP HABITAT

The 2014 feasibility report and EIS estimated a mitigation need of 1,090 AAHUs for swamp habitat through the proposed components:

- Swamp Mitigation Bank Credit Purchase
- Blind River Swamp Restoration
- Bonnet Carre Swamp Restoration
- Maurepas Crawfish Ponds Restoration
- Lutcher Polder Farmlands Swamp Restoration

In 2016 SEA #570 assessed impacts associated with surveys, borings, and investigations outside of the 2014 EIS right-of-way, as well as the addition of five stockpile/staging areas and access roads for investigation and construction related activities.

In 2020 SEA # 571 evaluated additional changes to the WSLP project levee alignment, the addition of four borrow areas, widening of the levee alignment, minor modifications to previously assessed access roads, and the addition of three access roads.

In 2020, the swamp mitigation plan was updated in EA #576 to meet the estimated swamp mitigation need of 1,504 AAHUs through the proposed components:

- Swamp Mitigation Bank Credit Purchase
- St. James Swamp Restoration

The 2022 SEIS documented an estimated swamp mitigation need of 1,153 AAHUs for the WSLP Project. The swamp mitigation can be exclusively achieved through implementation of the MSP for the tentatively selected alternative (TSA), Maurepas Swamp Alternative-2.

Section 9
Changes in Estimated Total Project Costs

The updated estimated project costs for the WSLP are displayed in Tables 9-1, 9-2, and 9-3 and reflect the 2014 Micro-Computer Aided Cost Estimating System Second Generation (MII) feasibility cost estimate (Class 3 level) for the WSLP construction and the 2014 MII (Class 3 level) WSLP mitigation escalated to current dollars. This cost escalation was accomplished by repricing the cost estimate utilizing the 2022 MII Cost Book, 2022 MII Equipment (Region 3) and 2022 New Orleans Labor Libraries, current material pricing and applying an escalation factor to lump sum sub bid items using CWCCIS EM1110-2-1304, 31 March 2022 INDEX. The January 2022 cost estimate for the Maurepas Diversion Structure (Class 4 level) was also escalated to current dollars by AECOM (NFS contractor) cost estimators applying a 2.9 percent per year project escalation rate.

In the effort to obtain an updated certified cost from MCX at Walla Walla District, the 2014 WSLP MII cost estimate is being revised to capture changes since feasibility such as changes to levee/structural designs, changes in the overall pumping capacity of pump stations, changes in sources for borrow and inclusion of any sunk costs. Further updates to Real Estate, Environmental and Relocation costs will be provided by others for inclusion in the cost estimate. AECOM will further develop the cost estimate for the Maurepas Diversion Structure and associated diversion channels and various Roadway/Railroad crossing structures along the channels to a (Class 3 level) in alignment with ER 1110-2-1302 which will be quality control reviewed for cost compliance. A new risk assessment will be performed and an updated Cost and Schedule Risk Analysis(CSRA) contingency will be applied to the future updated costs.

Table 9-4 shows the difference in costs between the 2014 MII estimates for the WSLP project and the updated costs with and without the Maurepas Swamp Project.

It should be noted that the costs reflected are based solely on the 2014 MII costs escalated to today’s dollars. Changes may occur as the project moves through construction. An additional planning or engineering memorandums will document these changes.

Table 9-1: Estimated Cost for WSLP Construction (2014 MII Escalated to October 2022 Price Level – 000's)

WBS #	Feature and SubFeature	Amount
1	Lands and Damages (WSLP Construction)	$9,548
2	Relocations (WSLP Construction)	$24,679
11	Levees and Floodwalls	$485,410
11	St. James Non Structural	$60,507
13	Pumping Plant	$149,157
30	Planning Engineering and Design (WSLP Construction)	$71,974
31	Construction Management (WSLP Construction)	$57,577
Total Estimated Cost		$858,852

Table 9-2: Estimated Cost for Original Mitigation (2014 MII Escalated to October 2022 Price Level – 000's)

WBS #	Feature and SubFeature	Amount
1	Lands and Damages	$26,680
2	Relocations	$0
6	Fish & Wildlife (BLH Mitigation)	$2,856
6	Fish & Wildlife (Swamp Mitigation)	$131,634
30	Planning Engineering and Design	$13,985
31	Construction Management	$11,190
Total Estimated Cost		$186,345

Table 9-3: Estimated Cost for Maurepas Diversion (OCT 2022 Price Level – 000's)

WBS #	Feature and SubFeature	Cost
1	Lands and Damages	$3,108
2	Relocations	$4,400
6	Fish & Wildlife (Adaptive Management, Monitoring)	$95,027
15	Floodway Control and Diversion Structure	$160,951
30	Planning Engineering and Design	$26,040
31	Construction Management	$20,830
Total Estimated Cost		$310,356

Table 9-4: Summary of Changes in Project Costs (000's)

	2014 Feasibility Report and EIS (3.75% interest rate)	WSLP Cost Updated to Current Price Level with Original Mitigation	WSLP Cost Updated to Current Price Level with Maurepas Mitigation
Estimated Costs	$718,090	$1,045,197	$ 1,169,208
Annual OMRR&R	$5,070	$5,500	$12,500
Annual Construction Costs	$28,881	$37,500	$42,200

Operation Plan Maintenance, Repair, Rehabilitation and Replacement

Operation, maintenance, repair, rehabilitation and replacement would be incorporated to sustain the constructed project to ensure satisfactory operation of the diversion features over a 50-year project life. The maintenance tasks of the various engineering and design features that comprise the Maurepas Diversion are grouped into the following eight categories: 1) intake & levee crossing, 2) headworks, 3) roadway crossings, 4) sediment basin & conveyance channel, 5) railroad crossings, 6) check valves, 7) flow distribution features, and 8) remote sensors. The estimated cost for these features over the 50-year project life is $344,450,591. In addition to maintaining project design features, maintenance activities for the MSA-2 would also include tasks associated with ancillary channel maintenance, including routine inspections and bathymetric surveys every 5 years, removal of debris and deposited material, and invasive and nuisance species management. Ancillary channels include conveyances within the MSA-2 area that are not associated with the engineering and design features. The total maintenance cost including the ancillary channels over the 50-year project life is $353,675,591. The 50-year cost, for diversion operation to optimize benefits to swamp habitat within the mitigation area is $5,381,250. The total estimated OMRR&R is $359,057.

Table 9-5: Summary of changes in OMRR&R (000's)

Total Estimated WSLP OMRR&R		
Levee System	Constructed Mitigation 2014 (swamp only)	Maurepas Diversion Mitigation
$313,936	$14,359	$359,057

Section 10
Changes in Project Benefits

The equivalent annual benefits were calculated using the FY23 federal discount rate of 2.5 percent. The equivalent annual benefits were escalated to FY23 price levels using the September 30, 2022 version of the CWCCIS.

Table 10-1: Changes in Project Benefits (000s)

	2014 Feasibility Report and EIS (3.75 % interest rate)	WSLP Cost Updated to Current Price Level with Original Mitigation	WSLP Cost Updated to Current Price Level with Maurepas Mitigation
Equivalent Annual Benefits	$97,840	$131,160	$131,160
Annualized Net Benefits	$63,888	$88,160	$76,460

Section 11
Benefit-Cost Ratio

Table 11-1 compares the benefits to cost ratio from the 2014 feasibility report and EIS (2.9) to the current price level with the original mitigation plan (3.0) to the WSLP project with the Maurepas Mitigation (2.4). The current benefit to cost ratio of the WSLP project including Maurepas Mitigation is 2.4. Table 11-2 displays and sensitivity analysis to show how the benefit to cost ratio could change if there are other additional cost increases.

Table 11-1: Benefit to Cost Ratio (000's)

	2014 Feasibility Report and EIS (3.75% interest rate)	WSLP Cost Updated to Current Price Level with Original Mitigation	WSLP Cost Updated to Current Price Level with Maurepas Mitigation
Equivalent Annual Benefits	$97,840	$124,570	$124,570
Annualized Net Benefits	$63,888	$79,374	$67,374
Benefit to Cost Ratio	2.9	3.0	2.4

Table 11-2: WSLP Cost Sensitivity Analysis (000's)

FY 23 Price Level and Discount Rate				
First Costs	Equivalent Annual Benefits	Average Annual Costs	Net Benefits	B/C Ratio
$1,200,000	$131,160	$55,900	$75,260	2.3
$1,300,000	$131,160	$59,700	$71,460	2.2
$1,400,000	$131,160	$63,500	$67,660	2.1
$1,500,000	$131,160	$67,300	$63,860	1.9

Note: The average annual costs include the OMRR&R costs for the Maurepas Diversion.

Section 12
Changes in Cost Allocation

There are no changes in cost allocation. All costs remain related to hurricane and storm damage risk reduction purposes and the required mitigation associated with the project as authorized.

Section 13
Changes in Cost Apportionment

Table 13-1: Apportionment of Estimated Cost in Current Dollars (000'S)

	Estimated Construction Cost	Fed	Total NFS Contribution	NFS LEERDS	NFS Cash/ Construction Credit	NFS Cash/ Construction Credit
WSLP Cost Updated to Current Price Level with Original Mitigation	**$1,045,197**	**$679,378**	**$365,819**	$60,907	$304,912	$0
Percent of total	**100%**	**65%**	**35%**			
WSLP Cost Updated to Current Price Level with Maurepas Mitigation	**$1,169,208**	**$679,378**	**$489,830**	$41,735	$367,488	$80,607
Percent of total	**100%**	**58%**	**42%**			
Difference in Construction Contribution between Original WSLP Mitigation Plan and Maurepas Diversion		0	$124,011			

Section 14
Environmental Considerations in Recommended Changes

The environmental impacts for the WSLP project were first addressed in the Final Integrated Feasibility Report and EIS for the WSLP Hurricane and Storm Damage Risk Reduction Study, November 2014. The ROD for the 2014 WSLP EIS was signed by the Assistant Secretary of the Army on September 14, 2016.

Supplemental Environmental Assessment (SEA) #570, WSLP Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations St. Charles and St. John the Baptist Parishes, Louisiana assessed impacts associated with surveys, borings, and investigations outside of the 2014 EIS right-of-way, as well as the addition of five stockpile/staging areas and access roads for investigation and construction related activities. The FONSI associated with SEA #570 was signed by the CEMVN District Commander on May 13, 2019.

SEA #571, WSLP Hurricane and Storm Damage Risk Reduction Levee System, St. Charles and St. John the Baptist Parishes, Louisiana evaluated additional changes to the WSLP project levee alignment, the addition of four borrow areas, widening of the levee alignment, minor modifications to previously assessed access roads, and the addition of three access roads. The FONSI associated with SEA #571 was signed by the CEMVN District Commander on June 29, 2020.

EA #576, BBA Construction Projects; WSLP, Comite River Diversion, and EBR Flood Risk Management, BBA Construction Mitigation identified mitigation for BLH and swamp habitat impacts associated with the WSLP, Comite, and EBR projects. The FONSI for EA #576 was signed by the CEMVN District Commander on April 13, 2020. The BLH features in EA #576's recommended mitigation plan are currently being implemented. EA #576 identified a TSA for BLH and swamp that was a combination of mitigation banks and constructed projects from the final array of alternatives.

Although EA #576 was determined to be adequate to address impacts resulting from the implementation of the WSLP project, at the request of the NFS CPRAP, the 2022 SEIS evaluated the MSP as an alternative project to compensate for unavoidable impacts to swamp habitat from the WSLP project. The MSP was converted into a mitigation alternative and evaluated against the selected swamp mitigation plan in EA#576. It was determined that the MSP, could produce the benefits necessary to be used as compensatory mitigation for the swamp impacts the WSLP project and at the request of the NFS was recommended for implementation. The project if approved would be implemented by the NFS; any costs above the swamp mitigation plan identified in EA #576 will be at the full NFS cost.

Section 15
Public Involvement

Public and agency comments on EA #576 included requests by the CPRAB and others that the MSP, a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. As a result of this request and in coordination with the NFS and the resource agencies, the MSP was converted into a viable alternative for swamp mitigation and evaluated and compared against the selected plan from EA #576.

Since the MSP recommended by CPRAB only has the potential to provide swamp benefits, only the swamp feature in EA #576's recommended mitigation plan was reviewed to see if the MSP could replace that portion of the Federal plan. The SEIS to WSLP Hurricane and Storm Damage Risk Reduction Study (2022) provides the analysis on the potential adverse and beneficial environmental effects of the MSP to allow an informed decision on the selection of MSP as swamp mitigation for the WSLP and signing of the ROD.

A notice of intent to prepare a SEIS to the 2014 WSLP EIS was published in the Federal Register (Document number 2021-17313) on August 13, 2021, with an initial 45-day comment period. The comment period was then extended to October 31, 2021, due to the damage caused by Hurricane Ida to Southeast Louisiana on August 29, 2021. Public scoping meetings were held virtually on October 5 and 6, 2021 at the CEMVN district office. In general, comments during the public scoping period expressed support for the Maurepas Diversion as mitigation for the WSLP levee construction in that it would provide a critical line of defense to protect the levee and communities within the levee. Support was also expressed for the NFS to pay the additional costs required to use the Maurepas Diversion as mitigation for WSLP. Alternatively, there were a few comments in opposition to the Maurepas Diversion: some comments indicated that the purchase of mitigation bank credits was the only option given the Maurepas Diversion lacks data and would not meet the required mitigation; five comments expressed concerns over any delays that might be happening now or that could happen in the future with the identification of the Maurepas Diversion as mitigation for the WSLP construction impacts; concern was expressed that construction of the WSLP levee was taking too long.

The release of the draft SEIS for a 45-day public comment period was published in the Federal Register (87 FR 15420; EIS No. 2022-0034) on March 18, 2022. A public notice was shared through announcements on Facebook, Instagram, and through media outlets.

The draft SEIS was subsequently retracted from public review on April 1, 2022, to correct outdated information integral to the study. An Addendum was prepared explaining the changes made to the draft document and the draft SEIS was re-released for a second 45-day public review period. The second 45-day public review period was announced in the

Federal Register on April 15, 2022 (87 FR 22531; EIS No. 20220051). The public comment period ended May 31, 2022.

A public information meeting was held virtually on May 11 and May 12, 2022, at the CEMVN district office to provide a summary of the study and answer any questions the public might have regarding the study.

The public was notified of the public information meeting via a public notice mailed and/or e-mailed to the CEMVN NEPA mailing list, which was comprised of non-government agencies, government agencies, stakeholders in the planning effort, as well as individuals who stated they were interested in the effort. A meeting notice was placed on the CEMVN websites and social media sites (Twitter, Facebook, Instagram). A media advisory was provided to local Louisiana and regional media outlets.

The public was informed at the meeting on the methods by which comments should be submitted and that all comments must be received by May 31, 2022. A total of 103 comments were received.

Comments were evaluated for recurring themes to gain an understanding of the key issues to be addressed in the final SEIS. The theme categories are broad and encompassing to summarize the comments that were identified. Twenty recurring themes were identified. The top recurring theme was monitoring with 19 comments received. Sixteen comments received were in support of the project. Nine comments were in regard to water quality comments seeking clarification of statements made or statement of inconsistency, and seven comments were in regard to seeking the cost used for other mitigation projects, estimates used for mitigation banks or the date in which the costs were determined.

CEMVN responded to questions and worked to address inconsistencies in the final draft of the SEIS. None of the comments resulted in a change to the recommended plan.

Section 16
History of Project

Tables 16-1 and 16-2 document the history of the WSLP project and includes updates to the construction of project features. Table 16-3 documents the history of the various documents that have proposed a diversion into the Maurepas Swamp.

Table 16-1: WSLP Project History

Project Year	Study/Report/Environmental Document Title	Description
2016	WSLP Hurricane and Storm Damage Risk Reduction Study, Final Integrated Feasibility Report and Environmental Impact Statement	The ROD for the 2016 WSLP EIS was signed by the Assistant Secretary of the Army on September 14, 2016.
2019	Supplemental Environmental Assessment #570, WSLP Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations, St. Charles and St. John the Baptist Parishes, Louisiana	Assessed impacts associated with surveys, borings, and investigations outside of the original EIS right-of-way, as well as the addition of five stockpile/staging areas and access roads for investigation and construction related activities. The FONSI associated with SEA #570 was signed by the CEMVN District Commander on May 13, 2019.
2020	Supplemental Environmental Assessment #571, WSLP Hurricane and Storm Damage Risk Reduction Levee System, St. Charles and St. John the Baptist Parishes, Louisiana	Evaluated additional changes to the WSLP project levee alignment, the addition of four borrow areas, widening of the levee alignment, minor modifications to previously assessed access roads, and the addition of three access roads. The FONSI associated with SEA #571 was signed by the CEMVN District Commander on June 29, 2020. Based on the changes as of February 2022, the WSLP project would impact as much as 10,892 acres of swamp and 4,877 acres of BLH-wet in LACZ. This equates to a mitigation need of approximately 947 AAHUs of CZ swamp and 293 AAHUs of CZ BLH-wet.
2020	Bipartisan Budget Act Construction Projects (BBA); WSLP, Comite River Diversion, and East Baton Rouge (EBR) Flood Risk Management, BBA Construction Mitigation EA #576	Identified mitigation for BLH and swamp habitat impacts associated with the WSLP, Comite, and EBR projects. The FONSI for EA #576 was signed by the CEMVN District Commander on April 13, 2020. The BLH features in EA #576's recommended mitigation plan are currently being implemented. EA #576 identified a TSA for BLH and swamp that was a combination of mitigation banks and constructed projects from the final array of alternatives. The EA combined projects like building blocks to form the TSA and additional credits beyond what was needed for the BBA18 projects were identified. There is a possibility that the lowest ranked project in the TSA may ultimately not be needed in part or in whole. If the projects in the TSA are unable to satisfy the mitigation need for the BBA construction projects, additional projects in the final array would be used in order of ranking until full satisfaction of the mitigation requirement is completed.
2022	WSLP Draft SEIS	The USACE, CEMVN, prepared a SEIS to evaluate, at the request of the NFS an alternative project to compensate for unavoidable impacts to swamp habitat associated with the construction of the WSLP project. Compensatory mitigation for impacts due to construction of the WSLP project was described previously in the 2014 WSLP EIS and in EA #576. Public comments on EA #576 included requests by the CPRAB and others that the MSP, a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. The MSP was evaluated and ultimately recommended as a revised plan to mitigation for swamp impacts from the WSLP project.

Table 16-2: West Shore Lake Pontchartrain Project Construction History

Project Year	Construction Activity	Description
2020	Mitigation	Purchase of 56.22 BLH-Wet (CZ) AAHUs (100.4 mitigation bank credits) on October 23, 2020
2021	Mitigation	Purchase of 58.35 BLH-Wet CZ AAHUs (100.7 mitigation bank credits) for WSLP Project on 5 Nov 2021
2020	Vegetation Clearing of Levee Alignment	Contract #1 – Work consisted of clearing a 100-foot corridor along the levee centerline for miles 1-9 of the 18-mile project in St. Charles & St. John Parishes to allow for surveys and borings. Work began in June 2019 and was completed in April 2020.
2020	Vegetation Clearing of Levee Alignment	Contract #2 – Work consisted of clearing a 100-foot corridor along the levee centerline for miles 10 - 18 of the 18-mile project in St. Charles & St. John Parishes to allow for surveys and borings. Work began in July 2019 and was completed in April 2020.
2022	Borrow Stockpile	Stockpile inside the Bonne Carre Spillway - Work consisted of processing 500K cy of clay borrow within the Bonne Carre Spillway and stockpiling adjacent to the borrow pit. Work began in January 2020 and completed in June 2022.
2022	Borrow Stockpile	Stockpile outside the Bonne Carre Spillway - Work consists of processing 1M cy of clay within the Bonne Carre Spillway and stockpiling approximately 5 miles west on Access Road J off of HWY 61 near LaPlace. Contractor also constructed an extension to Access Road J to accommodate future access for other WSLP projects. Work began in October 2020 and as of August 2022, 180K out of 1M cy (18%) have been stockpiled.
2022	Sand Stockpile	Work consisted of processing 750K CY of sand within the Bonne Carre Spillway and stockpiling approximately 5 miles west on Access Road J off of HWY 61 near LaPlace. Work began in February 2021 and completed in June 2022.
2022	Access Road Construction	Work consists of the construction and completion of 8 access roads (54,730 lf) that are required for the construction and maintenance of the entire West Shore Lake Pontchartrain Levee System. All the access roads are accessible from Highway 61 (Airline Hwy) running through St. John the Baptist Parish except Access Road “P” which enters from Highway 51 near Interstate 10’s Laplace exit and Access Road “G” which enters from Interstate 10 at the weigh station, both are

Project Year	Construction Activity	Description
		located in St. John the Baptist Parish. Access road construction began in December 2021 and as of August 2022 is 85% complete.
2022	Levee Test Section	WSLP 101 consisted of a test section project to create four adjacent test sections of 300 lf each. The work consisted of clearing existing trees and vegetative debris followed by the excavation of material creating landside canals and placing the material in four designated areas. Sand fill was imported and placed in all of the test sections to elevation (EL) +3.0. Geogrid was placed in Test Sections 1 & 2. Settlement gages and inclinometers were placed to monitor settlement. The final Geotech report will be forthcoming; however, initial findings suggest that the geogrid did not have a substantial impact on settlement to warrant use in the major levee construction projects. Work began in December 2021 and completed June 2022.
2022	Sand Placement	Contract #1 – Sand base contract for the future WSLP 101a levee construction contract and consists of clearing and grubbing, stump removal, and placement of sand fill to EL. +3.0 for a total of 5,950 lf. Access Road J off HWY 61 (Airline Highway) is being utilized for access. Work began in April 2022 and is approximately 25% complete as of AUG 2022.
2022	Sand Placement	Contract #2 – Sand base contract for the future WSLP 102 and 103 levee construction contracts and consists of clearing and grubbing, stump removal, and placement of sand fill to EL. +3.0 for a total of 10,689 lf. Access Roads north and south of Frenier Road are being used for access. Work began in May 2022 and is approximately 25% complete as of AUG 2022.
2022	Preliminary Consent Injunction	A Consent Preliminary Injunction was agreed to and ordered by the 40th Judicial District Court for the Parish of St. John the Baptist in State of Louisiana, Coastal Protection and Restoration Authority and Board of Commissioners for the Pontchartrain Levee District v. Nicholas A. Laseigne, III d/b/a Nick's Shooting Range and Gun Shop, No. 78,651 Div. C. The Consent Injunction prohibits conducting shooting activity and operations involving firearms Monday through Friday on property abutting the levee construction right-of-way

Table 16-3: River Reintroduction at Maurepas Swamp Project History

Project Year	Study/Report/Environmental Document Title	Description
2001	River Reintroduction at Maurepas Swamp (P0-29) - CWPPRA	The goal of the south Maurepas diversion project is to restore and protect the health and productivity of the swamps south of Lake Maurepas by reintroducing sediment- and nutrient-laden water from Mississippi River. The specific objectives of the Maurepas project are to: restore natural swamp hydrology; increase sediment and nutrient loading to the project area; increase substrate accretion; retain and increase existing areas of swamp vegetation, including overstory cover; and reduce salinity levels. The project's main structural features will include: two 10x10 box culverts capable of diverting 2,000 cubic feet of water per second; a 100x100 foot receiving pond reinforced with a 20-inch layer of riprap; and a 50-feet wide, 10-feet deep outflow channel roughly 27,500 feet long that will run from the river to U.S. Interstate 10.
2004	Small River Diversion at Hope Canal-Louisiana Coastal Area (LCA), Near-Term Study Report and Final Programmatic Environmental Impact Statement	The Small Diversion at Hope Canal was identified by the USACE for immediate authorization in the January 31, 2005 Report of the Chief of Engineers for ecosystem restoration for the LCA. The LCA Programmatic Supplemental Environmental Impact Statement (PSEIS), prepared in advance of the 2005 Report of the Chief of Engineers, states, "[i]nitial analysis indicates that [Hope Canal] address[es] the most critical ecological needs of the Louisiana coastal area in [a location] where delaying action would result in a 'loss of opportunity' to achieve restoration." In Section 7002(c) of the WRDA 2007, Congress established priorities for USACOE coastal restoration in Louisiana and directed the USACOE to carry out those priorities with the State of Louisiana. Section (b)(1)(B) states, "the Secretary shall give priority to . . . any Mississippi River diversion project that will protect a major population area of the Pontchartrain, Pearl, Breton Sound, Barataria, or Terrebonne basins" and "will produce environmental benefit to the coastal Louisiana ecosystem." Congress authorized the Small Diversion at Hope Canal for construction in Section 7000(c)(B) of WRDA 2007.
2012	West Maurepas Diversion-Louisiana's Comprehensive Master Plan for a Sustainable Coast, Coastal Protection and Restoration Authority	Union Freshwater Diversion: Diversion into West Maurepas swamp near Burnside to provide sediment for emergent marsh creation and freshwater and fine sediment to sustain existing wetlands, 25,000 cfs capacity (modeled at 25,000 cfs when Mississippi River flow equals 400,000 cfs; closed when river flow is below 200,000 cfs or above 600,000 cfs; a variable flow rate calculated using a linear function from 0 to 25,000 cfs for river flow between 200,000 cfs and 400,000 cfs and held constant at 25,000 cfs for river flow between 400,000 cfs and 600,000 cfs).
2017	East Maurepas Diversion - Louisiana's Comprehensive Master Plan for a Sustainable Coast, Coastal Protection and Restoration Authority	East Maurepas Diversion: Diversion into East Maurepas near Angelina to provide sediment for emergent marsh creation and freshwater to sustain existing wetlands, 2,000 cfs capacity (modeled at a constant flow of 2,000 cfs, independent of the Mississippi River flow).

Section 17
Summary

This addendum provides documentation for the recommended change to the mitigation plan for swamp impacts for the WSLP project. The MSP is recommended for implementation to fully compensate for the swamp impacts from the WSLP project. Swamp mitigation using the MSP is a revision to the originally approved mitigation plan in the 2015 WSLP Chief's Report and the 2020 EA #576. The proposed change is based off of the analysis conducted under the 2022 SEIS.

The updated estimated total construction costs for the WSLP project, including Maurepas mitigation, is $1,169,208. In addition to their 35 percent cost share for the construction of the WSLP project, estimated at $858,852,000 (total construction cost), the NFS will be responsible for all mitigation costs above the federally selected plan identified in EA #576, currently estimated at an additional cost of $124,011,000 for a total estimated contribution of $489,830,000.

Cover Page

Final Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study

Counties/Parishes: St. John the Baptist, St. James, Ascension, Livingston Parishes, St. Tammany and St, Charles Parish, Louisiana

Lead Agency: U.S. Army Corps of Engineers, New Orleans District

Cooperating Agencies: U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration's National Marine Fisheries Service, U.S. Department of Agriculture's Natural Resources Conservation Service, Louisiana's Department of Natural Resources, Louisiana's Department of Wildlife and Fisheries, Louisiana's State Historic Preservation Office, Advisory Council on Historic Preservation, Choctaw Nation of Oklahoma, Mississippi Band of Choctaw Indians, and Coastal Protection and Restoration Authority Board of Louisiana.

Abstract: The U.S. Army Corps of Engineers, Mississippi Valley Division, New Orleans District, prepared a supplemental environmental impact statement (SEIS) to evaluate, at the request of the non-federal sponsor an alternative project to compensate for unavoidable impacts to swamp habitat associated with the construction of the West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Project (hereafter WSLP project). Compensatory mitigation for impacts due to construction of the WSLP project was described previously in the 2014 WSLP Environmental Impact Statement and in Environmental Assessment (EA) #576. Public comments on EA #576 included requests by the Coastal Protection and Restoration Authority Board and others that the Coastal Wetlands Planning, Protection and Restoration Act PO-0029 River Reintroduction into Maurepas Swamp Project, (hereafter MSP), a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. The MSP was converted into a mitigation alternative and evaluated against the selected plan in EA #576. Maurepas Swamp Alternative-2 was recommended as the Tentatively Selected Alternative to mitigate for the impacts to swamp habitat from the WSLP project.

The 30-day review period for the Final SEIS Mitigation Plan update will begin Friday, December 2, 2022, and end Tuesday, January 3, 2023.

For further Information please contact:
New Orleans District, U.S. Army Corps of Engineers
Attention: CEMVN–PDC-C
7400 Leake Avenue New Orleans, LA 70118
Email: mvnenvironmental@usace.army.mil
Estimated Cost of Preparing the Draft and Final SEIS: $2,547,702

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APPENDICES

*Appendix D was removed after it was determined not to be current.

Executive Summary

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), prepared this final SEIS to evaluate, at the request of the non-federal sponsor (NFS), an alternative project to compensate for unavoidable impacts to swamp habitat associated with the construction of the WSLP project. Compensatory mitigation for impacts due to construction of the WSLP project was described previously in the 2014 WSLP EIS and revised in EA #576. EA #576 addressed mitigation for multiple habitat impacts associated with each of CEMVN's Bipartisan Budget Act (BBA) of 2018 funded risk reduction projects (i.e., the WSLP project, Comite River Diversion Project, and the East Baton Rouge (EBR) Parish Watershed Flood Risk Management Project) since all these projects occurred in the same watershed and impacted similar habitats. The record of decision (ROD) for the WSLP EIS was signed September 14, 2016, and the finding of no significant impact (FONSI) for EA #576 was signed on April 13, 2020. Public and agency comments on EA #576 included requests by the Coastal Protection and Restoration Authority Board (CPRAB) and others that the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) PO-0029 River Reintroduction into Maurepas Swamp Project, (hereafter MSP), a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. As a result of this request and in coordination with the NFS and the resource agencies, the MSP was converted into a viable alternative for swamp mitigation and evaluated and compared against the selected plan from EA #576.

The proposed action for implementation is a 2,000 cubic foot per second (cfs) freshwater diversion that would reconnect the Mississippi River to the Maurepas Swamp, strategically delivering nutrient-laden river water to restore a degraded Cypress-Tupelo swamp.

This report documents the sponsor, agency and public input and presents the analysis completed to determine the federal plan and the TSA to compensate for the WSLP project's swamp impacts.

AUTHORITY

Construction of the WSLP project was authorized as part of the 2016 Water Infrastructure Improvement for the Nation Act (WIIN Act, Public Law 114-322). Construction of the WSLP project was funded by the BBA of 2018 (BBA 2018, Public Law 115-123).

When unavoidable impacts occur, the CEMVN is required by 33 USC 2283 to offset those impacts through compensatory mitigation by replacing the lost habitat's functions and values equally and in-kind to the extent possible and shall ensure that the mitigation plan complies with, at a minimum, the mitigation standards and policies established pursuant to the regulatory programs administered by the Secretary (33 CFR 320.4(r), 325, and 332). Compensatory mitigation for unavoidable impacts is also required by the CWA Section 404(b)(1) Guidelines.

Guidance for planning for civil works mitigation is provided in ER 1105-2-100 Appendix C, WRDA 2008 Sec. 2036a Guidance issued on August 31, 2009, and WRDA 2016 Sec. 1162 Guidance issued on February 2, 2018.

PURPOSE AND NEED

The purpose of this evaluation is to look at the PO-0029 Maurepas River Reintroduction Project as it is currently designed (max flow of 2,000 cfs) to see if it could be transformed into a viable mitigation alternative for the WSLP project impacts. The evaluation did not consider variations of the diversion at that location.

Construction of the WSLP project would impact as much as 10,892 acres of swamp in the LA coastal zone (CZ). This equates to a mitigation need of approximately 947 average annual habitat units (AAHUs) of CZ swamp. The wetland value assessment (WVA) methodology is a quantitative habitat-based assessment developed to determine wetland benefits of proposed projects under the Coastal Wetlands Planning, Protection and Restoration Act. The WVA quantifies changes to fish and wildlife habitat quality and quantity that are expected to result from a proposed wetland project. The results of the WVA are AAHUs, which can be combined with cost data to measure the effectiveness of a proposed project.

The proposed action is needed to replace the lost functions and services of impacted swamp habitat through enhancement activities designed to create/increase/improve the habitat functions and services at specific mitigation sites.

The WSLP project would also impact as much as 4,877 acres of bottomland hardwoods (BLH-wet) in the LACZ, equating to a mitigation need of approximately 293 AAHUs of CZ BLH-wet. The mitigation plan addressing impacts to BLH-wet habitat was identified in EA #576.

ALTERNATIVE DEVELOPMENT AND SELECTION OF THE TSP

In response to the CPRAB request, CEMVN assessed and verified that the MSP could be revised from an ecosystem restoration project to a federal mitigation project that aligns with ER 1105-2-100, federal mitigation laws and policies, and that it could produce the benefits necessary to offset the WSLP swamp mitigation requirement.

Two alternatives under the MSP were identified for consideration, the Maurepas Swamp Alternative (MSA)-1 and MSA-2, in addition to the No-Action Alternative, which is the selected plan from EA #576 consisting of in-kind mitigation bank credits, the St. James project, and the Pine Island project (alternatives are further described in Section 2.2). The MSA-1 alternative consists of both public and private lands, while the MSA-2 is comprised of public lands only.

Based on the WVA modeling, the No Action Alternative has the potential to generate approximately 1,286 AAHUs for swamp (Table 2-5). Additional AAHUs could be generated by the purchase of mitigation bank credits. As of November 2022, the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) ledger indicates 64.1 Coastal Zone (CZ)

Swamp credits (approximately 32 AAHUs) are available for purchase in the Lake Pontchartrain Basin. There is the potential for an additional credit release of 43.7 CZ Swamp credits (22.04 AAHUs) within the next 12 months, contingent on the necessary criteria being met to grant credit release.

The MSA-1 could yield a net benefit of approximately 1,048 AAHUs to CZ swamp habitats. The benefits attributed to existing swamp through hydrologic improvement includes 7,564 acres closest to the outfall (primary and secondary areas) (Table 2-46). MSA-1 uses all the primary benefit areas, which are expected to receive the greatest benefits from the diversion, both private and public lands. According to the WVA modeling, 65 percent of AAHUs may be achieved in the primary benefit area, which has the greatest chance of success. This alternative is less dependent on the secondary benefit area to achieve 947 AAHUs (WSLP mitigation need) and has more contingency available (~15 AAHUs), even though MSA-1 does not include any benefits from the tertiary area. Under this scenario, private lands would have to be purchased in fee or through non-standard estates, which would not allow any adverse activities to impact the mitigation area.

The MSA-2 Alternative could generate approximately 1,239 to CZ swamp in the primary, secondary, and tertiary areas combined (see Table 2-46). MSA-2 would have net benefit to CZ swamp of 1,033 AAHUs because it would have the same negative impacts to CZ swamp from its construction as MSA-1, -206 AAHUs. Therefore, MSA-2 would meet the mitigation need for WSLP CZ swamp of -947 AAHUs.

Selection of the TSP

The alternatives were evaluated and compared based on cost effectiveness, adverse and beneficial environmental impacts, risk and reliability, watershed and ecological site considerations and ultimately selected based on the USACE Principles and Guidelines Criteria of completeness, efficiency, effectiveness, and acceptability. Based on the alternative evaluation process, the BBA Alternative (No Action Alternative) remains the federally selected plan to meet the WSLP project mitigation needs. However, following the confirmation of the federally selected plan, the NFS requested that the MSA-2 be pursued because it could be integrated with the implementation of the WSLP project, saves the NFS time and money, provides mitigation immediately adjacent to the impacts, and would increase system resiliency around the WSLP project. In conjunction with the request, the NFS offered that it would agree to be solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, pursuant to a Non-traditional Cost Sharing amendment to the Project Partnership Agreement (PPA) if MSA-2 were to be selected as the recommended swamp mitigation. The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs. As the NFS would be responsible for the construction of MSA-2, the total combined lands, easements, rights-of-way, and disposal (LERRD) and Work-in-Kind Credits which the NFS

would be able to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Thus, based upon the above, the NFS-preferred alternative, MSA-2, was recommended as the TSA with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative.

PUBLIC AND AGENCY COORDINATION

A notice of intent (NOI) to prepare a SEIS to the 2014 WSLP EIS was published in the Federal Register (Document number 2021-17313, Appendix O) on August 13, 2021, with an initial 45-day comment period. The comment period was then extended to October 31, 2021, due to the damage caused by Hurricane Ida to Southeast Louisiana on August 29, 2021. Public scoping meetings were held virtually on October 5 and 6, 2021 at the CEMVN district office. In general, comments received during the public scoping period were supportive of MSA-2 as mitigation for the WSLP levee construction in that it would provide a critical line of defense to protect the levee and communities within the levee. Support was also expressed regarding the NFS paying the additional costs of implementing MSA-2 as the TSA. Alternatively, there were a few comments received expressing opposition to MSA-2: some comments indicated that the purchase of mitigation bank credits was the only option given MSA-2 lacked data and would not meet the required mitigation; five comments expressed concerns over any delays presently occurring or occurring in the future with the selection of MSA-2 as the TSP; concern was expressed that construction of the WSLP levee was taking too long. A detailed discussion of the coordination and consultation is in Section 7.

Cooperating Agencies - The following agencies agreed to be cooperating agencies, and participate in the NEPA process: U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS), U.S. Department of Agriculture’s Natural Resources Conservation Service, Louisiana’s Department of Natural Resources, Louisiana’s Department of Wildlife and Fisheries, Louisiana’s State Historic Preservation Office, Advisory Council on Historic Preservation, Choctaw Nation of Oklahoma, Mississippi Band of Choctaw Indians, and Coastal Protection and Restoration Authority Board of Louisiana.

DATA GAPS AND UNCERTAINTY

Future conditions are inherently uncertain. The forecast of future conditions is limited by existing science and technology. Future conditions described in this SEIS 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 therefore a rigorous monitoring and adaptive management plan is proposed to inform and reduce these uncertainties over time and ensure required project benefits are achieved. Reference Section 2.8.4 for further discussion.

SIGNIFICANT RESOURCES AND ENVIRONMENTAL CONSIDERATIONS

Section 4 describes the direct, indirect, and cumulative impacts to significant resources associated with the No Action Alternative and the TSA. The analysis of the TSA takes place at multiple spatial scales (i.e., areas) that allows potential impacts to be presented from the largest to smallest area: Planning Area, Diversion Influence Area, Mitigation Area, and Proposed Construction Area. Overall, the significant resources assessed would receive positive, long-term benefits from the implementation of the TSA. There is a potential for a few species to be negatively impacted by the operation of the diversion; these species and the potential mitigating management measures are summarized below and discussed in detail in Section 2.8.4 “Areas of Controversy” of the main report.

Areas of Controversy

There are several areas of controversy discussed in Section 2.8.4 of the main report.

No Net Loss of Wetlands

While the MSA-2 can completely replace the lost swamp functions and values incurred by WSLP project through enhancement of existing swamp habitat, the MSA-2 may not result in “no net loss of wetlands” as defined in 33 USC 2283, 33 USC 2317 since the acres of swamp habitat impacted by construction of the WSLP project would not be replaced.

Effect on Wildlife Populations and Commercial Harvest

Although occasional flooding of the Maurepas swamp naturally occurs from tropical storm events or wind driven tidal events, the yearly operation of the diversion during the spring/early summer would regularly elevate water levels in the benefit area between approximately 1 to 2 feet within the Maurepas Wildlife Management Area (WMA), which would result in reoccurring adverse impacts to terrestrial species, including alligator and deer populations. Management measures by the Louisiana Department of Wildlife and Fisheries (LDWF) (such as hunting season reductions or closures) could potentially mitigate impacts to deer and alligator populations that would occur from diversion operation.

Effect on Threatened and Endangered (T&E) Populations

The endangered pallid sturgeon is adapted to living close to the bottom of large, silty rivers with a natural hydrograph. Juvenile pallid sturgeon is assumed to have a “low” entrainment risk due to low likelihood of their occurrence in the vicinity of the diversion’s intake. There is a “medium” risk of entrainment of adults and subadults due to the likelihood of presence and their relatively low burst swimming speeds compared to intake velocities. The Biological Opinion (Appendix J) received from USFWS includes reasonable and prudent measures that will be adhered to in order to reduce impacts to pallid sturgeon.

Impacts to Adjacent Water Bodies

The impacts of fresh water on estuarine systems in the Lake Pontchartrain Basin have historically been a concern to many users. Lake Pontchartrain and waterbodies beyond are unlikely to be negatively impacted by the operation of the diversion. According to the modeling, the river reintroduction flow of 2,000 cfs generally spreads radially outwards as it enters the swamp north of Interstate 10, and the diversion's impacts on mixing, water levels, and nutrients are negligible once the extent of the diversion influence area is reached (i.e., the southwestern portion of Lake Maurepas).

ENVIRONMENTAL COMPLIANCE

CEMVN is required to comply with state and federal law, as well as executive orders (EO), in the analysis and implementation of federal projects. Below is a brief discussion of the status of environmental compliance; refer to section 8 for a detailed discussion.

Clean Air Act (CAA) of 1972: The project is within, or near, St. John The Baptist Parish, Ascension Parish, St. James Parish, and Livingston Parish, which all are currently in attainment of National Ambient Air Quality Standards (NAAQS).

CWA of 1972: Section 401 and Section 404: State Water Quality Certification (WQC) 210426-02 was received on May 3, 2021, for the WSLP Environmental Mitigation Project. A Section 404(b)(1) evaluation was released for public review on March 18, 2022. An updated 404(b)1 was released for public review on May 1, 2022. No public comments were received. The Section 404(b)(1) evaluation was signed on June 8, 2022, and is available in Appendix L.

Coastal Zone Management of 1972: In accordance with Section 307, a consistency determination was submitted on February 22, 2022, to the Louisiana Department of Natural Resources (LDNR) for the TSA. On April 29, 2022, LDNR notified CEMVN that the TSA is consistent with the Louisiana Coastal Resources Program (see LDNR Coastal Zone Consistency, C20190208 Mod 01, in Appendix J).

Endangered Species Act (ESA) of 1973: CEMVN identified in an information for planning and consultation (IPaC) search (November 2021) three T&E species under USFWS jurisdiction: the pallid sturgeon, Gulf sturgeon, and West Indian manatee. These species are known to occur or believed to occur within the vicinity of the proposed construction area. No threatened or endangered plants or critical habitat were identified in the proposed construction area. CEMVN submitted a Biological Assessment to the USFWS indicating MSA-2 would have no effect on the red-cockaded woodpecker and Gulf sturgeon; may affect and is likely to adversely affect the pallid sturgeon; may affect but is not likely to adversely affect the West Indian manatee, and other protected species. Coordination was initiated with the USFWS on December 22, 2021. ESA consultation was finalized on June 23, 2022, with the receipt of the USFWS BO. The BO includes an Incidental Take Statement that requires the USACE to implement reasonable and prudent measures that the USFWS considers necessary or appropriate to minimize the impacts of anticipated taking on the listed species. Incidental taking of listed species that is in compliance with the terms and conditions of this

statement is exempted from the prohibitions against taking under the ESA. The BA, BO, and CEMVN coordination letters and responses from USFWS are found in Appendix J.

Farmland Protection Policy Act: In its review of the proposed project, the NRCS assessed the number of prime farmland acres impacted by the proposed project and it did not indicate that the project would impact NRCS work in the vicinity. No actions will be taken to avoid impacts to farmland. USACE coordination letters and responses from NRCS are found in Appendix J.

Floodplain Management: The objectives of EO 11988 were considered; however, CEMVN has determined that floodplain impacts, if any, from the proposed work would be mainly beneficial. Additionally, there is no practicable alternative for the proposed work outside the 100-year floodplain. CEMVN solicited comments from FEMA and the community of floodplain administrators for St. Charles, St. James, and St. John the Baptist Parishes during the scoping and draft SEIS public review periods. No public or agency comments were received regarding floodplain management.

Fish and Wildlife Coordination Act: A Final Coordination Act Report was received on June 8, 2022. The USFWS provided several recommendations, and CEMVN concurred. Those recommendations and CEMVN responses are located in Section 8.

Hazardous, Toxic, and Radioactive Waste (HTRW): The areas for the proposed Maurepas Diversion project features were surveyed via site visits, aerial photography, topographic maps, and data base searches. An American Society for Testing and Materials 1527-13 Phase I Environmental Site Assessment, HTRW 21-06 dated September 2, 2021, has been completed (Appendix P). The probability of encountering HTRW for TSA is low based on the initial assessment. An update to the September 2, 2021, Phase I ESA was completed on November 8, 2022 (Appendix P). The environmental conditions have not significantly changed since completion of the September 2, 2021, ESA; therefore, the probability of encountering HTRW for the proposed action remains low.

Magnuson-Stevens Fisheries Conservation and Management Act: The Draft SEIS was provided to the NMFS for review and comment during the 45-day public review period. The NMFS Habitat Conservation Division stated they had no objections related to the Draft SEIS via email correspondence dated June 1, 2022 (see Appendix J).

Migratory Bird Treaty Act: The bald eagle was removed from the List of Endangered and Threatened Species in August 2007 but continues to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (MBTA). Colonial nesting wading bird, neotropical migratory birds, and other birds are protected under the MBTA (50 CFR 10.13). During nesting season, construction and other related activities must take place outside of USFWS/LDWF buffer zones. A CEMVN Biologist and USFWS Biologist have surveyed for nesting birds prior to associated work described in Supplemental Environmental Assessment (570) West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations that is ongoing. No nesting birds were found during the survey. Surveys for bald eagle nests and colonial nesting waterbirds would be conducted prior to construction. In addition, CEMVN

recommends that onsite contract personnel be trained to identify colonial nesting birds and their nests and avoid affecting them during the nesting season. Coordination with the USFWS and the LDWF would continue throughout the project planning and implementation phase.

National Historic Preservation Act (NHPA) of 1966 – NEPA Coordination/Section 106 Consultation: CEMVN fulfills Section 106 of the NHPA procedures through an existing PA executed March 4, 2020.

Archaeological Resources Protection Act (ARPA) of 1979: A federal permit under the ARPA (16 U.S.C 470aa-470mm; 32 CFR Part 229; 43 CFR Part 7; 36 CFR Part 296) would be obtained from the appropriate federal land manager prior to the commencement of field work for any excavation, removal, alteration or destruction of archaeological resources occurring within federal and Indian lands, including disposition of archaeological resources from such sites.

Scenic Rivers Act - Louisiana Scenic Rivers Act of 1988: While multiple rivers are located in the planning area, only Blind River has the potential for being impacted by the project. On August 25, 2021, LDWF determined that there would be no anticipated impacts to Blind River from the proposed project under adherence to service recommendations (See Appendix J for personal coordination with Chris Davis, LA Scenic River Coordinator).

EO 12898: Environmental Justice (EJ): Impacts to areas of EJ concern from construction of the BBA Alternative, MSA-1, and MSA-2 are expected to be minimal and short-term occurring during construction activities. Overall, there are no permanent disproportionately high and adverse human health or environmental effects from the proposed activities. Public outreach was conducted in the area of EJ concern, Garyville, Louisiana, to gain insight from residents about potential positive and adverse impacts associated with the construction of the MSP. A total of eight entities were contacted, four local churches, two non-profits that serve residents of the area, the local public library, and Councilmember Warren Torres' office. Of those contacted, two churches, one non-profit, the local library, and Councilmember Torres agreed to notify residents of the public meeting. Additionally, the library agreed to broadcast our virtual public meeting in the lobby for incoming patrons.

EO 13175: Consultation and Coordination with Indian Tribal Governments: There are currently no Tribal rights or Indian lands that have the potential to be significantly affected by the proposed actions within in the planning area. There are, however, protected Tribal resources within the diversion influence area. In accordance with CEMVN's responsibilities under the NHPA Section 106 process and EO 13175, CEMVN has offered nine federally-recognized Tribes the opportunity to review and comment on the proposed action. As a result of coordination, two Tribes have requested cooperating agency status for the development of this supplemental SEIS.

MITIGATION

The Water Resources Development Act (WRDA) of 1986 and subsequent revisions require mitigation from unavoidable and irrevocable impacts due to construction of an authorized

project to be mitigated for prior to, or concurrent with, construction impacts requiring compensatory mitigation. Based on the most recent designs, WSLP would impact approximately (~) 947 AAHUs of CZ swamp habitat and ~293 AAHUs of CZ-BLH habitat. To date CEMVN has met 9.2 percent of this need, through mitigation bank credit purchases of 114.57 CZ-BLH AAHUs. Additionally, approximately 10 percent of the WSLP project features have been constructed to date, impacting an estimated ~136 CZ–swamp AAHUs and ~36 CZ-BLH AAHUs. Construction and operation of MSA-2 would result in the following impacts: ~206.5 AAHUs of CZ swamp, ~35.8 AAHUs of CZ BLH, and ~19.5 AAHUs of CZ marsh. Swamp impacts resulting from both WSLP project and MSA-2 would be mitigated through construction and operation of MSA-2 as discussed throughout this document. BLH impacts resulting from both WSLP project and MSA-2 would be mitigated per the federally approved plan discussed in EA #576 as summarized below. Marsh impacts resulting from construction and operation of MSA-2 would be mitigated through construction of one or a combination of mitigation bank credits and the Guste Island marsh creation project as discussed below. The mitigation plan is discussed in detail in Section 5.

REAL ESTATE

A Supplemental Real Estate Plan prepared in accordance with ER 405-1-12 identifies and describes lands, easements, and rights-of-way required for the construction and Operations and Maintenance, Repair, Replacement, and Rehabilitation of a proposed project including requirements for mitigation, relocations, borrow material, and dredged or excavated material disposal. It also identifies and describes facility/utility relocations; lands, easements, and rights-of-way value; and the acquisition process. The Real Estate Plan confirms the NFS has the ability to acquire the real estate required to support the project.

Private land will be impacted within the diversion channel and construction footprint, the diversion channel outfall area, the lateral discharge valve inundation areas, and the acreage required for mitigation. The estates to be acquired for this project include a Flowage Easement (4,894 acres), Channel Improvement Easement (57 acres), Temporary Work Area Easement (2 acres), Temporary Road Easement (7 acres) and Fee, Excluding Minerals (75 acres). Refer to the Supplemental Real Estate Plan in Appendix Q for additional details on real estate impacts.

CONCLUSION

The BBA Alternative was confirmed as the federally selected plan. The NFS preferred alternative MSA-2 was evaluated as a mitigation alternative and it was determined to satisfy the swamp mitigation need generated by the WSLP project. The NFS preferred alternative is recommended for implementation as the TSA. The NFS has the full understanding that they would be responsible for the increased cost over and above the cost of implementation of the federally selected BBA Alternative.

This SEIS and mitigation plan provide sufficient information on the potential adverse and beneficial environmental effects to allow the USACE Mississippi Valley Division Commander to make an informed decision on the appropriateness of the SEIS and signing of the ROD.

Section 1
Introduction

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), has prepared this SEIS to consider an additional alternative proposed by the NFS to compensate for unavoidable impacts to swamp habitat associated with the construction of the WSLP project.

Mitigation for impacts due to construction of the WSLP project was described previously in EA #576 (USACE 2020), which addressed mitigation for habitat impacts associated with each of the BBA 18 construction projects (WSLP, Comite, and EBR). The FONSI for EA #576 was signed by the CEMVN District Commander on April 13, 2020. Public and agency comments on supplemental EA (SEA) #576 included requests by the CPRAB and others that the PO-0029 River Reintroduction into MSP, a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. Section 2 explains the process that transpired following the receipt of this comment. At that time, because the MSP needed additional analysis to determine if it could be a compliant mitigation project, EA #576 was finalized and the FONSI was signed by the CEMVN District Commander on April 13, 2020. Implementation of the federally approved plan would satisfy all the WSLP project's mitigation requirements, as well as the mitigation requirements of the other BBA projects, the Comite River Diversion and EBR Flood Risk Management projects.

This SEIS provides an assessment of whether the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) project PO-0029, River Reintroduction into the MSP, could be transformed into a viable mitigation alternative to compensate for the WSLP's projects swamp impacts. Although the WSLP project incurred impacts to bottomland hardwoods (BLH-wet), the MSP does not produce BLH benefits. As such, the federally approved plan to mitigate WSLP project BLH-wet impacts was not reexamined and remains as identified in EA #576.

Mitigation planning was conducted in accordance with ER 1105-2-100 and the SEIS was prepared in accordance with the NEPA and the CEQ NEPA implementing regulations (40 Code of Federal Regulations [CFR] Parts1500-1508), as reflected in the USACE Engineer Regulation (ER) 200-2-2 (33 CFR Part 230). It supplements the WSLP project EIS finalized in 2014. The ROD was approved by the Assistant Secretary of the Army on September 14, 2016 and is hereby incorporated by reference. Unless otherwise indicated, all supporting figures cited are in Appendix A, tables are in Appendix B, and the list of abbreviations is in Appendix C.

1.1 AUTHORITY AND GUIDANCE FOR THE PROPOSED ACTION

Construction of the WSLP project was authorized as part of the 2016 Water Infrastructure Improvement for the Nation Act (WIIN Act, Public Law 114-322). Construction of the WSLP project was funded by the BBA of 2018 (BBA 2018, Public Law 115-123). As such, construction of the WSLP project and its required mitigation is not subject to the Section 902 cost limit, as stated in Title IV, Corps of Engineers – Civil, Department of the Army, Construction of Public Law 115-123.

When unavoidable impacts occur, the CEMVN is required by 33 USC 2283 to offset those impacts through compensatory mitigation by replacing the lost habitat's functions and values equally and in-kind to the extent possible and shall ensure that the mitigation plan complies with, at a minimum, the mitigation standards and policies established pursuant to the regulatory programs administered by the Secretary (33 CFR 320.4(r), 325, and 332). Compensatory mitigation for unavoidable impacts is also required by the CWA Section 404(b)(1) Guidelines.

Guidance for planning for civil works mitigation is provided in ER 1105-2-100 Appendix C, WRDA 2008 Sec. 2036a Guidance issued on August 31, 2009, and WRDA 2016 Sec. 1162 Guidance issued on February 2, 2018.

1.2 BACKGROUND AND HISTORY

The WSLP project is located in southeast Louisiana on the east bank of the Mississippi River in St. Charles, St. John the Baptist, and St. James Parishes. Part of the WIIN Act in 2016 authorized construction of the WSLP project, and the BBA 2018 funded construction of the WSLP project. The WSLP project, as described in the 2014 EIS, is approximately 18.3 miles in length and includes 17.3 miles of levee, 1 mile of T-wall, four pumping stations with associated drainage structures, two additional drainage structures, one gated rod crossing, two gated railroad crossings, and approximately 35 utility relocations. The ROD for the 2014 WSLP EIS was signed by the Assistant Secretary of the Army on September 14, 2016.

SEA #570, West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations St. Charles and St. John the Baptist Parishes, Louisiana, assessed impacts associated with surveys, borings, and investigations outside of the 2014 EIS right-of-way, as well as the addition of five stockpile/staging areas and access roads for investigation and construction related activities. The FONSI associated with SEA #570 was signed by the CEMVN District Commander on May 13, 2019.

SEA #571, West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Levee System, St. Charles and St. John the Baptist Parishes, Louisiana evaluated additional changes to the WSLP levee alignment, the addition of four borrow areas, widening of the levee alignment, minor modifications to previously assessed access roads, and the addition of three access roads. The FONSI associated with SEA #571 was signed by the CEMVN District Commander on June 29, 2020. As of February 2022, the WSLP project would impact as much as 10,892 acres of swamp and 4,877 acres of BLH-wet in Louisiana's coastal zone

(LACZ). This equates to a mitigation need of approximately 947 AAHUs of CZ swamp and 293 AAHUs of CZ BLH-wet. A figure depicting the location of the WSLP project is located in Figure 2-1.

EA #576, BBA Construction Projects; WSLP, Comite River Diversion, and EBR Flood Risk Management, BBA Construction Mitigation, identified mitigation for BLH and swamp habitat impacts associated with the WSLP, Comite, and EBR projects. The FONSI for EA #576 was signed by the CEMVN District Commander on April 13, 2020. The BLH features in EA #576's recommended mitigation plan is currently being implemented. EA #576 identified a TSA for BLH and swamp that was a combination of mitigation banks and constructed projects from the final array of alternatives. The EA combined projects like building blocks to form the TSA and additional credits beyond what was needed for the BBA18 projects were identified. There is a possibility that the lowest ranked project in the TSA may ultimately not be needed in part or in whole. If the projects in the TSA are unable to satisfy the mitigation need for the BBA construction projects, additional projects in the final array would be used in order of ranking until full satisfaction of the mitigation requirement is completed.

Subsequent to the signing of EA #576, in coordination with the resource agencies, the Joyce project that was included as part of the federally selected plan was dropped from the BBA mitigation plan for swamp because recent results of monitoring for similar projects called into question the success and sustainability of the project and a high risk of failure was anticipated. In addition, the St. James project was misidentified as a BLH out of CZ project in EA #576. During public review of the draft EA, the Department of Natural Resources commented that the St. James project was in fact within the CZ (see appendix J). Since the St. James project does fall within the CZ and has elevations that could be used or modified for a swamp project, it was moved to become one of the swamp features of the BBA mitigation plan. Since the St. James project falls within the Lake Pontchartrain Basin (LPB), it outranks the out of basin swamp projects in the original plan. Additionally, since the St. James project is less costly and has less impacts compared to the Pine Island project, it became the highest ranked project in the swamp feature of the BBA Mitigation Plan. With the addition of the St. James project into the swamp feature, out of watershed projects were no longer needed so that the BBA mitigation plan for swamp is now completely within the LPB. This decision was captured in a Memorandum for Record and coordinated with the resource agencies (see appendix J). As such, the federally selected plan for EA #576 includes the purchase of in-kind mitigation bank credits, the St. James project, and the Pine Island project.

Since the MSP requested by CPRAB only has the potential to provide swamp benefits, only the swamp feature in EA #576's recommended mitigation plan is being reviewed to see if the MSP could replace that portion of the federal plan. Note, the Comite River Diversion and EBR Flood Risk Management Projects only impact BLH habitat, not swamp habitat; therefore, EA #576 would fully satisfy the mitigation requirements incurred by these projects.

A number of studies and reports on water resources development in the proposed project area have been prepared by CEMVN, other federal, state, and local agencies, research institutes,

and individuals. The most relevant prior studies, reports, and projects are described in Table 1-1. The NEPA documents are incorporated by reference into this SEIS.

Table 1-1: Prior Studies Reports and Projects

Project Year	Study/Report/Environmental Document Title	Document Type	How Information is Being Used
2001	River Reintroduction at Maurepas Swamp (P0-29)	CWPPRA Report on the Maurepas Restoration Project	Existing Conditions and Historical Context
2004	Small River Diversion at Hope Canal-Louisiana Coastal Area (LCA), Near-Term Study Report and Final Programmatic Environmental Impact Statement	Near-Term Study and Programmatic Environmental Impact Statement	Existing Conditions and Historical Context
2012	West Maurepas Diversion-Louisiana's Comprehensive Master Plan for a Sustainable Coast, Coastal Protection and Restoration Authority	Master Plan	Existing Conditions, Historical Context, and Consistency
2016	West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study, Final Integrated Feasibility Report and Environmental Impact Statement	Final Integrated Feasibility Report and Environmental Impact Statement (EIS)	Impacts Identification
2017	East Maurepas Diversion, Coastal Protection and Restoration Authority Coastal Protection and Restoration Authority	Master Plan	Existing Conditions, Historical Context, and Consistency
2019	Supplemental Environmental Assessment #570, West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations, St. Charles and St. John the Baptist Parishes, Louisiana	Supplemental Environmental Assessment (EA)	Impacts Identification
2020	Supplemental Environmental Assessment #571, West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Levee System, St. Charles and St. John the Baptist Parishes, Louisiana	Supplemental Environmental Assessment (EA)	Impacts Identification
2020	Bipartisan Budget Act Construction Projects (BBA); West Shore Lake Pontchartrain (WSLP), Comite River Diversion, and East Baton Rouge (EBR) Flood Risk Management, BBA Construction Mitigation EA #576	Environmental Assessment (EA)	No Action Alternative (federally Identified Mitigation Plan)

CPRAB's permit application for the Mississippi River Reintroduction into MSP PO-29 (MVN-2013-01561-CQ), which had been stalled since October 18, 2019, was formally withdrawn by CEMVN via email dated March 28, 2022. Therefore, it is not considered in the future without project (FWOP) conditions.

The Small River Diversion at Hope Canal was one of the five near-term projects that received immediate conditional construction authorization under the LCA Near-term Plan in

WRDA 2007. That authority required a “Construction Report” and Final EIS be completed prior to initiation of construction. The Construction Report for the small diversion at Hope Canal was never initiated so the diversion was not fully authorized for construction. As such, it was not considered a project that would occur in the FWOP conditions in this SEIS.

1.2.1 CEMVN Civil Works Projects in the Alternative Areas

Mississippi River Ship Channel Gulf to Baton Rouge Project

The Mississippi River Ship Channel (MRSC) Gulf to Baton Rouge Project is a deep draft navigation channel extending from Baton Rouge Louisiana (River Mile 232 above head of passes [AHP]) to the Gulf of Mexico (River Mile 22 AHP). In 1985, the river channel was authorized to be deepened from 40 feet to 55 feet as authorized in the 1983 Report of the Chief of Engineers. Channel deepening was planned in three phases. The first two phases would deepen the channel to 45 feet, and the third phase would deepen the channel to 55 feet. The third phase has not been constructed. As a result, CEMVN prepared a final integrated general reevaluation report and SEIS in 2018 to deepen the existing MRSC Gulf to Baton Rouge Project from its current depth of 45 feet to 50 feet; construction began in 2020.

Mississippi River and Tributaries Project, Mississippi River Levee

After the flood of 1927, the 1928 Flood Control Act authorized the construction of the Mississippi River and Tributaries (MR&T) Project to achieve flood risk management and channel improvement for efficient navigation. The Mississippi River Levee system is a feature of the MR&T Project and contains levees, floodwalls, and various control features along the Mississippi River, which were constructed by CEMVN. After construction, local non-Federal interests are responsible for performing operations, maintenance, and repair while CEMVN manages the major maintenance and repair activities.

1.3 PURPOSE AND NEED

The fundamental objective of compensatory mitigation is to offset unavoidable impacts to significant resources. The purpose of this evaluation is to determine whether the CWPPRA project PO-0029, River Reintroduction into the MSP as it is currently designed (max flow of 2,000 cfs), could be transformed into a viable mitigation project for the WSLP project impacts and determine if the proposed 2,000 cfs diversion at Maurepas could be used to fully compensate for the unavoidable impacts to significant ecological resources that would occur with WSLP project implementation.

Construction of the WSLP project would have net adverse impacts to 10,892 acres of swamp in the LACZ, requiring a separable mitigation feature be developed for swamp habitat. This equates to a mitigation need of approximately 947 (AAHUs) of CZ swamp. The proposed action is needed to replace the lost functions and services of impacted swamp habitat through enhancement activities designed to increase/improve the habitat functions and services at specific mitigation sites.

The mitigation planning objective is to compensate for the loss of 10,892 acres of swamp habitat (947 average annual habitat units AAHUs) from construction of the WSLP project in the Lake Pontchartrain Basin.

The WSLP project would also impact as much as 4,877 acres of BLH-wet in the LACZ, equating to a mitigation need of approximately 293 AAHUs of CZ BLH-wet. The mitigation plan addressing impacts to BLH-Wet habitat was identified in EA #576 and remains the same. As such, mitigation for WSLP BLH-wet impacts would not be further discussed.

The purpose of this evaluation is to look at the PO-0029 Maurepas River Reintroduction Project as it is currently designed (max flow of 2,000 cfs) to see if it could be transformed into a viable mitigation alternative for the WSLP project impacts. The evaluation did not consider variations of the diversion at that location. See Table 1-1 for previous studies investigating the optimal diversion flow rate (more or less water flow) and type (freshwater vs sediment).

The need for the project and its importance has been documented with its continued inclusion in planning, engineering and design documents and multiagency approvals dating back to 2001.

- The Maurepas Swamp Alternative-1 (MSA-1) consists of both public and private lands, while the Maurepas Swamp Alternative-2 (MSA-2) is comprised of public lands only). MSA-1 and MSA-2 have support as documented by the MSP inclusion in multiple watershed plans and authorized programs:
    - Coastal Wetland Planning Protection Restoration Authority (CWPPRA) – 2001, PO-0029 River Reintroduction into MSP. This project is being designed to discharge up to 2,000 cfs of water from the Mississippi River approximately 5.5 miles to the north into the Maurepas Swamp through Hope Canal. The purpose is to restore natural swamp hydrology, increase sediment and nutrient loading to the project area, increase substrate accretion, retain and increase existing areas of swamp vegetation including overstory cover, and reduce salinity levels.
    - Louisiana Coastal Master Plan - The MSP was recommended and unanimously approved by the Louisiana legislature in both the 2012 and 2017 Coastal Master Plans; according to the state, the project would benefit approximately 45,000 acres of coastal forest by reconnecting the Mississippi River and the Maurepas Swamp, thereby improving the swamp ecosystem health and function.
    - LCA Program - (Authorized by the Water Resources Development Act of 2007, Title VII) -The LCA Program was developed and implemented in partnership with the Coastal Protection and Restoration Authority (CPRA), and aims to slow the current trend of coast-wide wetland loss and resource degradation. Several restoration techniques are employed by this program, including river diversions, marsh creation and barrier island restoration.

- RESTORE Council – In 2020, the RESTORE Council voted to approve $130 million in Deepwater Horizon oil spill dollars to fund the construction of the MSP.

1.4 PLANNING AREA

The planning area lies within the Mississippi Alluvial Plain and is defined for this analysis as the LPB within the CZ (See Figure 2-1). The area contains natural levee ridges, man-made levees, fresh, intermediate, brackish and saline marshes, forested wetlands, lakes and bays, barrier islands, and estuaries. Area communities include St. James, St. John and Ascension Parishes. The area occupies a portion of one of the oldest delta complexes in the Mississippi River Deltaic Plain. It is in the lower Mississippi River Alluvial Plain in the LPB. The area north of I-10 comprises the State of Louisiana's Maurepas Swamp WMA. Waterways and water bodies include Lake Maurepas, Amite River Diversion Canal, Amite River, Tickfaw River, Reserve Relief Canal, Blind River, Hope Canal, Dutch Bayou, Mississippi Bayou, Pearl River, Tchefuncte River, Bayou Lacombe, Mississippi River, Lake Pontchartrain, Lake Borgne, Mississippi River Gulf Outlet, and Chandeleur Sound. The proposed compensatory project for the WSLP project is found within LPB (Figure 2-1).

The planning area has a bounty of natural resources. Historically, it was subject to floods from the Mississippi River and nearby lakes. Swamps play an important role in the natural defense against storm surge. An important swamp buffer that separates development from nearby lakes in the area has been impacted over time due to natural and anthropogenic influences. For example, the closure of bayous and the construction of levees cut off the floods that historically nourished and maintained the cypress/tupelo habitat in the Maurepas Swamp. The cypress forests were logged in the 1890s–1930s. Canals and railroads were built through the swamp to remove timber. In the early 1970s, roadways were built through the swamp, further impacting the habitat. Additionally, the area may experience up to 2.32 feet of relative sea level rise (RSLR) over the next 50-years under an "intermediate" RSLR scenario. As a result of these natural and man-made influences, the swamp is converting to fragmented marsh and open water (USACE 2010a, USACE 2010b), and the swamp's surge buffer benefits are expected to continue to diminish as it degrades and disappears and as sea level rises.

1.5 NEPA PROCESS

Scoping is a critical component of the overall public involvement process to solicit input from affected federal, state, and local agencies, federally recognized Tribes, the public, and interested stakeholders. The NEPA scoping process is designed to provide an early and open means for determining the scope of issues (problems, needs, and opportunities) to be identified and addressed in the NEPA document. A Notice of Intent (NOI) to prepare a SEIS to the 2014 WSLP EIS was published in the Federal Register on August 13, 2021, with an initial 45-day comment period. The comment period was then extended to October 31, 2021, due to the damage caused by Hurricane Ida to Southeast Louisiana on August 29, 2021.

Virtual public scoping meetings were held on October 5 and 6, 2021, to solicit potential compensatory mitigation measures from the public. A scoping presentation outlining the

proposed WSLP mitigation alternatives was posted to the WSLP website (listed below) on September 27, 2021.

https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Bipartisan-Budget-Act-2018-BBA-18/West-Shore-Lake-Pontchartrain/

On October 5, 2021, the virtual WebEx scoping meeting included 23 participants and the associated live streaming of the meeting on Facebook was watched by 374 viewers. No comments or questions were submitted during this meeting. On October 6, 2021, the WebEx scoping meeting included 13 participants and the associated live streaming of the meeting on Facebook was watched by 169 viewers. One question was submitted by a Facebook participant during this meeting; it was answered by the panel.

Seventy respondents submitted comments via Facebook, emails, or emailed letters. Within the 70 respondents' e-mails/letters received, there were 60 distinct comments from individuals and non-government organizations. One respondent submitted a comment via both Facebook and e-mail. One non-government entity (Spanish Lake Restoration; mitigation bank)) submitted an email letter on the NOI and the scoping presentation. In total, 3 email/letters were submitted from Spanish Lake Restoration. Two different form letters were submitted by e-mail 56 times by different respondents totaling 10 distinct comments. Since the form e-mails contained the same comments, they were counted as a single e-mail/letter. All e-mails and letters received are included in the scoping report in Appendix O.

An analysis of the comments identified 20 themes that are detailed in the scoping report. The top six themes identified below represent 53 percent of the comments received:

1. **Critical Line of Defense**: Several comments were made regarding the positive benefits of the MSP as mitigation toward restoring the swamp habitat in front of the WSLP levee. They commented that the restored habitat would serve as a critical line of defense for storm surge and protect communities on the inside of the levee system.
2. **Mitigation in-kind & in-basin**: Positive comments were made regarding mitigation occurring in the same basin as the impacts and the restoration of the same habitat as that habitat was adversely impacted by the WSLP levee construction.
3. **Restore health and biodiversity of ecosystem**: A few comments expressed support for the MSP as mitigation for the WSLP levee construction, in that the MSP would increase primary productivity and ecosystem function while maintaining healthy populations and biodiversity. It was expressed that the MSP would restore important fish and wildlife habitat, which in turn would benefit the economy through recreational activities.
4. **Mitigation Bank Credits**: There were both positive and negative comments regarding the use of mitigation bank credits. Some commented that the purchase of mitigation bank credits was the only option, as the use of MSP as mitigation lacks data and would not compensate for the swamp impacts generated by WSLP. Positive comments centered around the fact that using mitigation bank

credits for the WSLP swamp impacts would use all the available credits and there would be no mitigation bank credits remaining for others to use.

5. **Mitigation Need**: Concern was expressed that the MSP was in the early planning stages and that there was insufficient baseline data to be confident that compensation for the WSLP swamp impacts could be achieved by MSP. One commenter expressed concern that the St. James mitigation site would not meet the requirement for mitigation of swamp habitat due to inadequate soils and elevation. Another commenter expressed concern for the costs required to construct the Pine Island Mitigation Project that would render the site unsuitable for WSLP mitigation based on high project costs.
6. **Delays to WSLP construction**: Many expressed concerns over any delays that might be happening now or that could happen in the future with the identification of the MSP as mitigation for the WSLP construction impacts. Concern was expressed that construction of the WSLP levee was taking too long.

A notice of availability was provided to cooperating agencies, the public, and interested parties on March 18, 2022, to correspond with the publication of the Draft SEIS in the Federal Register on the same date (Vol. 87, No. 53, FR page 15420; EIS No. 20220034). A notice of retraction was provided to the same entities as described previously on April 1, 2022, to notify them of outdated information included in the Draft SEIS that was published on March 18, 2022. An Addendum was added to the beginning of the Draft SEIS to describe the outdated information and the new information that would replace it. A new notice of availability was published on April 15, 2022, to correspond with the publication of the updated Draft SEIS in the Federal Register on the same date (Vol. 87, No. 73, FR page 22531; EIS No. 20220051).

Section 2
Alternative Formulation

The scope of the alternative evaluation in this SEIS was limited; this SEIS considers an additional alternative to those assessed under EA #576. The purpose of the evaluation was only to evaluate and compare MSP to the BBA swamp feature of the recommended mitigation plan in EA #576. The full analysis (including the identification and evaluation of a full range of measures, alternatives, and strategies including the purchase of mitigation bank credits) is presented in EA #576 and not repeated here. A summary of the development for the newly proposed construction alternative and the evaluation, comparison, and selection are included in this section.

The purpose of the evaluation under this SEIS was to:

- Evaluate the MSP as a new alternative to compensate for habitat losses incurred as a result of the work performed under WSLP. To qualify as a mitigation alternative, the MSP would need to replace the lost functions and services of the impacted swamp.
- Determine whether the MSP can provide compensatory mitigation for significant ecological resource impacts that are being caused by the construction of WSLP.
- Determine if the MSP can be implemented as a project feature of the WSLP project, to be constructed concurrent with other elements of the project causing impacts.
- Determine if the MSP should be recommended to take the place of the currently identified federal plan (BBA).

2.1 MITIGATION ALTERNATIVE DEVELOPMENT

During the public review of the draft EA #576, the CPRAB submitted a request, dated January 31, 2020, requesting consideration of the MSP as a compensatory mitigation project for the WSLP swamp habitat impacts (see Appendix J). During the plan formulation process for EA #576, the Maurepas Diversion project was not evaluated because it was previously an ecosystem restoration project being pursued under a CPRA (acts as the implementation and enforcement arm of the CPRAB) 404 permit and had never been proposed as a mitigation project. As such, the potential viability of such a project for mitigation needed to be evaluated before it could be looked at as a reasonable mitigation alternative.

In response to the CPRAB request, an interagency project delivery team (PDT) was established to determine whether the ecosystem restoration project could be revised to align with federal mitigation laws and policies and whether it could produce the benefits necessary to offset the WSLP swamp mitigation requirement so it could be considered as a viable mitigation alternative. The four main planning phases for this evaluation effort are listed below and further detailed in the subsequent sections.

- PDT evaluation of the MSP to determine if it is a viable mitigation alternative.
- Once it was determined the MSP was a viable alternative, CEMVN, CPRA and the resource agencies commenced to obtain all information needed for the alternative evaluation and impact analysis.
- Alternative Development-Conversion of MSP from an ecosystem restoration project into mitigation project alternatives (MSA-1 and MSA-2).
- Evaluate and compare the alternatives and complete the NEPA scoping process.

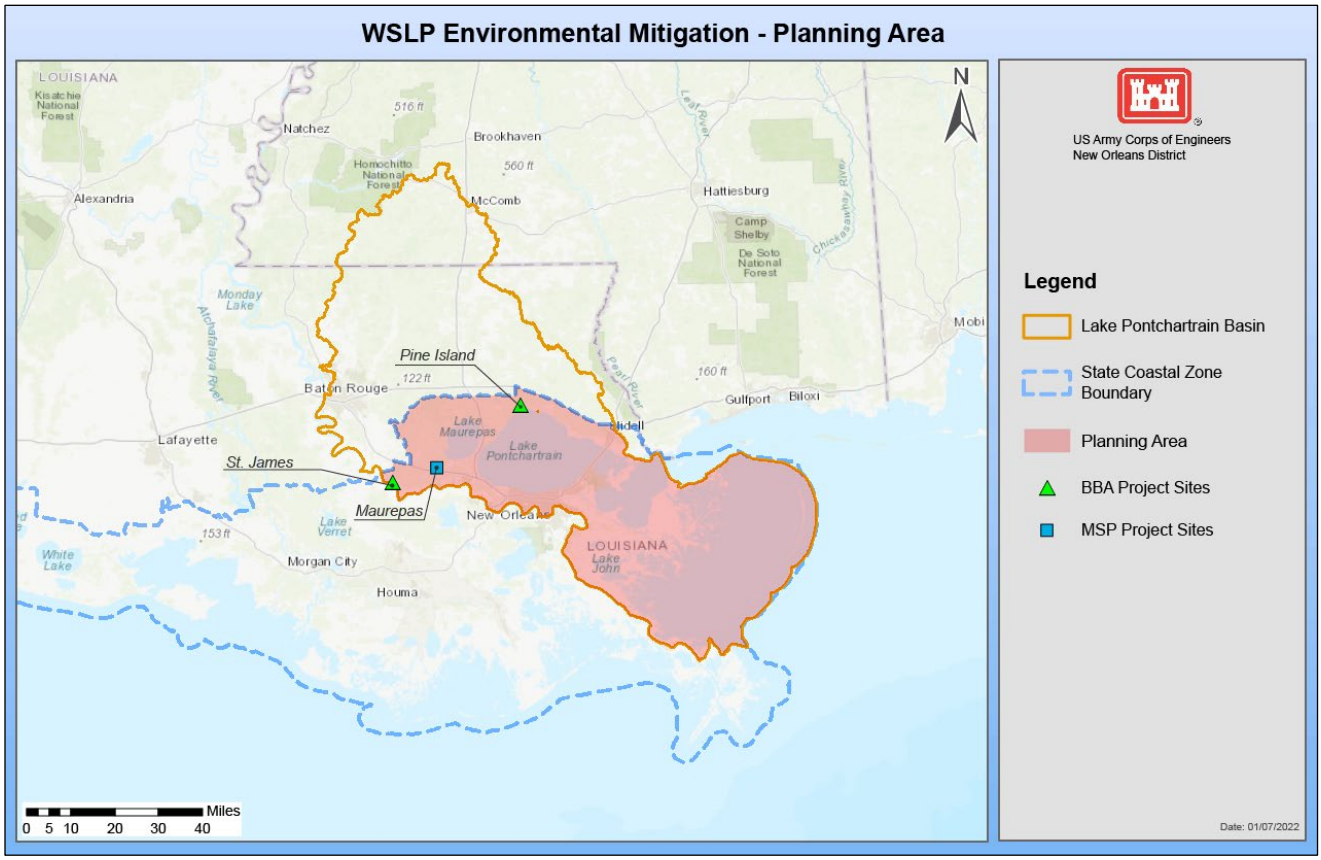

Figure 2-1: WSLP Environmental Mitigation Planning Area

2.1.1 Evaluation of the MSP to Determine if it is a Viable Mitigation Alternative (February 2020-July 2020)

During this phase, the PDT had to determine if the MSP contained the necessary elements required for mitigation planning and the resulting mitigation project plan and it had to determine whether the MSP could produce the necessary benefits to offset the WSLP swamp mitigation requirement.

Evaluation to Meet Requirements

Mitigation planning and the final mitigation plan for a project should, at a minimum, comply with the mitigation laws, policies, and standards described in Section 1.1. The MSP was

evaluated to determine if these elements were available or could be developed to be consistent with the requirements. It was determined that MSP could meet the mitigation planning elements and plan requirements in accordance with ER 1105-2-100 Appendix C. See Tables 2-1 and 2-2, which list the items that are required by mitigation laws, policies, and standards. In addition, these tables indicate where these required elements are located in this SEIS.

Table 2-1: Mitigation Planning Elements

Mitigation Planning Elements	Required By	Where Addressed (Section and/or Appendix)
Formulation Principle	1105-2-100	2.0, 2.1.1, 2.1.2, 2.4.1, 2.6, 2.7.1, 2.7.3, 2.7.4, 3.2, 5.0, 6.0, and 8.7; Appendix H
Range of Alternatives	1105-2-100	1.2, 1.5, 2.0 – 2.6, 3.1, 3.2, 4.1, 9.1
Determination that Separable Mitigation Features are Required	1105-2-100	1.3
Land Requirements	1105-2-100	ES, 2.2, 2.3, 2.5.3, 2.5.4, 2.7.5, 3.2, and 4.1.14; Appendix Q
Out of kind/out of watershed	1105-2-100	2.1.1
Inventory and Categorize Ecological Resources	1105-2-100	3.0
Determine Significant Net Losses	1105-2-100	ES, 1.2, 1.3, 2.1.1, 2.3, 2.5.1, 2.5.3, 2.5.4, 2.7.1, 4.0, and 5.0
Define Mitigation Planning Objectives	1105-2-100	1.3; Appendix H
Determine Unit of Measurement	1105-2-100	1.3, 2.5, and 2.6; Appendix E
Identify and Assess Potential Mitigation Strategies	1105-2-100	2.0-2.7. and 9.1; Appendix F, G, H, J, K, and O
Define and Estimate Costs of Mitigation Plan Increments	1105-2-100	2.6.1, 2.7.1, and 2.7.2; Appendix G, H, and N
Display Incremental Costs	1105-2-100	2.6.1
Recommended Compensatory Mitigation Plan	1105-2-100	2.7
Timing of Implementation	1105-2-100	2.1.1
Special Resource	1105-2-100	2.1.1
Allocation and Apportionment of Mitigation Costs.	1105-2-100	ES, 2.7, 9.1; Appendix J
Operation and Maintenance	1105-2-100	Appendix N

Table 2-2. Mitigation Compensatory Mitigation Plan

Recommended Compensatory Mitigation Plan	Required by	Where Addressed
Description	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	2.2 - 2.4; Appendix A, B, F, M, N, and Q
Type, Amount, and Characteristics of the Habitat	1105-2-100 and 33 USC 2283 3(d)(3)(B)	2.3, 2.5, and 3.0; Appendix A, B, E, F, and G
Ecological Success Criteria	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	6.0; Appendix H
Monitoring Plan	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	2.7.3; Appendix H
Contingency Plan	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	6.0; Appendix H
Land Acquisitions *Description of lands *Basis for determining available for acquisition *Determination that it does not exceed minimum interest necessary to meet requirements	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	2.7.5; Appendix Q
Functions and Values within Watershed	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	ES, 1.1, 1.2, 1.5, 2.1.1, 2.4.1, 2.5.2, 2.7.2, 4.1, and 7.1
Third-party mitigation instrument and basis for determination that can meet mitigation requirements	1105-2-100, 33 USC 2283 3(d)(3)(B), 40 CFR Section 230.92.4(c), 33 CFR 332.4(c)	ES, 1.1, 1.2, 1.5, 2.4.1, 2.5.2, 2.7.4, 2.7.5, 4.1.1, 4.1.14, 5.0, 6.0, and 7.1; Appendix G and H

Additional Factors Considered

- Development of Mitigation Objective: The original project objectives for the MSP ecosystem restoration project were converted into a mitigation objective.
    - Original MSP Restoration Project Objective: The specific objectives of the original River Reintroduction into MSP are to restore natural swamp hydrology, increase sediment and nutrient loading to the project area, increase substrate accretion, retain and increase existing areas of swamp vegetation, including overstory cover, and reduce salinity levels (PO-0029 River Reintroduction into Maurepas Swamp Fact Sheet).
    - Mitigation Objective: The mitigation planning objective is to compensate for the loss of 10,892 acres of swamp habitat (947 average annual habitat units AAHUs) from construction of the WSLP project in the Lake Pontchartrain Basin.

- Determination of Mitigation Method: Compensatory mitigation uses four different methods to replace lost functions and values: the restoration or rehabilitation of a wetland or aquatic resource that is degraded, the establishment (creation) of a new wetland or aquatic resource, the enhancement of an impaired or degraded wetland or aquatic resource, or in certain circumstances preservation of an outstanding aquatic resource that is determined to be important to the long-term success and sustainability of the surrounding watershed.

- Restoration: Re-establishment or rehabilitation of a wetland or other aquatic resource with the goal of returning natural or historic functions and characteristics to a former or degraded wetland. Restoration may result in a gain in wetland function or wetland acres, or both.

- Establishment (Creation): The development of a wetland or other aquatic resource where a wetland did not previously exist through manipulation of the physical, chemical and/or biological characteristics of the site. Successful establishment results in a net gain in wetland acres and function.

- Enhancement: Activities conducted within existing wetlands that heighten, intensify, or improve one or more wetland functions. Enhancement is often undertaken for a specific purpose, such as to improve water quality, flood water retention or wildlife habitat. Enhancement results in a gain in wetland function but does not result in a net gain in wetland acres.

- Preservation: The permanent protection of ecologically important wetlands or other aquatic resources through the implementation of appropriate legal and physical mechanisms (i.e., conservation easements, title transfers). Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection or enhancement of the aquatic ecosystem. Preservation does not result in a net gain of wetland acres and may only be used in certain

circumstances, including when the resources to be preserved contribute significantly to the ecological sustainability of the watershed.

In consultation with the interagency team, the method of compensation from the MSP was determined to be enhancement, since the diversion would restore swamp hydrology, provide nutrients and sediments, and increase tree growth rates and volume. These actions would address ecological needs of the watershed, which has been identified as a high priority habitat in the watershed by both CEMVN and CPRA (Section 1.2) as documented by its inclusion in previous studies.

- Planning Area: A planning area had previously been developed for the MSP; this area needed to be re-evaluated to determine which area could be successfully used for mitigation. See Section 2.3 for details on the mitigation and benefit area.

- In Kind and In Basin Mitigation: In accordance with ER 1105-2-100 Appendix C, WRDA 2007 Sec. 2036a Guidance, WRDA 2016 Sec. 1162 Guidance, and 33 USC 2283 (d), compensatory mitigation was formulated to occur within the same watershed as the impacts and to replace the functions and services of each habitat type impacted with functions and services of the same habitat type. The alternatives would replace the lost functions and values of the LACZ swamp impacts incurred by the WSLP project in-kind and within the same watershed as the impacts (i.e., the LPB).

- Timing of Mitigation. In accordance with guidance, the alternatives must be undertaken (at the latest) concurrent with the authorized parent project that incurred the impacts. The timeline for WSLP construction, this SEIS and the proposed MSA-2 construction schedules are being closely coordinated; if selected as the compensatory mitigation for the swamp impacts from the WSLP project, MSA-2 could be expected to be implemented within the required timeframe.

- Inventory of Baseline information. Due to the ongoing work by CPRA and the numerous previous reports and studies that have been done on variation of the MSP project, existing background and baseline information was used to inform the mitigation planning for MSP. The historic and existing conditions of the mitigation site are described in Section 3 Affected Environment.

- Performance standards. Ecologically based standards that would be used to determine whether the mitigation project is achieving its objectives are required. Success criteria were developed and included in Appendix H.

Assessment to Determine if MSP Could Produce Required Habitat Outputs

The WVA methodology is a quantitative habitat-based assessment developed to determine wetland benefits of proposed projects under the CWPPRA. The WVA quantifies changes to fish and wildlife habitat quality and quantity that are expected to result from a proposed wetland restoration project. The results of the WVA are AAHUs, which can be combined with cost data to measure the effectiveness of a proposed project.

The WVA Swamp Community Model for Civil Works Version 2.0 was first used to determine the environmental benefits of the original MSP to assess whether the MSP could be a viable mitigation project to compensate for unavoidable impacts to bald cypress–water tupelo swamp habitat associated with construction and implementation of the WSLP project. This model is approved for regional use on USACE civil works projects (Appendix E).

In a letter dated July 2, 2020, the USFWS stated that rough-draft WVAs using the intermediate sea level rise (SLR) scenario for a 2,000 cfs diversion indicated that the MSP could provide sufficient benefits to compensate for WSLP project swamp impacts (Appendix J). Additional WVAs were subsequently conducted on the alternatives once they were developed; this information is presented in Section 2.5. Draft operational assumptions are included in the operations plan (Appendix N).

2.1.2 Mitigation Project Development Phase (July 2020-November 2020)

Once it was determined the MSP could be a viable mitigation alternative, it needed to be converted from an ecosystem restoration project into a mitigation project that met the requirements in ER 1105-2-100 Appendix C. Information was needed for documentation of the required elements of a mitigation project, information was needed for a refined WVA for benefit calculation, and data were needed to inform alternative development and evaluation and comparison of alternatives. The documented information needs (work packages) are:

Documentation for required elements of a mitigation plan and SEIS (see Section 2.1.1)

- Information needed for the WVA
- Data to inform the Evaluation and Comparison of Alternatives
    - ArcGIS shape files for all project elements;
    - narrative description of the proposed project;
    - updated WVA models;
    - construction schedule;
    - detail how and when the diversion would be operated (triggers and durations for opening and closing as well as the triggers for pump operation) and address the monitoring system used to inform the operational decisions;
    - model output predicting effects of diversion operation on water levels - (Hydraulic & Hydrology (H&H);
    - detail how diversion would restore and/or enhance habitats lost due to its construction;
    - a description of the proposed mitigation monitoring program and the associated mitigation success criteria;
    - rough cost estimates for main diversion elements;
    - the potential adaptive management plan associated with operation of the diversion;
    - the existing conditions in the swamp area and in Lake Pontchartrain;
    - the current level of design for the proposed diversion (ex. 30 percent, 65 percent, 95 percent, 100 percent) and the estimated time it may take to achieve the next level(s) of design;

- modelling that has been performed on the proposed diversion and state what entity performed each model run; and
- right-of-entry documents allowing CEMVN staff access to any and all lands that would have to be purchased for the diversion, as well as all lands that would have to be placed in easements for the diversion.

2.1.3 Alternative Development Phase (November 2020-July 2021)

With confirmation that the MSP could provide the required benefits and could meet the laws, policies, and standards applicable to mitigation projects and therefore could be a viable mitigation alternative, in depth work began to transform the MSP ecosystem restoration project into a mitigation project. Two alternatives under the MSP project were identified for consideration: MSA-1 and MSA-2 (the MSA-1 alternative consists of both public and private lands, while the MSA-2 is comprised of public lands only), in addition to the No-Action Alternative (alternatives are further described in Section 2.2).

2.2 ALTERNATIVES IDENTIFICATION

During the transformation of the MSP into a mitigation alternative, the PDT initially established the new MSA boundaries at the head of the diversion outfall area to include habitat that would experience the greatest river water influence, and therefore receive the highest nutrient/oxygen benefit and the greatest amount of sediment that the freshwater diversion waters could carry. Doing so included both privately and publicly owned land. Since land used for mitigation for civil works projects must be acquired in fee, obtaining the necessary real estate interests in fee was identified as a high risk by the NFS. As such, an additional alternative was developed for the Action Alternative to identify options to minimize this risk. The MSA-1 (initial PDT Developed Alternative) with a benefit area that included both privately and publicly owned land (benefits were counted on both privately and publicly owned land) and MSA-2 (NFS Preferred Alternative) with a benefit area that included only publicly owned land (benefits were counted on publicly owned land – i.e., the Maurepas WMA). For MSA-2, flow is expected to occur over the private lands; however, these lands are not included in the benefit calculations. Flowage easements rather than fee purchase would still be required over those private lands. The following alternatives were carried forward into the alternatives analysis phase and are further described in Section 2.4:

1. No Action Alternative (BBA Alternative)
2. Action Alternative
    - Maurepas Swamp Alternative - 1 (MSA-1) PDT Developed Alternative, Public and Private Lands used for benefits to meet mitigation requirements.
    - Maurepas Swamp Alternative - 2 (MSA-2) NFS Preferred Alternative, Public Land Only. Only the benefits occurring on public lands are counted toward meeting mitigation requirements.

The No Action Alternative (BBA) includes the following projects: Mitigation Banks, St. James, and Pine Island (Figure 2-1). The Action Alternative includes MSA-1 and MSA-2, which both involve a freshwater diversion that would reconnect the Mississippi River to the Maurepas Swamp; both would have the same construction footprint and structural features, and both would have the same hydrological regime/hydrologic footprint. The main difference between the two alternatives is where the mitigation benefits are calculated (i.e., benefits would accrue on both private and public lands or only on public lands). The cost and benefits for these alternatives differ and thus they are carried through the evaluation and comparison process as two alternatives for the Proposed Action.

2.3 MITIGATION AND BENEFIT AREAS

Based on the design changes as of February 2022, the WSLP project would impact approximately 10,892 acres of swamp in the LACZ. This equates to a compensatory mitigation need of approximately 947 AAHUs of CZ swamp.

The Delft 3D hydrodynamic and water quality model (Appendix M) identified the extent of the diversion influence area by modeling total nitrogen (TN) during the summer, and by modeling the future with-project water surface elevation change relative to no action (2000 cfs steady state discharge, Figure 2-6). The same model also defined the mitigation areas (primary, secondary, and tertiary benefit areas, Figure 2-6), which are nested within the larger diversion influence area.

Previous research has found that an increase in nutrients could stimulate plant growth and improve forest health in the Maurepas Swamp (Effler et al., 2006, and Shaffer et al., 2016). Results of Delft 3D hydrodynamic and water quality modeling contracted by the CPRA to FTN and Associates, Inc. was used to determine the extent of the project areas for the MSAs. Examination of the H&H modeling showed obvious breaks in modeling results that were used to establish the primary benefit area. After WVA analysis of this area was complete, it was determined that additional benefit areas would be needed to completely satisfy the WSLP mitigation need. As such, additional breaks in the modeling results were used to establish the secondary and tertiary benefit areas and determine the AAHUs they would produce. Although the benefit areas were not weighted, the primary, secondary, and tertiary areas were identified and evaluated to ensure that each of the MSA alternatives would meet the required mitigation benefits (section 2.4) to be both complete and effective regardless of how many benefits are derived from the three different areas. See Appendix E: Certified WVA Models and Assumptions for more details regarding the selection of benefit areas.

The primary and secondary benefit areas of MSA-1 are located mostly on state-owned lands but include some privately owned lands (Figure 2-5). The hydrologic improvement benefits attributed to MSA-1 include 7,564 acres within the primary and secondary areas, of which 2,732 acres are in the secondary benefit area (Table 2-3). The purpose of having a public land only option (MSA-2, illustrated at the right in Figure 2-5) was to address NFS real estate concerns. MSA-2 boundaries remove private land from the mitigation benefit area and therefore preclude the need for acquiring that land in fee. It is acknowledged that although removing the private land from the benefit calculations, the private lands within the diversion

influence area may still be impacted. A takings analysis was completed for all lands within the diversion influence area, and flowage easements would be acquired for all land impacted. The hydrologic improvement benefits attributed to MSA-2 includes 8,814 acres within the primary, secondary, and tertiary areas, of which 2,324 acres are in the tertiary benefit area (farther away from outfall). With removing the benefits captured on private land, the MSA-2 takes 25 percent less of its benefits from the primary benefit area as compared to MSA-1 and is more dependent than MSA-1 on the secondary benefit area (38 percent) to satisfy the WSLP mitigation need. For more details on benefit calculations, see Section 2.5.

Table 2-3: MSA-1 and MSA-2 Benefit Area Acreages

Maurepas Diversion Benefit Area (Acres)	**MSA-1 Public + Private Lands**			**MSA-2 Public Lands Only**		
	Closed Canopy (acres)	Trans Canopy (acres)	Forested and Non-forested	Closed Canopy (acres)	Trans Canopy (acres)	Forested and Non-forested
Primary Benefit Area	2,743	2,089	5,259	1,898	1,753	3,982
Secondary Benefit Area	856	2,146	2,732	808	2,028	3,191
Tertiary Benefit Area	N/A-not needed for MSA 1*-Captured as ancillary benefits outside of mitigation area			781	1,543	2,324
Subtotals	3,599	4,235	**7,564**	3,487	5,324	**8,814**
Swamp Acre Totals		**7,834**			**8,811**	
Estimated acres for ancillary benefits outside of the mitigation area (not claimed in mitigation benefits)	**MSA-1 Public + Private Lands**			**MSA-2 Public Lands Only**		
Tertiary Area	797	18,492	288	Captured in required mitigation benefit area		
Estimated Diversion influence Area	104,746 acres					

Acres have been rounded to nearest whole unit.
*No tertiary benefits are included for MSA-1 since all required benefits could be achieved in the primary and secondary areas. Tertiary acres are included at the bottom of the table as additional benefits not being claimed.

2.4 ALTERNATIVES CONSIDERED INCLUDING THE PROPOSED ACTION

2.4.1 No Action – EA #576 Selected BBA Alternative

NEPA requires that in analyzing alternatives to a proposed action, a federal agency consider an alternative of “No Action.” Typically, the No Action Alternative evaluates the alternative of “taking no action” as the FWOP condition by which alternatives considered in detail are compared. However, a federal plan for mitigating WSLP impacts has already been identified and approved (EA #576’s FONSI was signed April 13, 2020), placing the swamp portion of

the approved mitigation plan from EA #576 in this SEIS's FWOP conditions. Understanding this and that a baseline of no mitigation in the Maurepas swamp is necessary for impact analysis, the No Action Alternative presents two scenarios: implementation of the approved mitigation plan identified in EA #576 (BBA Alternative), and no action being taken in the Maurepas swamp.

The projects that make up the BBA alternative include the purchase of in-kind mitigation bank credits, the St. James project, and the Pine Island project (see Section 1.5, EA #576, and Appendix J). These projects meet the need of the WSLP through the purchase of mitigation credits from banks and restoration of swamp at St. James and Pine Island. This alternative was determined to have a low uncertainty and risk associated with achieving ecological success or implementation concerns. Maintenance activities associated with the constructed features are expected to be minimal and include moving, invasives/nuisance species control and the maintaining of ditches and culverts as necessary. The alternative was expected to have positive benefits to hydrology, wildlife and habitats, recreation, T&E and protected species and aquatic species. Impacts were noted for water quality (temporary), water bottoms, EFH, and farmland. The alternative has habitat connectivity to a larger project area, giving it significance in the watershed.

Mitigation Banks

Mitigation banks have minimal uncertainty relative to achieving ecological success because the banks are already established and are monitored through CEMVN's regulatory program. Mitigation banks are required to monitor ecological success, to adaptively manage their sites to ensure ecological success, and to maintain financial assurances to ensure project success. Banks have financial assurances in place to ensure that funds are available if needed for corrective actions. Further, use of bank credits does not require any real estate acquisitions. Because the mitigation banks are already constructed and operating and have credits available, they have no new negative environmental impacts compared to existing and future without project conditions. The purchase of bank credits can proceed considerably faster than the design, contract award and construction of the other potential projects. Additionally, the purchase of bank credits does not require ongoing monitoring for ecological success or the operations or maintenance that would be required for CEMVN's constructed projects.

If CEMVN solicits the purchase of bank credits, mitigation banks wishing to sell credits to satisfy the BBA construction projects' mitigation obligations would be encouraged to submit competitive bids. However, if based on cost and considering other factors, CEMVN determines the purchase of mitigation bank credits is not cost effective or would not be appropriate, the next ranked project would be considered.

St. James

The St. James project consists of converting agricultural land to swamp habitat. This project would require a reduction of site elevations. This would be accomplished by removing the top 6 inches to 1 foot of soil. The removed earthen material would be used to fill depressions at the site to achieve uniform target elevations throughout the site or would be hauled off by

a contractor to a government approved disposal area. Additional construction activities would likely consist of construction of new access roads, clearing and grubbing, backfilling of existing ponds/ditches, demolition of onsite structures, leveling/harrowing soil to receive planting, and planting of canopy and mid-story plant species required to establish swamp habitat. See Appendix F for full project description of the St James project as discussed in EA #576.

Pine Island

The Pine Island project consist of converting shallow open water to swamp habitat. This project would require such construction activities as construction of containment dikes, hydraulic dredging and placement of fill material, planting of canopy and mid-story plant species required to establish swamp habitat and gapping or degrading of containment dikes after the fill material has settled to the target elevation. See Appendix F for full project description.

The AAHUs available for the mitigation bank project were determined by averaging the credit availability of approved swamp banks over the past 10 years and assuming that number of credits would be available. The acres needed were determined by using the average mitigation potential of the banks with available credits over the past 10 years. The AAHUs available and acres needed could change based on the banks available and their actual mitigation potential at the time of implementation.

2.4.2 Proposed Action – Maurepas Swamp Alternatives

Both MSA-1 and MSA-2 alternatives would involve a 2000 cfs freshwater diversion that would reconnect the Mississippi River to the Maurepas Swamp. The hydrologic reconnection would enhance swamp habitat in the Maurepas Swamp by strategically delivering nutrient-laden river water to improve 104,746 acres of Cypress-Tupelo swamp (Figure 2-6). Both alternatives meet the purpose and need for the mitigation project to confirm that the MSP could be used as a mitigation project and meet the swamp mitigation need from the WSLP project.

A description of the construction and structural features for the MSA alternatives is described below. The MSA-1 is depicted on the left in Figure 2-5. The MSA-2 is depicted on the right in Figure 2-5. Both alternatives would have the same construction footprint and structural features, and both would have the same hydrological regime/hydrologic footprint. The two main differences between the two alternatives would be 1) how the mitigation benefits are calculated whether benefits would be calculated from both private and public lands or just calculated from public lands, and 2) how the real estate interests differ between the two alternatives (see Section 2.2 and 2.3). In short, the purpose of having a public land only option was to address NFS real estate concerns. MSA-2 boundaries remove private land from the mitigation benefit area and therefore preclude the need for acquiring that land in fee. It is acknowledged that although removing the private land from the benefit calculations, the private lands within the diversion influence area may still be impacted. A takings analysis was completed for all lands within the diversion influence area, and flowage

easements would be acquired for all land impacted. After evaluation and comparison, which is described in Section 2.6 and 2.7, MSA-2 was selected as the proposed action.

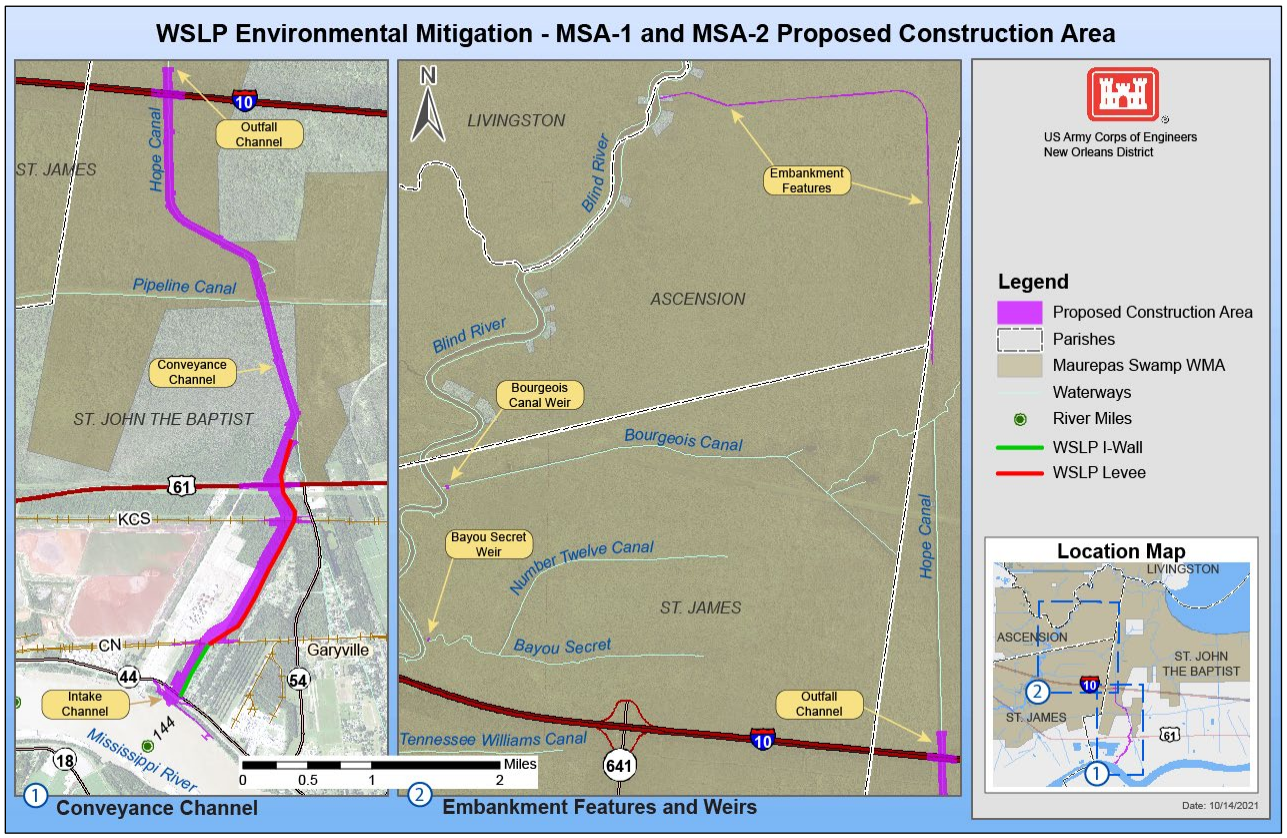

Figure 2-2: Maurepas Diversion Proposed Construction Area (Overall proposed construction area is 288.30 acres. Temporary Impacts are 26.48 acres and Permanent Impacts are 261.82 acres)

MSA-1 and MSA-2 would be a 2,000 cfs freshwater diversion that would be operated to optimize benefits to swamp habitats within the mitigation area (Appendix N: Operation and Maintenance Plan). Construction would include three groups of features: the conveyance channel, embankment features, and weirs (Figure 2-2). The conveyance channel would be located on the East Bank of the Mississippi River in St. John the Baptist Parish, immediately west of Garyville, Louisiana, at River Mile 144 AHP. The construction corridor for the conveyance channel extends from LA 44 (River Road) northward. It extends northward for 5.5 miles, terminating approximately 1,000 feet north of Interstate 10 (I-10). The majority of the open conveyance channel, excluding vehicular and railroad crossings, is a 40 feet to 60 feet excavated channel bottom tightly positioned between a guide levee on the west and the WSLP levee and I-wall system on the east. Both banks along the channel are compacted fill material and have a 1:4 slope. The 1:4 slope decreases to 1:5 after Airline Highway, until the channel outfall north of I-10. Figure 2-3 illustrates typical construction corridor sections of the conveyance channel and the WSLP alignment from the sedimentation basin to the outfall north of I-10.

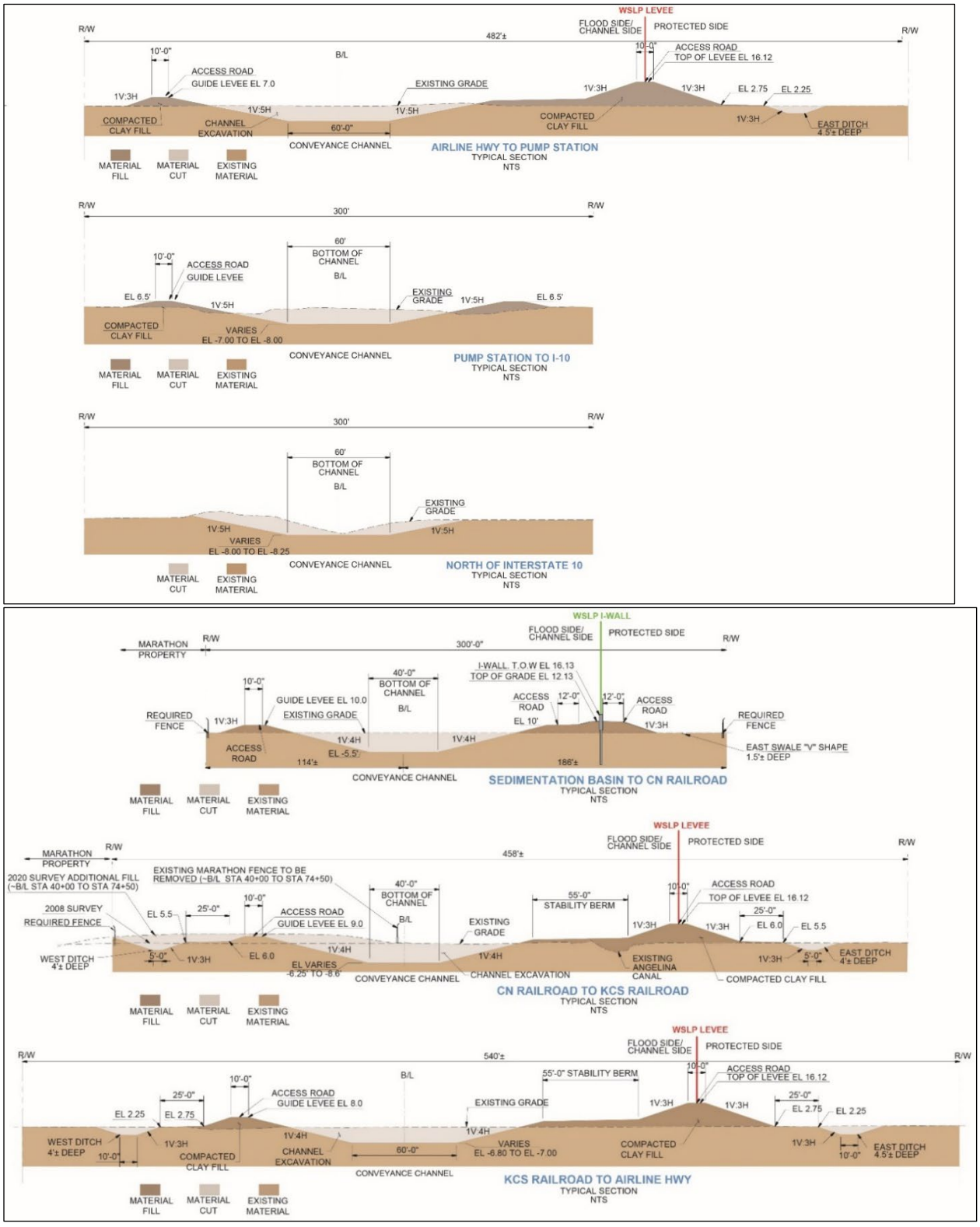

Figure 2-3: Typical Construction Corridor Sections of the Conveyance Channel and the WSLP Alignment from the Sedimentation Basin to the Outfall North of I-10

The majority of MSA-1 and MSA-2 features are located in St. John the Baptist Parish and are comprised of the following elements. Features located partially or wholly outside of St. John the Baptist are indicated as such (Tables and Figures):

- an intake channel from the Mississippi River (Table 2-4, Figure 2-2, Figure 2-4);
- an automated gate structure in the Mississippi River levee (MRL) (Table 2-4, Figure 2-4);
- a sedimentation basin (within the conveyance channel);
- a 5.5-mile-long open conveyance channel (Figure 2-2);
- box culverts under River Road, Canadian National Railroad (CN), and Airline Highway (Figure 2-2);
- a bridge over the channel at Kansas City Southern Railroad (KCS) (Table 2-4, Figure 2-2);
- up to approximately 32 lateral discharge valves between Airline Highway and I-10 to allow water exchange between the conveyance channel and areas east and west of the channel (Figure 2-6);
- check valving on culverts underneath I-10 to reduce or eliminate southward backflow;
- reshaping the geometry of the existing Hope Canal channel under I-10;
- embankment cuts in the existing ridge of an old railroad embankment located in St. John the Baptist and Ascension Parishes (Table 2-4, Figure 2-2);
- submerged rock rip-rap weirs in Bayou Secret and Bourgeois Canal located in St. James Parish; *(*Table 2-4, Figure 2-2*)*

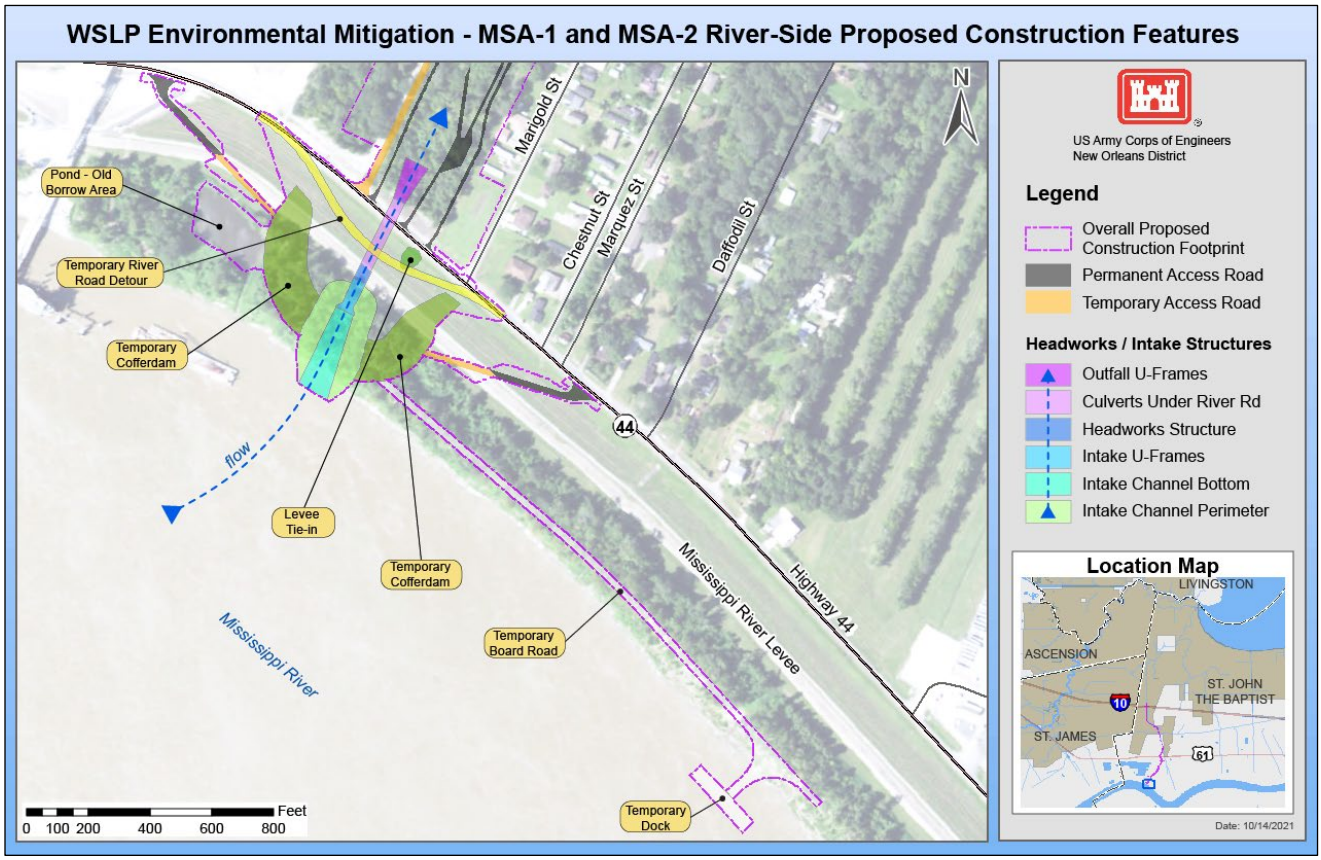

Figure 2-4: MSA-1 and MSA-2 Features from the Mississippi River to LA-44

The intake channel would have a bottom depth at elevation (EL) (-) 4 feet NAVD88 excavated into the batture to route flow from the Mississippi River into the diversion headworks. This channel would be lined with riprap to prevent scour. The diversion headworks structure would include a multi-cell box culvert with vertical lift gates (sluice gates). The primary function of the headworks structure is to convey flow from the intake channel underneath the MRL.

Table 2-4: MSA-1 and MSA-2 Features

Grouping	Feature Name	Acres	Description
Down-river Features	Dock	0.29	Temporary dock to be constructed for offloading of materials.
	Board Road	1.37	Temporary board road to be constructed offloading of materials.
River-side Features	Intake Channel Bottom	0.55	The bottom of the Intake Channel.
	Intake Channel Perimeter	0.98	The banks of the Intake Channel where it comes up to existing grade.
	Cofferdam	2.95	Temporary Cofferdam to provide flood protection during construction.
	Intake U-Frames	0.11	U-frames to be constructed on Flood Side of the Headworks Structure.
	Headworks Structure	0.05	Structure housing the sluice gates and operating equipment.
	Pond	0.93	Old borrow area on batture to be filled in for cofferdam.
	Levee Tie-In	0.08	Connection of River Road flood gate to the Mississippi River levee.
	Culverts Under River Rd	0.23	Culverts connecting the headworks structure to the outfall U-frames.
	River Road Detour	0.65	Area used to temporarily re-route River Road during construction.
	Outfall U-Frames	0.19	U-frames to be constructed on Protected Side of the Headworks Structure.
Railroad Crossings	CN RR Shoofly	4.89	CN RR shoofly crossing at diversion channel.
	KCS RR Shoofly	3.72	KCS RR shoofly crossing at diversion channel.
Lateral Discharge Valves	Lateral Discharge Valves	0.01	Up to approximately 32 lateral discharge valves between Airline Highway and I-10
Features at Blind River	Bayou Secret Weir	0.15	Submerged weir is to be constructed in Bayou Secret, near Blind River.
	Bourgeois Canal Weir	0.30	Submerged weir is to be constructed in Bourgeois Canal, near Blind River.
Embankment Features	Embankment Degrading	1.03	5 individual areas along old RR embankment that would be excavated to existing grade.
	Embankment Spoil Areas	1.84	20 individual areas where excavated spoils would be placed.
	Embankment Clearing	7.51	Area along the old RR embankment to be cleared for access.

Between I-10 and US 61, there would be up to approximately 16 points at which pipes with lateral discharge valves (LDVs) would traverse the conveyance channel levee and carry flow to the areas east and west of the channel. The flow would be carried by means of 24 inch reinforced concrete pipes approximately 80 feet long. There would be a total of up to approximately 32 pipes, 16 on each side. The LDVs are assumed to discharge 140 cfs on each side of the conveyance channel (280 cfs total) for at least 7 days at the end of each pulse. This surface flow would disperse throughout the area between the two roadways and follow the natural drainage gradient to the north. One-way check valving on culverts between Mississippi Bayou and LA 641 underneath I-10 would allow for northward flow and reduce or eliminate southward backflow. Operating LDVs to coincide with the end of each pulse would deliver flowing water, nutrients, and potentially some sediments into wetlands between the I-10 and Highway 61 while allowing the introduced water to drain. The LDVs would be actively operated and bidirectional to facilitate drainage of discharged water and precipitation events to minimize potential impacts from increased inundation duration. The Habitat Evaluation Team (HET) has specifically evaluated 7 days of discharge through the LDVs through Delft 3D modeling; however, it may be possible or required to operate differently in practice as part of the adaptive management approach to MSA-2 (see Appendix M for technical report).

The outlet for the conveyance channel would be along the existing centerline of Hope Canal. Guide levee elevations from the I-10 bridges to the termination point would gradually transition to existing grade. At that point, 2-D hydrodynamic modeling results suggest the diverted water would generally spread radially (i.e., evenly with respect to distance from the discharge point) outward into the area north of I-10, south of Lake Maurepas (Figure 2-2, Figure 2-5).

Approximately one-third of the water would flow westward through the swamp, one-third through Dutch Bayou, and the remaining third would flow eastward through the swamp. The westward flow would enter Blind River and largely proceed to Lake Maurepas. The eastward flow would enter the Reserve Relief Canal and mostly proceed to Lake Maurepas. Most of the swamp water within the benefit areas would be displaced by the introduced Mississippi River water.

Further information on construction methods, timing, sequence, site access, staging, and maintenance and management activities can be found in Appendix F.

2.5 BENEFIT ESTIMATION FOR ALTERNATIVES

The WVAs were first used to assess whether the MSP would be a viable mitigation project to compensate for unavoidable impacts to swamp habitat associated with construction and implementation of the WSLP project. Once the PDT made the determination that the MSP could be considered as a viable compensatory mitigation alternative, additional WVAs were created to determine the environmental benefits of a smaller mitigation area, which would meet but not greatly exceed the swamp mitigation need resulting from the construction of WSLP. The WVA BLH and Swamp Community Models were certified in accordance with EC 1105-2-412 and approved for regional use in 2018, expiring in 2025. The WVA Coastal Fresh/Intermediate Coastal Marsh Community Model was certified in accordance with EC

1105-2-412 and approved for regional use in 2017, expiring in 2024. For the MSAs, the WVAs were conducted on the primary, secondary, and tertiary benefit areas. 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 2.0) were used to calculate the impacts from the WSLP project: 1) Bottomland Hardwood Community Model; 2) Swamp Community Model.

The following WVA models (version 2.0) were used to calculate the impacts (positive and negative) from the MSA Alternatives: 1) Bottomland Hardwood Community Model; 2) Swamp Community Model 3) Fresh/Intermediate Coastal Marsh Model.

The WVA model used to calculate the impacts (positive and negative) from the BBA18 Alternative was Swamp Community Model.

2.5.1 WSLP Impacts Requiring Mitigation

Based on the design changes as of February 2022, the WSLP project would incur impacts to approximately 947 AAHUs of CZ swamp and approximately 293 AAHUs of CZ BLH-wet habitat. Swamp impacts resulting from the WSLP project could be mitigated through construction and operation of MSA-2 and BLH-wet habitat impacted by the construction of the WSLP project would be mitigated in accordance with EA #576.

2.5.2 BBA Alternative

Based on the WVA modeling, the St. James and Pine Island projects within the BBA Alternative have the potential to generate approximately 1,286 AAHUs for swamp (Table 2-5). Additional AAHUs could be generated by the purchase of mitigation bank credits. As of November 2022, the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS) ledger indicates 64.1 Coastal Zone (CZ) Swamp credits (approximately 32 AAHUs) are available for purchase in the Lake Pontchartrain Basin. There is the potential for an additional credit release of 43.7 CZ Swamp credits (22.04 AAHUs) within the next 12 months, contingent on the necessary criteria being met to grant credit release.

Table 2-5: No Action-BBA Alternative Benefit Area Acreages and AAHUs

	Projects	AAHUs	Acres
BBA Alternative	Mitigation Bank (LPB)	TBD	TBD
	St James	up to 511	up to 1,246
	Pine Island (LPB)	up to 775	up to 1,965

2.5.3 MSA-1

Based on the WVA modeling, MSA-1 could generate approximately 1,255 swamp AAHUs in the primary and secondary benefit areas combined (see Table 2-6 and Table 2-7).

Impacts from Construction of MSA-1

Although MSA-1 would produce swamp benefits, the construction of this alternative would incur direct impacts to approximately -52.4 AAHUs of CZ swamp and indirect impacts to approximately -154.1 AAHUs of CZ swamp. These impacts would be mitigated through construction and operation of MSA-1 (mitigation need for this alternative would increase from 947 AAHUs, for WSLP impacts, to approximately 1,154 AAHUs).

Additionally, implementation of MSA-1 would also have direct impacts to approximately 79 acres and indirect impacts to approximately 1,830 acres of BLH-wet. This equates to a compensatory mitigation need of approximately 36 AAHUs of BLH-wet. This impact would be mitigated in accordance with EA #576's Mitigation Plan for CZ BLH-wet (see Section 5).

South of I-10, implementation of MSA-1 would incur indirect impacts to approximately 2,743 acres of CZ fresh marsh. This equates to a compensatory mitigation need of approximately 19.5 AAHUs of CZ fresh marsh. This impact would be mitigated as specified in section 5.

For the area North of I-10, marsh acres for each mitigation area were estimated using habitat classification data (Keim et al. 2010). Impacts to marsh were assessed using the USACE-certified approved for use Fresh/Intermediate Coastal Marsh WVA Model version 2.0 per EC 1105-2-412. Results suggest that implementation of MSA-1 would yield a net decrease in AAHUs for mitigation area marshes for the intermediate SLR for the 50-year project life. Results from this model also indicate a net gain in AAHUs for low and high SLR scenarios and a net increase in acres for the intermediate SLR scenario for FWP. Eventually, under the intermediate SLR model, net benefits to marsh would accrue for the FWP condition (i.e., a net increase in AAHUs for marsh habitats for the FWP condition sometime after year 50). Based on all the approved for use WVA results for the marsh north of I-10, the project would be self-mitigating and more resilient to climate change with implementation of MSA-1. The resource agencies and HET agree with this determination and do not recommend compensatory mitigation for marsh impacts north of I-10.

Appendix E provides additional habitat modeling using non-USACE certified WVA models conducted by USFWS to meet their agency needs and was part of agency coordination.

Even though these models produced different results, the USACE did not consider the results of the un-certified WVA model when assessing and quantifying project impacts.

In summary, MSA-1 would yield a net benefit of approximately 1,048 AAHUs to CZ swamp habitats (Table 2-6). The benefits attributed to existing swamp through hydrologic improvement includes 7,564 acres closest to the outfall (primary and secondary areas) (Table 2-6). MSA-1 uses all the primary benefit areas which are expected to receive the greatest benefits from the diversion, both private and public lands. According to the WVA modeling, 65 percent of AAHUs may be achieved in the primary benefit area, which has the greatest chance of success. This alternative is less dependent on the secondary benefit area to achieve 947 AAHUs (WSLP mitigation need) and has more contingency available (~15 AAHUs), even though MSA-1 does not include any benefits from the tertiary area. Under this scenario, private lands would have to be purchased in fee or through non-standard estates, which would not allow any adverse activities to impact the mitigation area.

2.5.4 MSA-2

Based on the WVA modeling, MSA-2 can generate approximately 1,239 AAHUs to CZ swamp in the primary, secondary, and tertiary areas combined (Table 2-6 and Table 2-7). MSA-2 would have net benefit to CZ swamp of 1,033 AAHUs because it would have the same negative impacts to CZ swamp from its construction as MSA-1, -206 AAHUs. Therefore MSA-2 would meet the mitigation need for WSLP CZ swamp of -947 AAHUs.

This alternative would be more likely to need adaptive management since the alternative is not able to capture the benefits accrued on private lands in the event that some areas within the public lands do not succeed, or additional mitigation is required.

Like MSA-1, implementation of MSA-2 would also have direct impacts to approximately 79 acres and indirect impacts to approximately 1,830 acres of BLH-wet. This equates to a compensatory mitigation need of approximately 36 AAHUs of BLH-wet. This impact would be mitigated in accordance with EA #576's Mitigation Plan for CZ BLH-wet.

Also, like MSA-1, implementation of MSA-2 would incur indirect impacts to approximately 2,743 acres of CZ fresh marsh. This equates to a compensatory mitigation need of approximately 20 AAHUs of CZ fresh marsh. This impact would be mitigated as specified in Section 5.

Table 2-6: Impacts Associated with MSA-1 and MSA-2 Primary, Secondary, and Tertiary Benefit Area

MSA-1 (Public and Private Lands) Intermediate RSLR WVA Summary						
Area	**Swamp AAHUs**	**Swamp Acres***	**BLH AAHUs**	**BLH Acres***	**Marsh AAHUs**	**Marsh Acres***
Primary	822.73	4832	0.00	0	0.00	262
Secondary	432.04	2732	0.00	0	0.00	252
Tertiary	227*	*	N/A	N/A	N/A	N/A
Construction	-52.39	95	-29.12	79	0.00	0
South of I-10	-154.10	7539	-6.71	1830	-19.54	2743
Total	1048.28	15198	-35.83	1909	-19.54	3257

*although benefits and impacts occur over the tertiary area for MSA-1 they are not included in the benefits calculation since all mitigation requirements can be met in the primary and secondary areas.

MSA-2 (Public Lands Only) Intermediate RSLR WVA Summary						
Area	**Swamp AAHUs**	**Swamp Acres***	**BLH AAHUs**	**BLH Acres***	**Marsh AAHUs**	**Marsh Acres***
Primary	634.65	3651	0.00	0	0.00	208
Secondary	408.15	2839	0.00	0	0.00	244
Tertiary	196.61	2324	0.00	0	0.00	284
Construction	-52.39	95	-29.12	79	0.00	0
South of I-10	-154.10	7539	-6.71	1830	-19.54	2743
Total	1032.92	16447	-35.83	1909	-19.54	3479

*acres are the existing condition acres by habitat type

Table 2-7: Summary Comparison of Benefits for No Action and Mitigation Alternatives

No Action (BBA) Alternative (947 AAHUs needed)	**Habitat**	**AAHUs**	**Acres**
Mitigation Bank (LPB)	Swamp	TBD	TBD
St. James	Swamp	up to 511	up to 1,246
Pine Island (LPB)	Swamp	up to 775	up to 1,965
Maurepas Swamp Alternatives (1,154 AAHUs needed)	**Habitat**	**AAHUs**	**Acres**
MSA-1 Public and Private Land	Swamp	1,255	7,564
MSA-2 Public Lands Only	Swamp	1,239	8,814

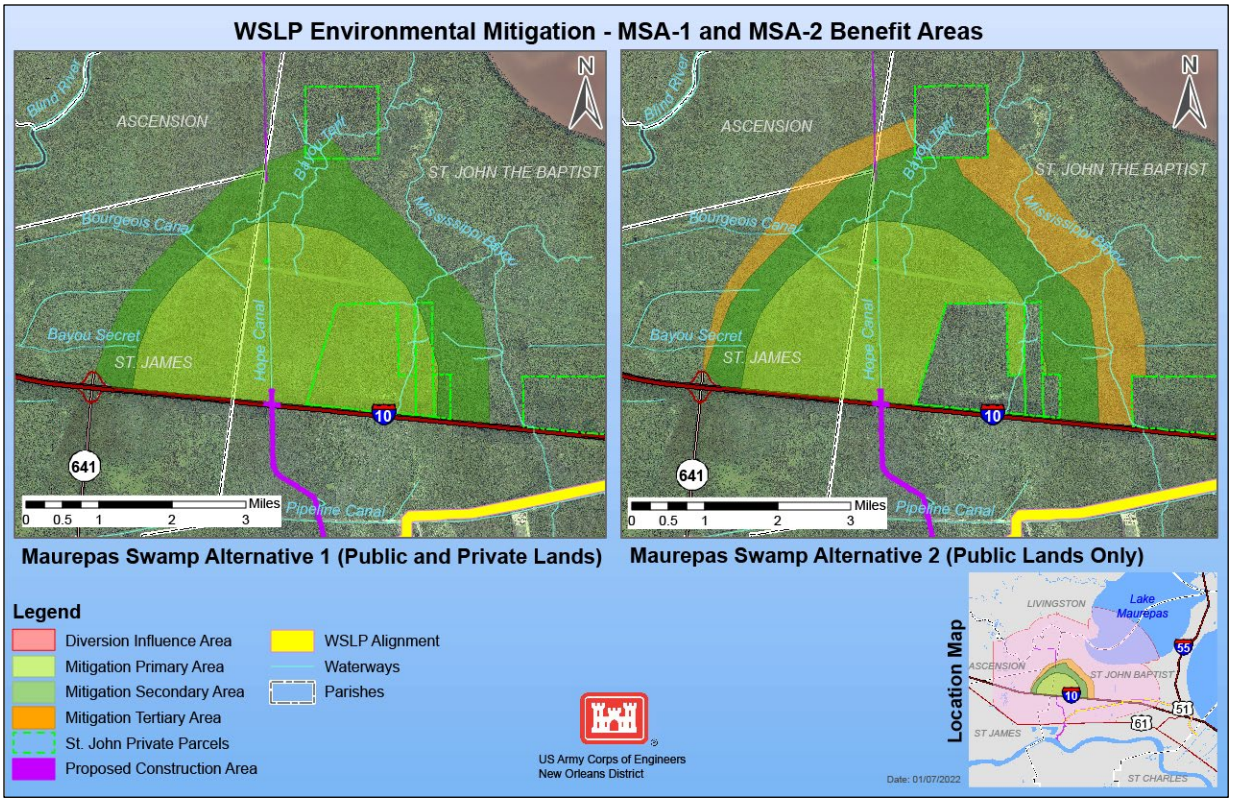

Figure 2-5: Primary, Secondary, and Tertiary Benefit Areas

Figure 2-5 depicts the outlet for the conveyance channel along the existing Hope Canal north of I-10 and the areas of impact and/or benefits. At the outfall of the diversion, 2-D hydrodynamic modeling results suggest the diverted water would generally spread radially outward into the area north of I-10 and south of Lake Maurepas. The diversion of freshwater into the receiving swamp generates graduating effects. These effects diminish with distance from the outlet channel. As discussed, the areas are described as primary, secondary, and tertiary. Within the WMA boundaries, there are inholdings that are privately owned. The lime green outline defines private ownership parcels in this area.

(LEFT) MSA-1 Public and Private Lands – Alternative 1 demonstrates the overall impact and benefit areas, which are delineated as mitigation primary and secondary areas. Required mitigation habitat units for the WSLP project have been calculated such that the benefits realized can be met by securing lands in the primary and secondary areas. These areas include both public and privately owned lands.

Fee, Excluding Minerals, would be purchased over the impacted private lands, as swamp mitigation habitat units for the WSLP project would be realized over both the public and private lands in the mitigation primary and secondary areas.

(RIGHT) MSA-2 Public Lands Only – Alternative 2 demonstrates the overall impact and benefit areas. Benefits accrue in the primary, secondary, and tertiary areas. Lands required for mitigation habitat units for the WSLP project would only be secured over the publicly

owned lands in the mitigation primary, secondary, and tertiary areas within the Maurepas Swamp WMA.

Because there are no physical demarcations between the privately owned lands and the publicly owned lands, flow of water from the conveyance channel would enter the private lands. Effluent from diversion flows onto private lands outside of the identified mitigation boundaries would require the purchase of Flowage Easements. These privately owned areas are not included in the estimation of swamp mitigation habitat units for the WSLP project.

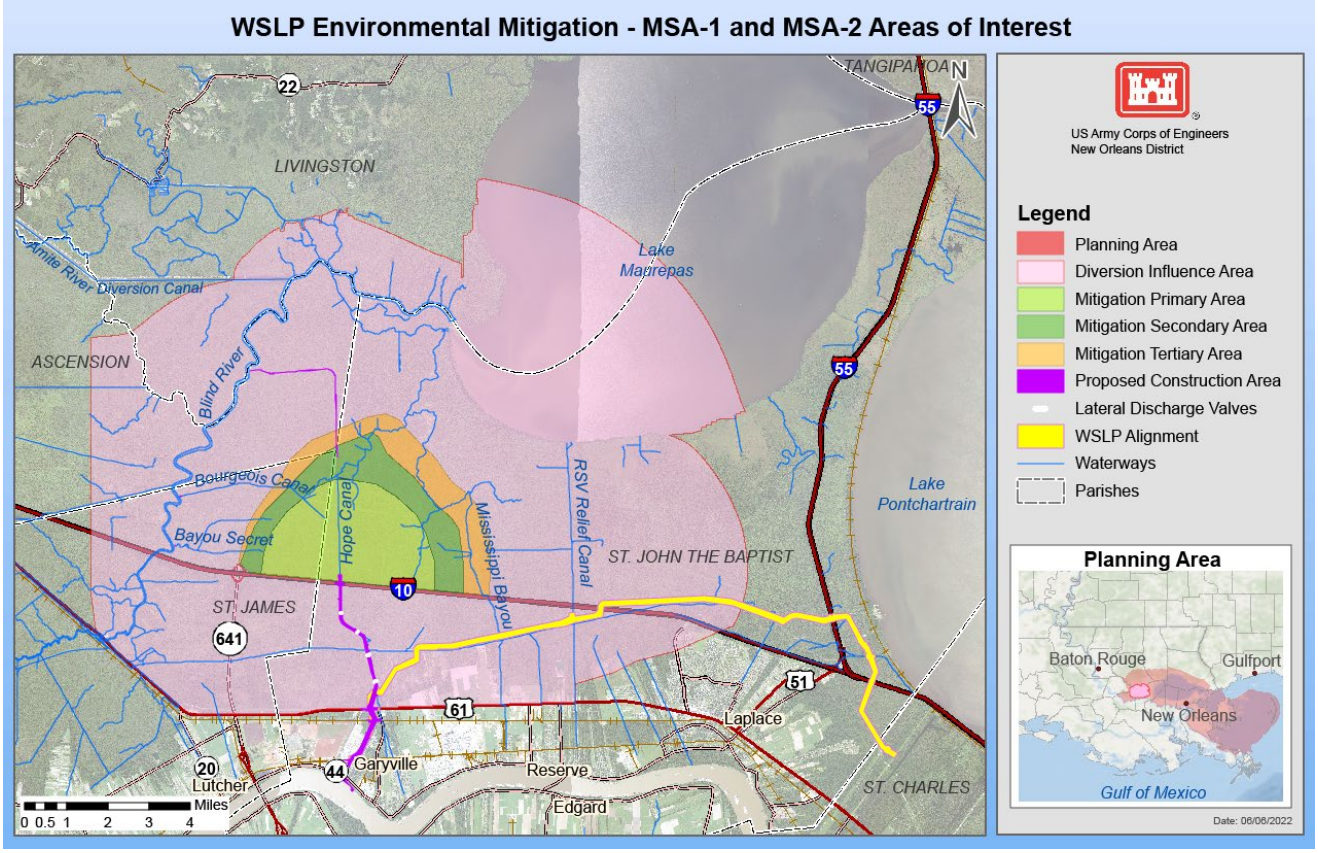

Figure 2-6: Maurepas Areas of Interest

As mentioned previously, prior to the compensatory mitigation areas being defined as shown in Figure 2-5, there was a much larger ecosystem restoration area, 44,683 acres, associated with the Maurepas Diversion when it was defined as the MSP. River Reintroduction into Maurepas Swamp Wetland Value Assessment (LaCour-Conant et al. 2019) can be referenced for more information on the previously proposed restoration project. Flowage easements will be purchased on any privately owned properties within the mitigation area.

2.6 COST ANALYSIS AND INCREMENTAL COST ANALYSIS

Cost estimates were developed for each alternative. Coupled with the outputs of the alternatives defined in Section 2.5, this information supported an assessment of cost

effectiveness and an incremental cost analysis. Table 2-8 displays the costs and outputs for each alternative plan. IWR Planning Suite Decision Support Software was used to perform the cost effectiveness/incremental cost analysis (CE/ICA). For this evaluation, the outputs for each of the alternatives considered had the same benefits, which is the mitigation AAHU target, but have varying costs. Other outputs/benefits are in excess of the target and are not captured in the cost analysis.

Table 2-8: Cost Effective Analysis

Name of Alternative	Average Annual Cost	AAHUs	Cost Effective
BBA	$4,802,642	947	Yes
MSA 1	$8,989,187	947	No
MSA 2	$9,342,272	947	No

It should be noted that these costs used during the CE/ICA analysis were preliminary and were refined as the planning effort progressed and do not constitute final costs for the alternatives.

Figure 2-7 shows the No Action Alternative (previously federally selected BBA-18 Alternative from EA # 576) is the least cost alternative for the required environmental mitigation output. The BBA Alternative is the only cost-effective plan and the best buy plan.

For this evaluation, the least cost plan was not the ultimate criteria used for plan selection (see Section 2.8 for the selected plan and rationale). MSA-1 and MSA-2 have additional benefits that are not captured and are above and beyond what is required for mitigation, and beyond what is measured in the cost analysis. It should also be recognized that with the NFS being solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, the federal cost and investment is the same between the BBA Alternative and MSA-2. The results of the CE/ICA, along with the results of the evaluation and comparison, the P&G criteria, compliance with laws, regulations and policies, implementation timing, risk elements, and the broader Maurepas Swamp ecosystem and the NFS request for MSA-2 as Non-traditional Cost Sharing were all considered in plan selection.

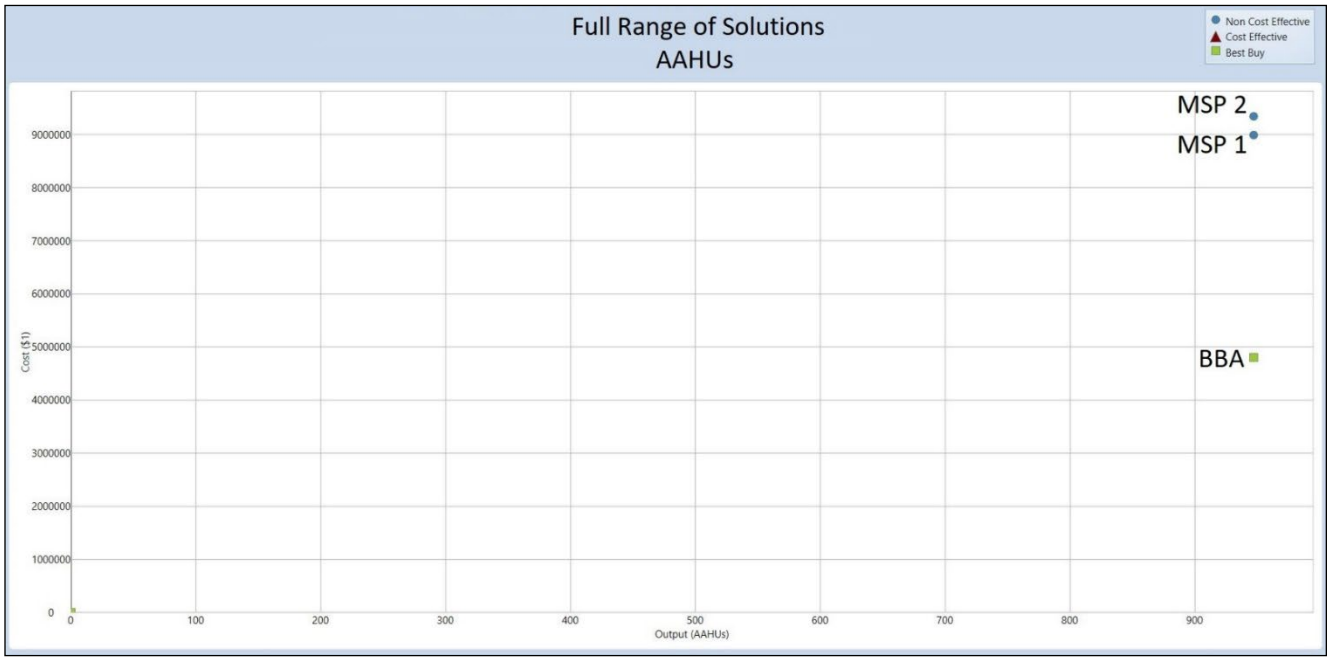

Figure 2-7: Cost Benefit Analysis from CE/ICA

2.7 EVALUATION AND COMPARISON

The three alternatives were evaluated and compared using a cost effectiveness and incremental cost analysis (CE-ICA), an established set of criteria (risk and reliability, environmental impacts, time to ecological success, and watershed and ecological site considerations), and the P&G criteria. The three alternatives evaluated include: two variations of the Proposed Action: MSP including Maurepas Swamp Alternative 1 – MSA-1 (benefits claimed on both private and public lands), Maurepas Swamp Alternative 2 – MSA-2 (benefits claimed on public lands only), and the No Action Alternative (previous federal selected plan under BBA in EA #576).

Mitigation projects were evaluated individually and then compared to one another using the following criteria during an interdisciplinary PDT meeting. For consistency with EA #576 the same criteria were used. It should be noted that the results from the evaluation and comparison were used in conjunction with the results from CE-ICA and the evaluation against P&G Criteria, compliance with laws, regulations and policies, implementation timing, risk elements, and the broader Maurepas Swamp ecosystem and the NFS concerns to support plan selection. The plan with the highest score from the evaluation and comparison of alternatives ultimately was not the plan recommended when all factors and tradeoffs were considered.

- **Risk and Reliability** – This criterion considers issues such as a proposed projects' susceptibility and resiliency to stressors, long-term sustainability, uncertainty relative to CEMVN's ability to implement the project, and uncertainty relative to project success.

- **Environmental** – This criterion evaluates a proposed project's adverse and beneficial impacts to human and natural resources.
- **Time** – Time evaluates the duration to contract award and to initial ecological success or Notice of Construction Complete.
- **Cost Effectiveness** –This criterion evaluates the average annual cost per AAHU.
- **Other Cost Considerations** – This criterion evaluates total proposed project costs, including construction, real estate, operations and maintenance, total project and average annual costs over the 50-year period of analysis.
- **Watershed and Ecological Site Considerations** – This criterion evaluates the proposed project site characteristics, such as the role that a potential project would play in terms of creating habitat linkages or wildlife corridors, whether the project is consistent with watershed plans such as Coast 2050, and its proximity to the WSLP construction project impacts.

Weighting of these criteria were established based on importance by the PDT with risk and reliability ranked highest at 30 percent, environmental weighted 20 percent, watershed and ecological site considerations weighted 15 percent, time weighted 15 percent, and cost effectiveness and other cost considerations both weighted 10 percent.

The results of the evaluation and comparison are presented in Table 2-9.

Table 2-9: Evaluation and Comparison

Criteria	PDT Approved Weights	Scores[1]		
		BBA	MSA-1	MSA-2
Risk and Reliability	30%	3	2	1
Environmental	20%	2.5	1.75	1.75
Watershed and Ecological Site Considerations	15%	1.5	2.25	2.25
Time	15%	2	2	2
Cost Effectiveness	10%	4	1	1
Other Cost Considerations	10%	4	1	1
Aggregate Score		2.73	1.79	1.49
% of Total Available		69.13%	44.69%	37.19%

[1]Higher numbers are better, total score for each criterion must equal 6.

Through the evaluation, the BBA Alternative (no action) received the highest scores in the evaluation and rankings of the alternatives during plan comparison. The primary criteria that resulted in the higher scores for the BBA Alternative were cost effectiveness, other cost considerations and risk and reliability. The MSA-1 and MSA-2 projects scored higher in watershed/ecological and equal in time. This information was used in conjunction with the results of the CE/ICA and the P&G criteria for ultimate plan selection.

2.7.1 Principles and Guidelines Criteria

USACE projects, including mitigation, must be verified to reasonably maximize benefits to the national economy, to the environment, or to the sum of both in consideration of four criteria described in Principles and Guidelines (P&G) promulgated in 1983: completeness, efficiency, effectiveness, and acceptability (ER-1105-2-100 P&G (Paragraph 1.6.2(c)). In addition to the P&G criteria.

- Completeness: A plan must provide and account for all necessary investments or other actions needed to ensure the realization of the planned outputs. This may require relating the plan to other types of public or private plans if these plans are crucial to the outcome of the objective. Real estate, operation and maintenance, monitoring, and sponsorship factors must be considered. Where there is uncertainty concerning the functioning of certain restoration features and an adaptive management plan has been proposed, it must be accounted for in the plan.
- The No action alternative was determined to be complete with the signing of the ROD for EA #576.
- Given that the results of the benefit calculations, MSP (MSA-1 and MSA-2) are capable of completely fulfilling the mitigation needs for the WSLP project for swamp, it was deemed complete.
- Efficiency: The efficiency criterion is the extent to which an alternative is the most cost-effective and/or least complex means of alleviating the identified problems.
- When considering total costs, MSA-1 and MSA-2 are not the least cost means of addressing the established mitigation requirements (see Section 2.6). However, with the request from the NFS agreeing to be solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, the federal cost for MSA-2 and the BBA-18 federally selected plan become equivalent and cost effective for the federal government.
- With equivalent federal costs it is also recognized that the overall ecosystem performance and function is greater with MSA-2 in benefits beyond the mitigation requirements. The MSA-2, by reestablishing a natural hydrologic regime, would provide significant long-term beneficial impacts beyond the benefit area that would not be included in the calculated benefits.
- Effectiveness: The mitigation alternatives must be capable of delivering the required mitigation outputs.
- The No Action, MSA-1, and MSA-2 meet this requirement since it produces the benefits required and includes a contingency to account for uncertainties and to reduce risk of not meeting required mitigation.
- Acceptability: A mitigation plan should be compliant with applicable laws (described in section 1.1) and acceptable to state and federal resource agencies, and local government. There should be evidence of broad-based public consensus and support for the plan. A recommended plan must also be acceptable to the non-federal cost-sharing partner.

- The No Action, MSA-1, and MSA-2 were determined to be complaint with requirements and applicable policies and laws. Furthermore, MSP (MSA-1 and MSA-2) has broad based support as evident in its long history of being proposed as described in Section 1.2.

2.8 TENTATIVELY SELECTED ALTERNATIVE (TSA)

2.8.1 Selection Rationale

The WSLP project is expected to impact approximately 10,892 acres of swamp and 4,877 acres of BLH-wet in the LA CZ. This equates to a compensatory mitigation need of approximately 947 AAHUs of CZ swamp habitat and approximately 293 AAHUs of CZ BLH-wet habitat (BLH-wet habitat impacted by the construction of the WSLP project would be mitigated in accordance with EA #576).

The MSP was assessed and it was determined it could meet the mitigation needs for the WSLP project. The MSP was then converted to mitigation alternatives MSA-1 (benefits captured on private and public lands), MSA-2 (benefits captured on public lands only) and evaluated and compared to the previously identified mitigation plan in EA #576.

The following items were considered during the alternative analysis:

- Risk and Reliability
- Environmental Impacts
- Watershed and Ecological Site Considerations
- Time to benefits achieved
- Cost Effectiveness, incremental cost and other cost considerations
- Principles and Guidelines Criteria-Completeness, Efficiency, Effectiveness, Acceptability

The evaluation and comparison of alternatives confirmed the BBA18 alternative as the least environmentally damaging practicable alternative and the federally selected plan to meet the mitigation needs of WSLP.

Through a letter dated August 23, 2021 (Appendix J), the NFS acknowledged the BBA Alternative (no action) as the federally selected plan but requested MSA-2 be pursued because it could be integrated with the implementation of the WSLP project, saves the NFS time and money, provides mitigation immediately adjacent to the impacts, and would restore the ecosystem around the WSLP project, which would increase its resiliency.

The NFS offered that it would agree to be solely responsible for the complete construction of MSA-2 and solely and completely responsible for any and all costs above the BBA Alternative current cost estimate, pursuant to a Non-traditional Cost Sharing amendment to the Project Partnership Agreement (PPA) if MSA-2 were to be selected as the recommended swamp mitigation. The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts

resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs. As the NFS would be responsible for the construction of MSA-2, the total combined lands, easements, rights-of-way, and disposal (LERRD) and Work-in-Kind Credits which the NFS would be able to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Thus, based upon the above, the NFS-preferred alternative, MSA-2, was recommended as the TSA with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative.

MSA-1 was removed from further consideration since it was not the federally selected plan through the evaluation and comparison of alternatives or being requested by the NFS. In consideration of the results of the alternative analysis, the significance of the Maurepas Swamp in the watershed and the NFS request, on November 4, 2021, the New Orleans District Engineer and Commander supported the NFS preferred alternative (MSA-2) as the TSA the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative. Although the BBA alternative was determined to be the least environmentally damaging practicable alternative, the MSA-2 was recommended as the TSA since it meets the swamp mitigation requirements for the WSLP project for the same federal investment and is expected to provide additional benefits beyond what is required for mitigation.

While the CEMVN District Engineer and Commander recommended MSA-2 as the TSA, the ultimate decision on which mitigation plan to implement as the recommended plan is forthcoming and will be made by the MVD Commander.

In a letter dated June 21, 2022, the NFS outlined the use of various funding sources to meet the required share for the construction of MSA-2 (see Appendix J). A cost-share record for each source of funding would be created to track obligations and expenditures accordingly.

Beyond MSA-2's ability to provide mitigation that is in-basin and immediately adjacent to WSLP project impacts, the selection of MSA-2 provides flexibility in management and restoration with a system-wide approach (larger than the mitigation project) to support the broader objective for the Maurepas system restoration and is consistent with the LA Master Plan. The Maurepas Swamp is one of the largest and last remaining tracts of coastal freshwater swamp in Louisiana (Shaffer et al. 2016). The resources to be preserved with the selection of this alternative contribute significantly to the ecological sustainability and improvement of the aquatic resources in the watershed. The MSA-2 delivers net benefits

beyond those being captured in the mitigation project; this will restore the ecosystem around the WSLP project increasing its resiliency. Additionally, MSA-2 as a mitigation alternative for the WSLP project integrates the implementation of two key projects (WSLP project and the Maurepas Diversion) saving time and money for the overall implementation of both projects.

The specifications and work descriptions for the construction of MSA-2 are included in Appendix M: Engineering Reports. It should be noted that the engineering reports were provided by CPRA as standalone documents and in some cases the terminology within may not match the terminology used in this SEIS (e.g., MSP vs MSA-2 for the selected alternative).

2.8.2 Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R)

The TSA is a 2,000 cfs freshwater diversion that would need to be actively operated to optimize benefits to swamp habitat within the mitigation area. The operation plan is a separate plan from the maintenance plan, and each is discussed separately below. The operation plan, maintenance plan, and a standing water control plan are included in Appendix N.

Operation Plan

The purpose of the operation plan is to outline diversion operations that have been developed to optimize benefits to swamp habitat within the mitigation area. The 50-year cost, including 2.5 percent inflation, is $5,381,250.

The HET, with assistance from the Maurepas Technical Advisory Group created project operational assumptions for the MSA-1 and MSA-2 benefit WVAs. The assumptions include two discharges that coincide with anticipated high Mississippi River discharge during the swamp forest growing season. Non-flow periods are included to reduce flooding stress and allow for the opportunity of swamp floor dewatering. This variability in discharge is expected to improve swamp health. The environmental conditions could vary widely year to year, but the expected annual operational period for the diversion would be between January 1 and July 1. The precise timing, discharge rate, and duration of the pulses would be modified to maximize benefit to the swamp. The first 3 years of operation consist of gradually increasing flow duration and magnitude (i.e., a “ramp-up” period). This ramp-up period is intended to reduce the initial shock to the system and enable adaptive management based upon monitored water flow and environmental responses.

Maintenance, Repair, Rehabilitation and Replacement Plan

The purpose of the maintenance, repair, rehabilitation and replacement (MRR&R) plan is to sustain the constructed project to ensure satisfactory operation of the diversion features over a 50-year project life. The maintenance tasks of the various engineering and design features that comprise the Maurepas Diversion are grouped into the following eight categories: 1) intake & levee crossing, 2) headworks, 3) roadway crossings, 4) sediment basin & conveyance channel, 5) railroad crossings, 6) check valves, 7) flow distribution features, and 8) remote sensors. The estimated cost for these features over the 50-year project life is $344,450,591. In addition to maintaining project design features, maintenance activities for

the MSA-2 would also include tasks associated with ancillary channel maintenance, including routine inspections and bathymetric surveys every five years, removal of debris and deposited material, and invasive and nuisance species management. Ancillary channels include conveyances within the MSA-2 area that are not associated with the engineering and design features. The total maintenance cost over the 50-year project life is $353,675,591. Additional details on maintenance activities and costs are provided in the MSA-2 maintenance plan included in Appendix N. This estimate does not include the cost for the operation of the diversion, which is included in the separate operations plan. If approved as mitigation for the WSLP project, MSA-2 would be designed and constructed as Work-in-Kind by CPRA and would adhere to all applicable USACE standards.

2.8.3 Monitoring

As per the requirements of 33 USC 2283 (d)(3)(B) for mitigation projects, Appendix H includes the plan for monitoring the implementation and ecological success of the MSA-2, including the cost and duration of any monitoring, as well as the criteria for ecological success by which the mitigation project would be evaluated. Additionally, an adaptive management plan presenting corrective actions that could be taken if monitoring demonstrates that mitigation project is not achieving ecological success is summarized in section 6 and included as Appendix H.

Monitoring associated with MSA-2 includes two types: monitoring to ensure mitigation benefits are achieved and monitoring to ensure no additional impacts are incurred from the implementation of MSA-2 that would require mitigation. The monitoring specified in the mitigation monitoring plan (Appendix H) is associated with ensuring MSA-2 produces sufficient benefits to mitigate impacts incurred by the WSLP project and the implementation of MSA-2. The monitoring included in the adaptive management plan (Appendix H) is associated with ensuring additional impacts beyond what has already been assessed for MSA-2 are not experienced. If additional impacts from the implementation of MSA-2 are identified, adaptive management actions may be employed to either rectify or mitigate such impacts, or additional NEPA documentation may be necessary to identify what additional mitigation would be completed. Monitoring data from all sources can be used to inform the operation plan (Appendix N).

The currently known impacts and mitigation plans associated with MSA-2 are identified in section 5 of the SEIS. These mitigation plans will require their own monitoring and adaptive management plans, which will be included in Appendix G.

2.8.4 Data Gaps, Risk and Uncertainty Analysis, and Areas of Controversy

There are many uncertainties associated with coastal systems. The PDT identified the following environmental factors that inherently carry uncertainty and could impact the accrual of benefits within the 50-year period of analysis. These environmental risks to implementation would be managed by gathering data and making changes to the project, if necessary, based on this data, through adaptive management.

- Potential climate change issues, such as SLR, in addition to regional subsidence rates are significant scientific uncertainties. These issues have been incorporated in the alternative evaluation process.
- Future climate change trajectories or projections affect swamp conditions (e.g., subsidence, sea level rise, flood events, drought, growing season lengths, etc.).
- The mitigation area, project infrastructure and/or project operations could be impacted by severe weather events (flooding, structural damage from wind, etc.).
- River conditions could change.
- Impacts and risk of pollution or oil/contaminant spills could occur in the river or in the vicinity of the mitigation area. There would be a system in place at the diversion intake structure in the Mississippi River to automatically close the structure if a spill is detected at a nearby industrial facility; this would lessen the impact of a spill reaching the mitigation area.
- Swamp response from the application of water, fine sediment, and nutrients is uncertain.
- The annual sediment and nutrient requirements for swamp habitat are uncertain.
- Unknown variability in topography or bathymetry within the benefit areas and vicinity could alter diversion flow and change environmental impacts.

Engineering factors that carry uncertainty include:

- Final construction design;
- Diversion infrastructure is damaged or inefficient;
- Modeling analysis and assumptions;
- Existing or future projects cause unexpected interactions with MSA-1 or MSA-2;
- Design changes to the WSLP project could change the mitigation need.

Section 6 and Appendix H: BBA and MSA-2 Swamp Monitoring, Success Criteria, and Adaptive Management Plans identify the numerous adaptive management activities in the life cycle of the project that could be used to address and or manage these risks and uncertainties.

Uncertainties in Analysis

Future conditions are inherently uncertain. The forecast of future conditions is limited by existing science and technology. Future conditions described in this SEIS 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 the models used to inform the SEIS are 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 evaluation. 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.

Impact Assessment

The WSLP mitigation requirement has been assessed through review of the existing NEPA documents for the WSLP project. Project designs for WSLP are undergoing final engineering refinements and may change. A final reassessment of impacts would be completed once those designs are final to ensure all impacts from construction of the WSLP project are fully mitigated. If additional impacts are identified beyond what has been assessed in this document and EA #576, then a supplemental NEPA document would be prepared analyzing options to complete the outstanding mitigation. This supplemental NEPA document would be published for public review and comment.

If the MSA-1 or MSA-2 incur, through construction, additional impacts to habitat, those impacts must also be mitigated (see Section 5).

Wetland Value Assessment Model Uncertainties

Lack of project-specific field data in the benefit areas reduces the precision of existing condition assumptions. The CWPPRA maintains a Coastwide Reference Monitoring System (CRMS) in coastal Louisiana that collects relevant data, such as water surface elevation and vegetation characteristics. CRMS station data located within the benefit areas and vicinity were used to estimate existing conditions (n=3). These stations were assumed to be representative and as such were used to estimate and project conditions for a large area.

The secondary and tertiary area benefits were based on an assumed reduction in diversion effects related to distance from the discharge point and an assumed loss rate of nitrogen within the water column. The AAHU/acre value for the secondary benefit area was assumed to be 75 percent of the primary benefit area and the tertiary benefit area was assumed to be 45 percent of the AAHUs/acre of the primary benefit area. These reductions in benefit were based on nitrogen concentrations in the water column.

Some of the remotely sensed data used to classify habitat type used older data. Satellite imagery data used to classify habitat types may be as old as 2005. There is a risk that these data may not accurately represent the existing conditions.

There are many general risks associated with using mathematical models and projecting future conditions in a dynamic environment. These risks are covered in other parts of this section.

Implementation

USACE has been involved in planning and construction of diversion projects for decades; however, it is novel to use a diversion to meet mitigation requirements. The benefit areas for the proposed diversion were carefully selected by an interagency team and a detailed monitoring and adaptive management plans developed to better ensure that the required mitigation benefits are able to be met and measured. Nevertheless, if the diversion does not produce the required mitigation in the required timeframe, CEMVN would implement the BBA Alternative to ensure full satisfaction of the mitigation requirement.

The timing for implementation is an uncertainty that must be considered. Policy requires the mitigation project to be implemented before or concurrent with WSLP project construction. There is a risk that diversion construction could be delayed; this risk has been accepted and has been determined to be low at this time. The timeline for WSLP project construction, this SEIS and the mitigation construction schedules are being closely coordinated; if selected as the recommended mitigation plan, MSA-2 could be expected to be implemented within the required timeframe. Mitigation for the WSLP project is proceeding concurrently with construction of the WSLP project. As of November 2022, negative impacts associated with the construction of the WSLP project identified the need to mitigate for an estimated 1,240 AAHUs (293 CZ-BLH and 947 CZ-Swamp). To date CEMVN has met 9.2 percent of this need, through mitigation bank credit purchases of 114.57 CZ-BLH AAHUs. Additionally, approximately 10 percent of the WSLP project features have been constructed to date. Construction activities for the WSLP project, including vegetation clearing, access road construction, borrow/sand stockpiling, and levee construction are currently underway. The final WSLP construction contract is currently scheduled to be completed in Calendar Year (CY) 2027. If approved as mitigation for the WSLP project and completion of all reviews in accordance with civil works policy construction on the Maurepas Diversion would begin in CY 2023 and be completed in CY 2026. Construction on the no action alternative could begin in CY 2024 and be completed by CY 2026.

Beyond the policy requirements, if MSA-2 is not implemented in the near future, the conditions in the planning area could degrade. The impact of the uncertainties associated with the future condition of the planning area could increase mitigation costs, decrease mitigation benefits, or both.

If the proposed TSA becomes infeasible due to difficulties in implementation or changed conditions and adaptive management actions are put in place, CEMVN would implement the BBA Alternative to ensure full satisfaction of the mitigation requirement.

Areas of Controversy

No Net Loss of Wetlands

While the MSA-2 can completely replace the lost swamp functions and values incurred by WSLP project through enhancement of existing swamp habitat, the MSA-2 may not result in “no net loss of wetlands” as defined in 33 USC 2283, 33 USC 2317 since the acres of swamp habitat impacted would not be replaced. This project is assumed to sustain swamp

acres longer in the FWP than the FWOP condition. This assumption is based on benefits to hydrology, water quality, salinity, and forest integrity.

Effect on Wildlife Populations and Commercial Harvest

Although occasional flooding of the Maurepas swamp naturally occurs from tropical storm events or wind driven tidal events, the yearly operation of the diversion during the spring/early summer would regularly elevate water levels in the benefit area between approximately 1 to 2 feet within the Maurepas WMA, which would result in reoccurring adverse impacts to terrestrial species, including alligator and deer populations. During flooding events, the size of white-tailed deer populations may be affected by the mortality of smaller fawns and a reduction in the area's carrying capacity (due to a reduction in the amount of sub-areal land masses and their associated vegetation). Loss of forage and reduced lactation rates in adult females have been reported from late summer flood events in habitats similar to the Maurepas swamp. Similarly, an increase in water levels affects the size of suitable habitat for nesting and the hatching success of alligator populations. Additionally, the reduction in sub-areal land masses concentrates predators and harmful insects, such as fire ants, that can negatively affect wildlife populations. Louisiana LDWF determines the price per alligator egg the agency receives back from hunters and selects commercial alligator egg hunters via a bid process. Reduced nesting, reduced nesting success, and the effects these reductions have on the overall alligator population from operation of the diversion would negatively impact the income of commercial alligator hunters and the revenues LDWF receives back from these hunters. In the past, the LDWF has modified deer seasons and harvest recommendations in specific areas due to the anticipated impacts to recruitment in response to late summer flooding. Further management measures by LDWF (such as hunting season reductions or closures) could potentially mitigate impacts to deer and alligator populations that would occur from diversion operation.

Impacts to alligator populations would be similar, but less intense for adults given their resilience to flood conditions. There can be much variation in alligator populations following tropical storm events, and some of the changes are more the effect of prey availability in lower salinity areas.

Effect on Threatened and Endangered (T&E) Populations

The endangered pallid sturgeon is adapted to living close to the bottom of large, silty rivers with a natural hydrograph. The U.S. Army Engineer Research and Development Center (ERDC) conducted sampling near the location of the proposed diversion intake and several pallid sturgeons were captured during this event. Adult and subadult pallid sturgeon are relatively abundant in the construction area and could be directly affected by the proposed diversion due to noise, vibration, and presence of construction personnel and equipment. Pallid sturgeon would also be directly impacted by the operation of the diversion by way of entrainment. Since operation of the diversion is expected to occur every year, this impact would be reoccurring over the 50-year project life. Juvenile pallid sturgeon is assumed to have a "low" entrainment risk due to low likelihood of their occurrence in the vicinity of the diversion's intake. There is a "medium" risk of entrainment of adults and subadults due to the

likelihood of presence and their relatively low burst swimming speeds compared to intake velocities. A Biological Opinion (BO) (Appendix J) was received from USFWS, which includes reasonable and prudent measures (RPMs) that will be adhered to in order to reduce impacts to pallid sturgeon.

Impacts to Adjacent Water Bodies

The impacts of fresh water on estuarine systems in the Lake Pontchartrain Basin have historically been a concern to many users. Lake Pontchartrain and waterbodies beyond are unlikely to be negatively impacted by the operation of the diversion. Delft3D hydrodynamic and water quality modeling has found that an increase in nutrients could stimulate plant growth and improve forest health in the Maurepas Swamp. According to the modeling, the river reintroduction flow of 2,000 cfs generally spreads radially outwards as it enters the swamp north of I-10, and the diversion's impacts on mixing, water levels, and nutrients are negligible once the extent of the diversion influence area is reached (i.e., the southwestern portion of Lake Maurepas).

Quantification of Benefits and Impacts Beyond Primary, Secondary, and Tertiary Area

It is acknowledged that implementation of MSA-2 would have benefits and could have potential impacts beyond the primary, secondary, and tertiary areas identified as the benefit areas needed to capture the required mitigation outputs. A potential diversion influence area (Figure 2-6) was identified based on hydrologic modeling as the extent of flow from the diversion (FTN and Associates, LTD Hydraulic and Water Quality Modeling of Proposed River Reintroduction into Maurepas Swamp (PO-0029) dated January 27, 2021, and FTN's Technical Memorandum dated March 23, 2021). Potential impacts to the diversion influence area and within the larger planning area (Figure 2-1) for impacted resources and is further described by resources in Section 5.4 of this SEIS. Positive benefits and annual habitat units were calculated in the primary, secondary, and tertiary areas. It was determined coordination with HET and interagency teams that although benefits would be achieved beyond the primary, secondary, and tertiary areas they would be difficult to measure and calculate and could be reliably used to document meeting the required mitigation outputs.

Environmental Factors

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.

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 the mitigation area susceptible to storm surge and shearing. The extent of potential damage to the particular mitigation area 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 planning area, and

variability of project performance from forecast conditions due to other factors of risk and uncertainty.

During tropical storm events, the diversion would not be operable. However, after a storm event, the operation of the diversion could potentially ameliorate the effects of a storm event as defined in the operations plan.

Climate Change

Extreme changes in climate (temperature, rain, evaporation, wind) could result in conditions that cannot support the types of habitat preserved, enhanced, or restored, reducing the effectiveness of the mitigation project. This would require adaptive management actions to meet required mitigation credits.

Sea Level Rise Analysis

SLR is a global phenomenon resulting from significant warming occurring in the earth's climate. MSA-2 connects to the global ocean system through two distinct routes. The diversion intake is located at the Mississippi River's river mile (RM) 144. The Mississippi River flows generally southwest into the Gulf of Mexico, which is connected to the Atlantic Ocean. The Maurepas Swamp is directly connected to Lake Maurepas, which is connected to Lake Pontchartrain, thence to the Rigolets, which connects to Lake Borgne, which is connected to the Gulf of Mexico. The Maurepas Swamp to Gulf of Mexico is a much more direct route. The more direct connection to Maurepas Swamp and the relative stillness of the water results in the Maurepas Swamp being tidally influenced. The flow rate of the Mississippi River and location of the diversion intake results in tides having no significant factor on that structure.

As discussed in Appendix M with further calculations, SLR was factored to have an approximate 2.1 feet elevation change over 50 years (up to 2075) following shortly after the expected completion of the project. Due to the flow rates of the Mississippi River and location of the Maurepas Diversion intake, the effect of SLR is negligible. While this effect is anticipated to be negligible, the swamp water surface elevation, or tailwater elevation, is expected to rise steadily. Water surface elevations resulting from SLR for given flow rates are provided in Appendix M. An effect of the water surface elevation increase in the Maurepas Swamp is the requirement for an increase in river stage for the diversion to convey 2,000 cfs. At the current time, the diversion would require a river stage of 8.53 feet to be able to convey 2,000 cfs (without SLR). At the projected 2075 (intermediate SLR), the diversion would require a river stage of 9.68 feet to be able to convey 2,000 cfs (see Appendix M for more details). If the river stage is higher than these previous numbers, then the diversion would still convey 2,000 cfs.

Engineering Factors

Uncertainty in Engineering Factors

Key elements of uncertainty for this project are natural variability in the soil conditions, natural variability in riverine flows and hurricane storm surge events, and exposure of the diversion structure to marine traffic. For the MRL, the soil conditions are known, but the structure will have site specific borings to characterize the local subsurface conditions. Similarly for the guide levees and WSLP project levees, subsurface investigations meeting the appropriate USACE standards will be performed. Current standards for modeling will be used for determining water surface elevations, and appropriate measures will be taken in the design and construction to reduce the risk of impact to the diversion structure from aberrant vessels.

Surface Transportation Impacts During Construction

Construction is expected to occur over a 3-year period, and would cause temporary, moderate, adverse impacts on roadway traffic including delays and congestion in the proposed construction area. Roadway routes for trucks delivering construction materials to the proposed construction sites are anticipated to include I-10, US 61, LA 641, LA 44, and LA 54.

The permanent project features would intersect three highways (LA 44, US 61, and I-10) and two railroads (Kansas City Southern and Canadian National). For two of the highways (LA 44 and US 61) and both railroads, temporary bypasses would be constructed to allow for the continuous flow of vehicular and rail traffic during construction of the conveyance channel and culvert or bridge crossings. The duration of the detours being in service would be approximately 1.5 to 2.5 years at each crossing, with each detour keeping the same number of travel lanes/tracks at the existing posted speed limit. Upon completion of construction, traffic will be returned to its original alignment which will pass over the conveyance channel via bridges or culverts. At I-10 there are existing bridges for traffic in each direction that would not require reconfiguration. However, there will be channel reshaping performed beneath each bridge.

In addition to the potential congestion, construction traffic would cause temporary, minor, adverse air quality impacts due to criteria pollutant emissions generated by combustion-powered engines and fugitive dust emissions generated by the truck transport of materials. Additionally, combustion engines associated with construction traffic would have temporary, minor, adverse airborne noise impacts. These impacts would be highly localized.

Utility Impacts

The proposed alignment for the Maurepas Diversion Conveyance Channel stretches 5.5 miles from the Mississippi River to deep within the Maurepas Swamp, ending 1,000-feet north of Interstate 10. Due to the length of the proposed construction area, the channel intersects numerous utility and industrial product pipeline rights-of-way.

To construct the channel, these utilities and other infrastructure components must be relocated to positions that will not adversely affect the construction process yet allow continued operation of the utilities/infrastructure elements.

The utilities crossings were identified from field reconnaissance, historical surveys, maps, records, and information provided directly from the utility and industrial owners. There are six key locations along the proposed Maurepas Diversion Project ROW that have numerous utilities and/or product lines which intersect the proposed alignment. These locations include LA 44, CN RR, KCS RR, US 61, I-10, and a major pipeline corridor which runs between Airline Highway and I-10.

Given the locations of the utility corridors, there would be potential impacts to traffic speed due to the proximity of the work to highways and railroads. For pipelines, crossings of the conveyance channel would likely require excavation and directional drilling. Other utilities may require relocation of aerial crossings.

Construction traffic would cause temporary, minor, adverse air quality impacts due to criteria pollutant emissions generated by combustion-powered engines and fugitive dust emissions generated by the truck transport of materials. Additionally, combustion engines associated with construction traffic would have temporary, minor, adverse airborne noise impacts. These impacts would be highly localized.

Boat Launch Impacts

The Maurepas Diversion Conveyance Channel would necessitate the temporary closure and relocation of the existing boat launch at Bourgeois Canal at Hope Canal. The closure would last approximately 1.5 to 2.5 years until the opening of a new boat launch that will be constructed north of US 61 on the west side of the new Maurepas Diversion Conveyance Channel.

Levee/Structure Failure

The MSA-2 features integrated into the MRL system are being designed, constructed, and maintained to MR&T standards and would follow all required engineering regulations and guidelines. The MSA-2 features forming the WSLP project levees are being designed, constructed, and maintained to HSDRRS standards and would follow all required engineering regulations and guidelines. As such, the probability of levee/structure failure is expected to be low. However, there is always a residual risk of overtopping either system (MRL or WSLP) if a greater-than-design water surface elevation is experienced. The overtopping risk is considered low for the MRL and low for the WSLP project.

Hydrologic Flows

The conveyance channel has been modeled in HEC RAS and would be constructed to ensure that the guide levees provide proper freeboard above the water surface elevation when operating. Thus, the risk and uncertainty as related to hydrologic flows within the conveyance channel is low. All associated drainage ditches and culverts are being designed

and would be constructed to maintain the drainage capacity at the same level as the existing St. John the Baptist Parish ditches and culverts. The likelihood of the system being overwhelmed and the consequences of the system being overwhelmed will not be increased due to the proposed plan. Thus, the risk and uncertainty as related to hydrologic flows of the proposed drainage system is low.

Mitigation Project Performance and Associated Risk Factors

There are many stressors affecting the Maurepas Swamp in the existing condition. Implementation of the MSA-2 is expected to positively affect some of these stressors. There are many risks associated with MSA-2 performance. Implementation of the MSA-2 is associated with having positive effects on swamp habitats within the benefit areas. These benefits could be associated with having a positive effect on environmental stressors. See Table 2-10 for a summary of environmental stressors, how MSA-2 is expected to affect these stressors, and associated risk factors.

The following environmental factors inherently carry uncertainty and risk and could impact the accrual of benefits within the 50-year period of analysis. These environmental risks to implementation would be managed by gathering data and making changes to the project, if necessary, based on this data, through adaptive management (Appendix H).

1. Potential climate change issues, such as SLR, in addition to regional subsidence rates are significant scientific uncertainties.
2. Future climate change trajectories or projections affect swamp conditions (e.g., subsidence, sea level rise, flood events, drought, growing season lengths, etc.).
3. The mitigation area, project infrastructure and/or project operations could be impacted by severe weather events (flooding, structural damage from wind, etc.).
4. River conditions could change.
5. Impacts and risk of pollution or oil/contaminant spills could occur in the river or in the vicinity of the mitigation area. There would be a system in place at the diversion intake structure in the Mississippi River to automatically close the structure if a spill is detected at a nearby industrial facility; this would lessen the impact of a spill reaching the mitigation area.
6. Swamp response from the application of water, fine sediment, and nutrients is uncertain.
7. The annual sediment and nutrient requirements for swamp habitat are uncertain.
8. Unknown variability in topography or bathymetry within the benefit areas and vicinity could alter diversion flow and change environmental impacts.

    If there is a high area, such as a ridge that is not included in the H&H model grid, there could be unanticipated flows affecting the path of the diverted Mississippi River water. The farther away from the discharge point the more likely an impact such as this could occur for three reasons:

        1. The longer the distance, the larger the area, the more opportunity there is for unknown variability;

2. The farther from the discharge point the smaller the change in water level, so less variation from the H&H modeled grid would have a larger impact; and
3. In general, the farther from the discharge point, the lower the water velocity, and therefore smaller variations would have a larger impact on water flow.

Table 2-10: Ecological stressors in the Benefit area swamps, how Project implementation would affect these stressors, and associated risks

Existing Condition Stressor	MSA-2 Effect on Stressor (+ or -)	WVA Variable	Uncertainties and Risk Associated with MSA-2 Impacts on Stressor	Ecological Success Criteria	Risk of Failing to Meet Ecological Success Criteria
Flooding duration	+	Yes; V3 - Flooding Duration and Water Exchange.	**Medium Risk.** MSA-2 is expected to not improve the flooding duration compared to existing conditions, but the FWP flooding duration condition (i.e., less flooding) is expected to be better than the FWOP condition because of increases in organic accretion and sedimentation. MSA-2, when operating, would increase water surface elevations which could temporarily exacerbate flooding duration. However, increases in organic accretion and sedimentation are predicted to decrease flooding duration in the FWP versus FWOP despite temporary increases in water surface elevations during diversion operations. The risk of MSA-2 failing to affect this stressor is medium, because of uncertainties associated with temporary flooding impacts and accretion and sedimentation. It is also affected by environmental risk factors 1, 2, 3, 4, 6, 7, and 8.	No	N/A
Lack of Flow through	+	Yes; V3 - Flooding Duration and Water Exchange.	**Low to Medium Risk.** Positive effects associated with flow through would likely be observed throughout the swamp where discharged Mississippi River water flows. Flow during operations is expected to occur throughout the benefit areas according to the CPRA's contractor's H&H model results. Due to environmental risk factors 1, 2, 3, 4, 6, 7, and 8, the risk is low near the discharge point and medium within the secondary and tertiary benefit areas.	No	N/A

Existing Condition Stressor	MSA-2 Effect on Stressor (+ or -)	WVA Variable	Uncertainties and Risk Associated with MSA-2 Impacts on Stressor	Ecological Success Criteria	Risk of Failing to Meet Ecological Success Criteria
High Salinity	+	Yes; V4 - Mean High Salinity During the Growing Season	**Low Risk.** Salinity levels are currently near optimal for bald cypress and tupelo tree species. In the past, salinity levels have been high enough to cause severe stress to cypress, tupelos, and other vegetation. In the FWOP condition, salinities are expected to increase due to sea level rise. In the FWP condition, salinities are expected to remain within the optimal condition for bald cypress and tupelo tree species due to the introduction of Mississippi River water (~0.2 ppt). This is based on the CPRA's contractor's H&H modeling efforts, which show that diverted water would be sufficient to maintain optimal salinities.	Yes; Initial, Intermediate, and Long-term: $\leq$ 0.8 ppt at $\geq$ 75% of sites	**Low Risk.** Information on current salinity levels indicate the much of the benefit area is meeting success for this criterion. This ecological success criteria could still be met if Mississippi River water does not reach all monitoring stations, because Mississippi River water would decrease salinities in the benefit area in the vicinity and could prevent the ability of high salinity water to reach the monitoring station(s).
Water Quality – Low Nutrients	+	No*	**Low to Medium Risk.** The Diversion channel would convey nutrient laden Mississippi River water into the benefit areas. The CPRA's contractor's H&H modeling efforts show that water with a Total Nitrogen concentration of at least ~ $\geq$ 0.6 mg/L would be conveyed throughout the benefit areas. This risk of MSA-2 failing to affect this stressor is low near the Diversion outfall area but increases to medium in the secondary and tertiary impact areas due to environmental risk factor 8. Additionally, the CPRA's contractor's H&H modeling report did not indicate any sensitivity analysis was performed for the TN and TP decay rates. This would also be affected by environmental risk factors 1, 2, 3, 4, 6, and 7 in addition to environmental risk factor 8.	Yes; Initial Success - 2x baseline rates at $\geq$ 75% of sites; Intermediate and long-term - 0.45 mg/L nitrate at $\geq$ 75% of sites	**Low to Medium risk.** Baseline nitrate levels are likely to be very low, therefore, meeting the initial success rate of 2x baseline at sites nearest the discharge point is likely. The nitrate level of 0.45 mg/L is approximately 75% of lowest modeled Total Nitrogen values within the benefit areas and this would only need to occur at 75% of sites for intermediate and long-term sites. However, there is still an elevated risk of not achieving ecological success for this criterion for stations farther from the diversion outfall, because of environmental risk factor 8. Additionally, the CPRA's contractor's H&H modeling report did not indicate any sensitivity analysis was performed for the TN and TP decay rates, so we do not have an estimate of variability in nutrient availability. This would also be affected by environmental risk factors 1, 2, 3, 4, 6, and 7 in addition to environmental risk factor 8.

Existing Condition Stressor	MSA-2 Effect on Stressor (+ or -)	WVA Variable	Uncertainties and Risk Associated with MSA-2 Impacts on Stressor	Ecological Success Criteria	Risk of Failing to Meet Ecological Success Criteria
Water Quality – Low Dissolved Oxygen	+	No*	**Low to Medium Risk.** The risk of not improving dissolved oxygen levels near the diversion outfall area is low but increases to medium in the secondary and tertiary benefit areas. The Mississippi River would carry highly oxygenated and nutrient rich water into a nutrient poor swamp that has seasonally low dissolved oxygen and some anoxic soil conditions. Excessive nutrients are known to cause hypoxic events, but it is assumed that nutrients would not accumulate to levels that would cause hypoxic conditions within the benefit areas. This risk of MSA-2 failing to affect this stressor is low near the Diversion's outfall area but increases to medium in the secondary and tertiary impact areas due to environmental risk factor 8. Additionally, the CPRA's contractor's H&H modeling report did not indicate any sensitivity analysis was performed for the TN and TP decay rates. This would also be affected by environmental risk factors 1, 2, 3, 4, 6, and 7 in addition to environmental risk factor 8.	Yes; Initial Success - Maintain a stable or increase mean Basal Area relative to baseline	**Low to Medium Risk.** The threshold for meeting success should be achievable if Mississippi River water consistently reaches monitoring stations during periods of operation. This risk of MSA-2 failing to meet this ecological success criteria is low near the Diversion's outfall area but increases to medium in the secondary and tertiary impact areas due to environmental risk factor 8. Additionally, the CPRA's contractor's H&H modeling report did not indicate any sensitivity analysis was performed for the TN and TP decay rates. This would also be affected by environmental risk factors 1, 2, 3, 4, 6, and 7 in addition to environmental risk factor 8.
Lack of Sediment Delivery	+	No*	**Medium Risk.** Positive effects associated with the input and deposition of Mississippi River sediments (clays and silts) were assumed to occur in the FWP condition. The benefit area has been and is expected to continue to have problems with subsidence and sea level rise, and in the existing condition much of the area is flooded. Implementation of MSA-2 is not expected to deliver enough sediment to completely reverse the current flooding condition. However, MSA-2 is expected to increase sediment delivery, which would lead to inorganic accumulation of sediment throughout the benefit areas, and this would provide better conditions in the FWP versus the FWOP condition. This risk of MSA-2 failing to affect this stressor is medium throughout the benefit areas, because the CPRA's contractor's H&H modeling did not include sediment transport. This would also be affected by environmental risk factors 1, 2, 3, 4, 6, 7, and 8. There is a sediment basin designed to retain sand for removal at the beginning of the diversion channel, but this was accounted for when making assumptions by assuming no sand would be distributed to the benefit areas.	Yes; Initial Success - increased sediment delivery and retention; long-term net increase in wetland soil surface elevation rates at 75% of stations (primary and secondary benefit areas only)	**Medium to High Risk.** The intermediate and long-term ecological success criteria associated with net increase in wetland soil surface elevation rates would measure both sediment delivery and organic accretion. The CPRA's contractor's H&H modeling did not include sediment transport. Much of the benefit areas have highly organic substrate where accretion could be difficult to measure. The Mississippi River typically has high concentrations of fine sediments (clays and silts) when the diversion would be operated, and these sediments can be carried by water farther than sand. Some of these sediments would be deposited within the Diversion channel, but it is very likely that much would be carried well beyond the discharge point if the Diversion is operated and maintained as described in Appendix N. Furthermore, it is likely that some fine sediments would be carried beyond the tertiary benefit area. Increased sedimentation and accretion have been observed through the deposition of fine sediments for other Diversions in southeast Louisiana (e.g., Caernarvon Diversion). Achieving ecological success for this criterion would also be affected by environmental risk factors 1, 2, 3, 4, 6, 7, and 8,

Existing Condition Stressor	MSA-2 Effect on Stressor (+ or -)	WVA Variable	Uncertainties and Risk Associated with MSA-2 Impacts on Stressor	Ecological Success Criteria	Risk of Failing to Meet Ecological Success Criteria
					and would be dependent on river water and sedimentation reaching all monitoring stations. There is a medium risk that increased sediment retention would not be met for initial success and a high risk that a net increase in wetland soil surface elevation change would not be observed at 75% or more of the monitoring stations for intermediate and long-term ecological success criteria.
Low Organic Accretion	+	No*	**Medium Risk.** Positive effects associated with increased organic accretion are assumed to occur in the FWP condition. These would occur through increased below ground production (e.g., more root mass), and increased litter fall because of increased above ground production. These are anticipated to occur because of increased growth rates which are anticipated to occur due to improved water quality and flow through, and increased sediment and nutrient input. The risk of MSA-2 failing to affect this stressor is medium, because it would temporarily increase water surface elevations and because of environmental risk factors 1, 2, 3, 4, 6, 7, and 8.	Yes; Intermediate and long-term - net increase in wetland soil surface elevation rates at 75% of stations (primary and secondary benefit areas only)	**Medium to High Risk.** The intermediate and long-term ecological success criteria associated with net increase in wetland soil surface elevation rates would measure both sediment delivery and organic accretion. Much of the benefit areas have highly organic substrate where accretion could be difficult to measure. This process also involves two levels of uncertainties: 1. Uncertainties with respect to whether oxygen, nutrient, and sediment rich Mississippi River water would reach the monitoring stations, 2. Uncertainties associated with how the vegetation would respond to these conditions if they were available to the vegetation. There is a medium risk that a net increase in wetland soil surface elevation rates would be measured near the diversion outfall and high risk in the secondary benefit area. These risks are associated with the two levels of uncertainty mentioned here and environmental risk factors 1,2,3,4,6,7, and 8.

Existing Condition Stressor	MSA-2 Effect on Stressor (+ or -)	WVA Variable	Uncertainties and Risk Associated with MSA-2 Impacts on Stressor	Ecological Success Criteria	Risk of Failing to Meet Ecological Success Criteria
Basal Area and Low Growth Rates	+	Yes; V2 - Stand Maturity (basal area)	**Medium to High Risk.** Previous research found that an increase in nutrients could stimulate plant growth in the Maurepas Swamp (e.g., Effler et al., 2006). It was assumed that the reintroduction of flowing, nutrient, and oxygen rich Mississippi River water would improve water quality and soil conditions which would increase growth rates for both Cypress and Tupelo trees. Additionally, the increase in sedimentation and organic accretion is expected to slightly improve the flooding conditions for the FWP when compared to the FWOP condition. For these reasons, it is assumed that increases in basal area and growth rates would occur for the FWP condition. This is a medium risk for the primary benefit area because there are two levels of assumptions: 1. Diversion Operations would affect flow through, nutrient levels, accretion, salinities, and oxygen levels; and 2. These changes would be positive and would increase basal area and growth rates within the benefit areas. This would be a high risk for secondary and tertiary areas because of the additional risks associated with environmental risk factor 8. Environmental risk factors 1-7 add uncertainty and increase the risk that Project implementation would not affect this stressor.	Yes; Initial - maintain a stable or increasing mean basal area (BA) and basal area increment (BAI; essentially a measure of mean growth rate); Intermediate and Long-term - demonstrate BAI consistent with WVAs for $\geq$ 75% of sites (1.9x baseline BAI for primary and secondary; 1.2x for tertiary).	**High Risk.** Success criteria for growth rates mirror the assumptions used for the WVA analyses. These assumptions were made based on the H&H modeling results, other data sources (e.g., CRMS data), scientific literature, and professional judgment. Implementation of this project would initially shock the ecosystem; it has been over 100 years since Mississippi River water was directly diverted into the benefit areas, and there would be some ecological adjustment that occurs in the first few years. This would be exacerbated near the discharge point as the Diversion would affect this area the most. Exactly how long this would occur and to what spatial extent is not known. Risk of meeting these ecological success criteria is high for all benefit areas because of the uncertainty of the magnitude of the shock to the system implementation is likely to initially cause, and because of uncertainties and risks associated with environmental risk factors 1-8.
Subsidence	No Effect	No*	The MSA-2 is not expected to affect subsidence.	No	N/A
Herbivory	No Effect	No	The MSA-2 is not expected to affect herbivory.	No	N/A
Low Regeneration Rates	No Effect	No*	The MSA-2 is not expected to affect tree regeneration.	No	N/A
Sea level Change	No Effect	No*	The MSA-2 is not expected to affect SLC.	No	N/A

2.8.5 Real Estate

A supplemental real estate plan has been prepared in accordance with ER 405-1-12 in support of this SEIS. It identifies and describes lands, easements, and rights-of-way required for the construction and OMRR&R of a proposed project, including requirements for mitigation, relocations, borrow material, and dredged or excavated material disposal. It also identifies and describes facility/utility relocations; lands, easements, and rights-of-way value; and the acquisition process. The supplemental real estate plan is located in Appendix Q. The supplemental real estate plan confirms the NFS has the ability to acquire the real estate required to support the project.

Private land will be impacted within the diversion channel and construction footprint, the diversion channel outfall area, the LDV inundation areas, and the acreage needed for mitigation.

The diversion channel is approximately 5.5 miles long and impacts both public and privately held land between the Mississippi River and the outfall area just north of I-10. The diversion channel itself is estimated to impact approximately 11 private landowners and 57 acres of private land.

Although most of the diversion outfall area is within the Maurepas Swamp WMA, there are six private ownerships that also fall within the expected inundation limits. These private ownerships are not within the boundaries of the mitigation benefits area, but since there are no physical demarcations between the privately owned lands and the publicly owned lands, flow of water from the conveyance channel will enter the private lands. For this reason, a flowage easement will be acquired over these six privately-owned parcels, totaling approximately 1,872 acres. Estate language for the flowage easement can be found in Appendix Q: Supplemental Real Estate Plan.

A flowage easement would also be acquired over approximately 3,022 acres of private lands south of I-10 and north of Hwy 61, which would impact approximately 16 private landowners. The LDVs will be located on either side of the diversion channel and will impact water levels on public and private lands both east and west of the channel.

Additionally, fee excluding minerals would be acquired over lands needed to mitigate for the impacts of MSA-2. Marsh impacts resulting from construction and operation of MSA-2 would be mitigated through a combination of purchasing mitigation bank credits and/or construction of the Guste Island marsh creation project. Approximately 75 acres would be acquired from private landowners to mitigate for approximately 20 AAHUs impacted by the MSA-2 footprint.

The acquisition of LERRD not owned by local government agencies is estimated to impact approximately 48 private landowners and over 5,000 acres.

Please refer to the Supplemental Real Estate Plan located in Appendix Q for additional details on real estate impacts.

Section 3
Affected Environment

This chapter describes the existing conditions of the affected environment and a forecast of the FWOP conditions if there is no action taken. Water use, water supply and ground (drinking) water would not be significantly affected by the proposed action. These resources will not be further discussed in this report.

3.1 ENVIRONMENTAL SETTING PLANNING AREA

The WSLP project requiring mitigation occurs within the LPB. The proposed alternatives to mitigate for swamp impacts are found within LPB, within the CZ (Figure 2-1). These areas comprise the planning area, which is the focus of this evaluation.

3.1.1 Geomorphic Physiographic Setting

Most of the present landmass of southeast LA was formed by deltaic processes of the Mississippi River. Over the past 7,000 years, the Mississippi River deposited massive volumes of sediment in five deltaic complexes.

The planning area lies within the Mississippi Alluvial Plain and is defined for this analysis as the LPB within the CZ (see Figure 2-1). The area contains natural levee ridges, man-made levees, fresh, intermediate, brackish and saline marshes, forested wetlands, lakes and bays, barrier islands, and estuaries.

Lakes Maurepas and Pontchartrain occupy a portion of the old Mississippi River pathway known as the St. Bernard Delta. The complex formed in what was then Pontchartrain Bay, enclosing a portion of it to form Lake Pontchartrain. The St. Bernard delta complex was formed by Mississippi River deposits between 3,000 and 4,000 years ago (Frazier 1967). The majority of other landform features include inland swamp, tidal channels, shallow lakes and bays, natural levee ridges along active and abandoned channels, barrier islands and beaches.

3.1.2 Climate

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

3.1.3 Land Use and Land Cover

The 235,581-acre area contains residential and commercial development south of I-10. West of Laplace, most development is between US-61 and the MRL. The area north of I-10 is undeveloped wetlands in the Maurepas Swamp WMA. Appendix A, Figure 10 presents various habitat classifications from the most recent land cover database. Land loss is a key environmental factor in coastal Louisiana.

3.1.4 Ecological Resources

The WSLP project occupies a portion of one of the oldest delta complexes in the Mississippi River Deltaic Plain. It is in the lower Mississippi River Alluvial Valley, in the Pontchartrain Basin. The WSLP levee system project area is within a portion of the Upper Pontchartrain hydrologic basin known for forested wetland habitat, including swamp and BLH forests. A small portion of the State of Louisiana's Maurepas Swamp WMA falls within parts of the WSLP and MSA-2 proposed construction area and benefit areas. MSA-2 and the WSLP project are both partially within the Maurepas Swamp, which is the largest contiguous bald cypress tupelo swamp in the Pontchartrain Basin and one of the largest contiguous forested wetlands remaining in the lower Mississippi River Alluvial Valley (~190,000 acres).

The habitat evaluation team investigated the habitat resources found in the MSA-2 diversion influence area and WSLP project area on over 20 field visits from 2018 through 2022. The team collected information from existing data sources, surveys, and other studies, in addition to the aforementioned site visits. Sources of habitat data include information from resource agencies, published reports, agency records, and field investigations. Table 3-1 describes how each data source was used in developing the mitigation plan.

Table 3-1: Data Sources

Year	Source of Information	Information	Use in Mitigation Planning
1999	LDNR	Coast 2050: Toward a Sustainable Coastal LA	Alternative development
2001	CWPPRA Report	River Reintroduction at Maurepas Swamp (P0-29)	Alternative development
2004	USACE	LA Coastal Area (LCA), LA Ecosystem Restoration Study	Alternative development
2011, 2013, 2019, 2020	USACE, USFWS, LDWF	Field trip	Baseline habitat quality data for Wetland Value Assessments
2017	Krauss, K.W., et al.	Performance measures for a Mississippi River reintroduction into the forested wetlands of Maurepas Swamp	Success criteria and monitoring, Alternative development
2017	CPRA	Louisiana's Comprehensive Master Plan for a Sustainable Coast	Alternative development
2019	USACE, Engineer Research and Development Center	Remotely Sensed Habitat Assessment of Swamp and Bottomland Hardwood Habitat: West Shore Lake Pontchartrain Hurricane Damage Risk Reduction System Potential Impact Area.	Distinguish and determine extent and quality of habitat types
2019	USACE	West Shore Lake Pontchartrain – Tidal Simulations of With and Without Project. Interior Drainage Hydraulic Design Analysis – Environmental Effects.	Wetland Value Assessment, Alternative development
2020	CPRA	Louisiana's Coastwise Reference Monitoring System	Baseline data for Wetland Value Assessments
2020	CPRA (contracted to FTN)	DELFT3D Hydrodynamic and water quality modeling	Wetland Value Assessment, Alternative development
2021	USACE, Engineer Research and Development Center	Remotely Sensed Assessment of Swamp, BLH, and Wetland Habitat within the Maurepas Diversion Project Potential Impact Area	Distinguish and determine extent and quality of habitat types

The WSLP levee system impacts both swamp and BLH forest. Table 3-2 shows the habitat resources in the levee system project area, the quantity of the resource, the type of impact to the resource, and the significance of the resource. These resources are recognized as significant across institutional, public, and technical perspectives. See Table 2-6 for this information as it relates to the MSA-2.

Table 3-2: Ecological Resources

Habitat	Quantity	Type of Impact	Significance of Resource
Swamp	1,137 acres 595 AAHUs	Direct Removal	Large old stand cypress and tupelo swamp with little regeneration within the watershed; within largest remaining tracts of contiguous swamp in Louisiana; unique habitat value due to vast contiguous size
Swamp	9,755 acres 352 AAHUs	Altered Hydrology	Large old stand cypress and tupelo swamp with little to no regeneration within the watershed; within largest remaining tracts of contiguous swamp in Louisiana; unique habitat value due to vast contiguous size
Bottomland Hardwood Forest	242 acres 169 AAHUs	Direct Removal	Degraded and flooded forests within the watershed; proximity to second largest remaining tracts of contiguous swamp in Louisiana; unique habitat value, particularly for migrating neotropical North American birds
Bottomland Hardwood Forest	4,636 acres 124 AAHUs	Altered hydrology	Degraded and flooded forests within the watershed; proximity to second largest remaining tracts of contiguous swamp in Louisiana; unique habitat value, particularly for migrating neotropical North American birds

The WSLP project impacts freshwater forested wetland (swamp and BLH forest, Figure 3-1), which are unique habitat types that provide important services to North America and the Mississippi Delta. Similar wetland habitats are also associated with the MSA-2 diversion influence area (Figure 3-1 and Figure 3-2). These wetland types provide important water storage, biogeochemical function, and habitat for various songbirds, wading birds, waterfowl, raptors, reptiles, amphibians, mammals, crawfish and fish (Chambers et al., 2005). Vast virgin stands of bald cypress-tupelo swamp habitat once stretched from the bottomlands of northern Louisiana to the Gulf of Mexico (Conner and Day 1976). Changes in the Mississippi River have been responsible for changes in the flow and water levels in the vicinity of the WSLP project area and MSA-2 diversion influence area over several geological periods. Seasonal flooding of the Mississippi River historically contributed to the flow and water level characteristics of the area. Large flood events would bring freshwater, sediment and nutrients to the back swamp areas. However, construction of river levees, beginning in the 1700s by local landowners, interrupted this natural process and has permanently altered

hydrology in the vicinity of the WSLP project area and MSA-2. Swamps are largely comprised of bald cypress and tupelo, which have regenerated since extensive logging, and tracts of old-growth swamp and BLH forest within the state are rare. Swamps are likely to degrade, including in the Maurepas Swamp, where recent observations include high tree mortality rates, little to no observed regeneration, and low growth rates for many native tree species (Shaffer et al., 2009, Shaffer et al., 2016).

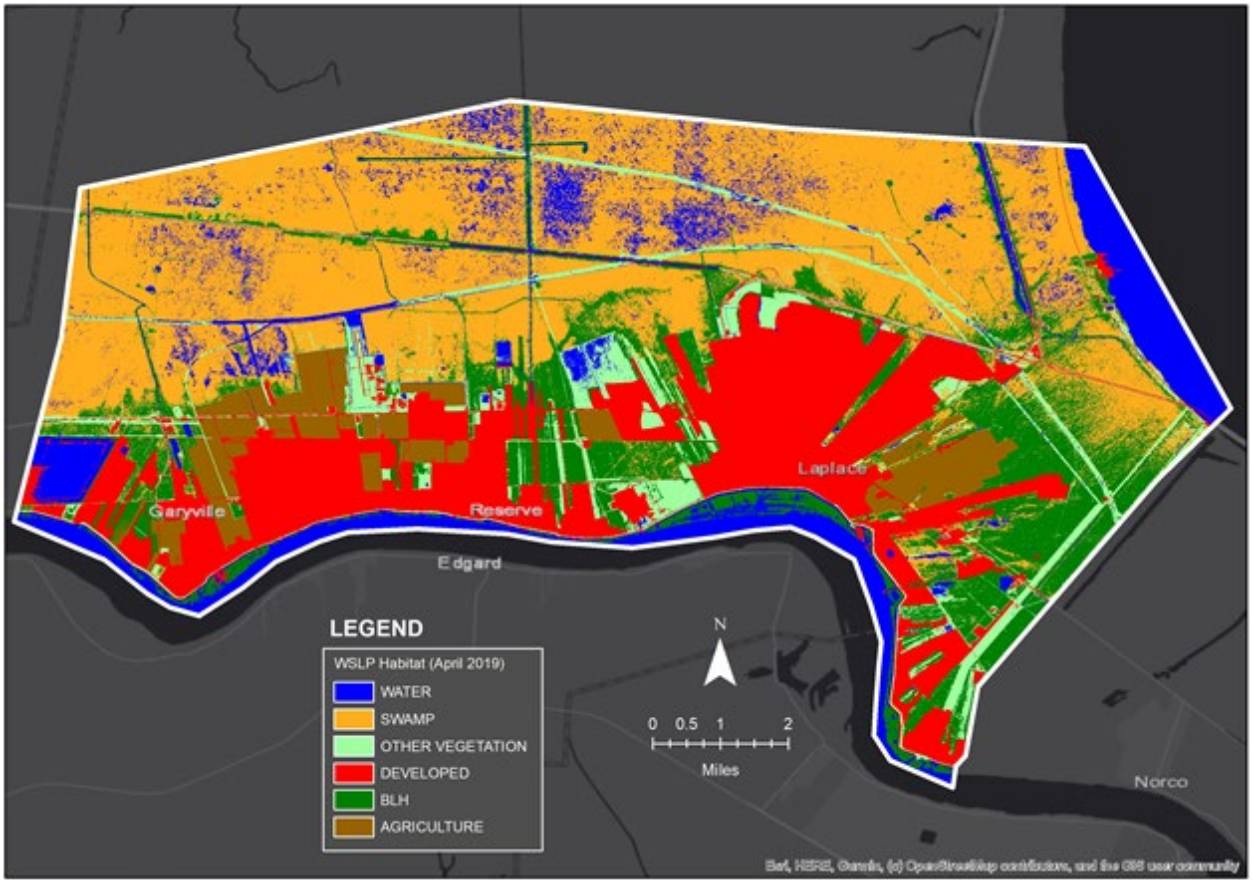

Figure 3-1: Habitat types in the WSLP project area (Saltus and Suir, 2019)

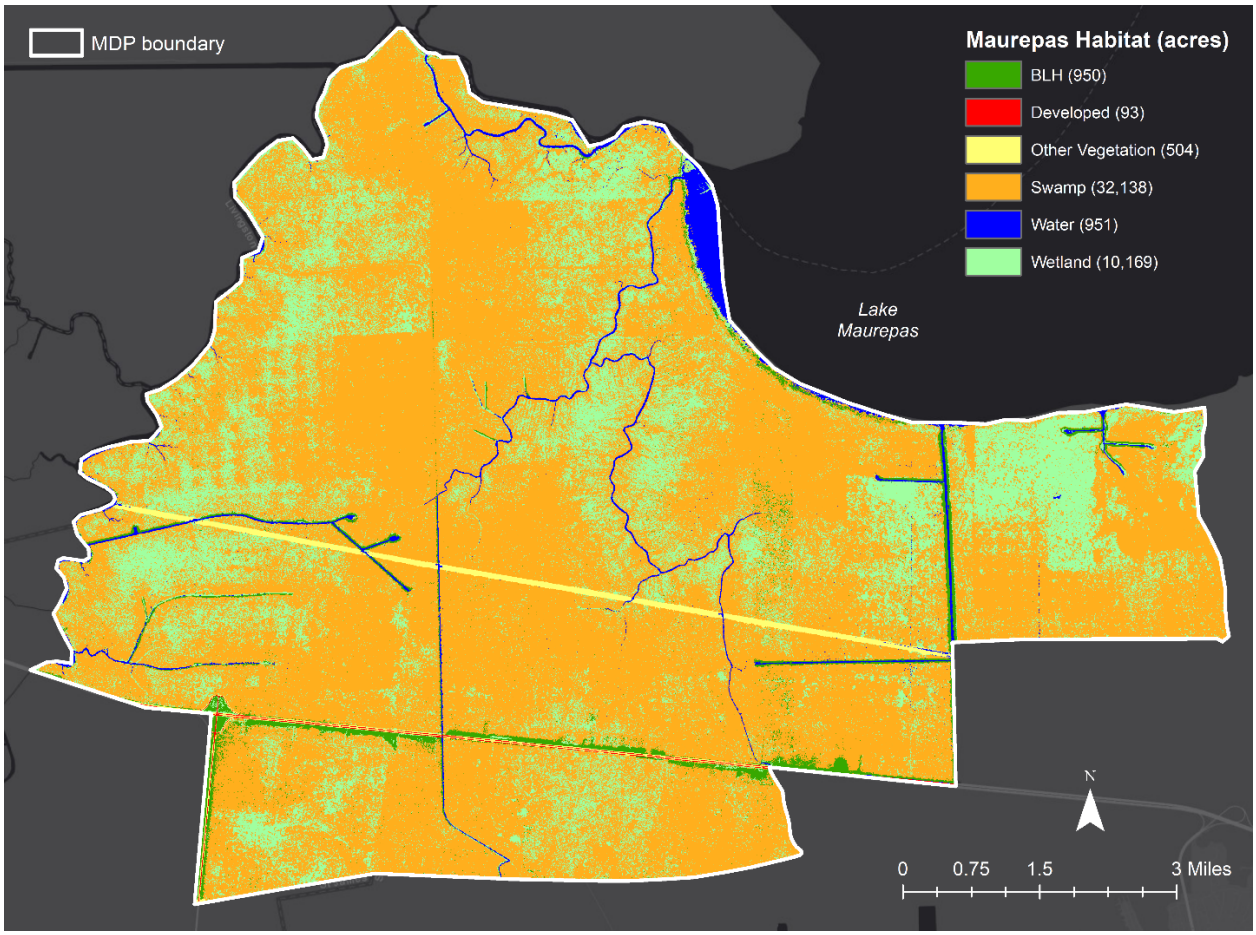

Figure 3-2: Habitat types in the MSA-2 Project Area not included in Figure 3-1 (Saltus and Suir, 2021)

3.2 SIGNIFICANT RESOURCES

This section contains a list of the significant resources located in the larger planning area and the smaller alternative areas. It describes those resources that may be impacted, directly, indirectly, and cumulatively, by implementation of the proposed alternatives. The resources described are those recognized as important by laws, EOs, 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 resource is described in Appendix B, Table 1. Additionally, see Appendix A, Figure 10 for the main habitats found in the planning area.

The alternatives considered include the No Action Alternative (BBA Alternative), Maurepas Swamp Alternative - 1 (MSA-1: Public and Private Lands), and Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only).

The BBA Alternative includes a combination of the following projects: Mitigation Banks, St. James, and Pine Island (Figure 2-1; see Appendix A, Figures 7 and 8 for details on St. James and Pine Island). MSA-1 and MSA-2 each contain the proposed construction footprint, mitigation benefit area, and diversion flow area or influence area as shown in Figure 2-6. According to Delft3D modeling, the river reintroduction flow of 2,000 cfs generally spreads radially outwards as it enters the swamp north of I-10, and the diversion's impacts on mixing, water levels, and nutrients are negligible once the extent of the diversion influence area (104,746 acres) is reached (Figure 2-6). Given how the Delft3D modeling defines the diversion's influence area, Lake Pontchartrain and waterbodies beyond are generally excluded from the existing conditions evaluations in this section; however, a few significant resources do have existing conditions evaluations that go beyond the diversion influence area into the larger planning area (e.g., hydrology, water quality, EJ). The diversion influence area is defined in FTN and Associates, LTD Hydraulic and Water Quality Modeling of Proposed River Reintroduction into Maurepas Swamp (PO-0029) dated January 27, 2021, and FTN's Technical Memorandum dated March 23, 2021.

Various mitigation banks within LPB may be capable of supplying enough CZ credits to meet the swamp mitigation requirements. Since the bank that may ultimately be selected to provide the necessary mitigation credits is unknown, the existing conditions present at the bank site are similarly unknown. Existing bank habitat quality varies depending on the success criteria met, as specified in the bank's Mitigation Banking Instrument (MBI). Typically, as mitigation success criteria are met and the quality of the habitat increases within the bank, more credits are released for purchase.

The resources described are those recognized as important by laws, EOs, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the public. Further detail on the relevance of each resource is in Appendix B, Table 1. Additionally, see Appendix A, Figure 10 for the main habitats found in the planning area.

The portion of Lake Pontchartrain that would be affected by the Pine Island mitigation project is not used for federal or interstate commerce and therefore navigation is not considered a significant resource for this project.

3.2.1 Wetlands

Planning Area

Louisiana's coastal wetlands provide habitat for the largest concentration of over-wintering waterfowl in the U.S., as well as habitat for wildlife, finfish, shellfish, and other aquatic organisms, including threatened or endangered species. Additionally, Louisiana's coastal wetlands provide protection from wave action, erosion, and storm damage and offer various consumptive and non-consumptive recreational opportunities. Coastal wetland types within the planning area include bottomland forests, fresh, intermediate, and brackish emergent wetland, and swamps.

Swamps within the planning area are dominated by bald cypress and water tupelo, which have regenerated since extensive logging of virgin forest more than 70 years ago. Louisiana swamps generally lack a mature canopy compared to forests before logging occurred and have lower productivity where isolated from riverine influences (Shaffer et al., 2003). A list of plant species common to swamps in the planning area and their scientific names are in Appendix B, Table 2.

Coastal Louisiana has one of the highest land loss rates in the country and it is exacerbated by human activities and climate change (Couvillon et al., 2017). Swamps, as with other coastal wetlands in the planning area, would likely continue to decline over the next 50 years due to factors such as lack of nutrient and sediment input, subsidence, sea level rise, saltwater intrusion, hydrologic alteration, and habitat conversion.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

The project area is currently existing agricultural land within the CZ and contains no wetland resources. Historically, before conversion to agricultural fields, this area supported BLH and swamp habitats.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The project area, consisting of the borrow site and the swamp restoration site is located within the CZ along the northern shoreline of Lake Pontchartrain with water depths of approximately 9 feet and 2 feet, respectively. Historically, the shorelines of the lake were bordered by cypress/tupelo gum swamps, fresh to intermediate marshes, and bands of BLH forests bordering natural drainages and the lake rim in some areas. Historic agricultural use of the project area, including diking and pumping, contributed to the conversion of the site to open water.

The lake shoreline is a mixture of low-density residential development and undeveloped wetlands, including second-growth swamp and BLH forest, scrub/shrub wetlands and fresh to intermediate marshes.

MSA-2 Alternative Area

The MSA-2 is located within the LPB and within the CZ.

Diversion Influence Area

Swamp

Most of the proposed diversion influence area (Figure 2-6) is within the Maurepas Swamp, an extensive bald cypress-water tupelo swamp surrounding Lake Maurepas. Historically, the Maurepas Swamp was an expanse of old growth, freshwater forested swamp. Current swamp forest stands are those that regenerated after widespread logging from the late 1800s through the 1930s, which resulted in loss of old-growth trees. The diversion influence

area includes natural, scenic, and man-made channels; the main waterways present are Blind River, a designated natural and scenic river, Amite River, the Amite River Diversion Canal, Hope Canal and the Reserve Relief Canal. Numerous smaller waterways, including Dutch Bayou, Alligator Bayou, Mississippi Bayou, Bayou Secret, Bourgeois Canal, and other small channels are present.

The swamp overstory vegetation consists primarily of bald cypress and water tupelo, with swamp red maple, species of ashes and others present in the midstory (Paille and Breaux, 2021). For a comprehensive list of vegetation likely present in the Maurepas Swamp, see Appendix B, Table 2. Recent observations of the swamp include high tree mortality rates, little to no observed regeneration, and low growth rates for many native tree species (Shaffer et al., 2009, Shaffer et al., 2016). The forest is highly degraded due to subsidence, permanent inundation, lack of sediment and nutrient input, herbivory, and saltwater intrusion (Shaffer et al., 2016). Nitrate levels within the swamp indicate that available nutrient levels are low (Lane et al., 2003) and likely limit tree health (Effler et al. 2006). Although cypress-tupelo swamps are more resistant than other forest types to major hurricane damage, such as windthrow, the Maurepas Swamp, which has trees in various states of decline, is likely more susceptible to damage, particularly in the midstory (Shaffer et al., 2016). Portions of the swamp have degraded from closed canopy to transitional (more open canopy), while other portions have transitioned to marsh, and are characterized by an absence of healthy trees and dominance by understory vegetation (Keim et al., 2010). Free-floating and rooted aquatic vegetation (water hyacinth), common Salvinia, giant Salvinia, and others are observed throughout open water areas within the diversion influence area.

Prior to leveeing the Mississippi River (1700s-current), the forested wetlands within the diversion influence area experienced periodic overbank flooding, which provided nutrient and sediment input. Other alterations, such as the construction of highways, pipelines, railroads, the Amite River Diversion Canal, other canals, and associated spoil banks have further disrupted the hydrology. In addition to limiting nutrient and sediment input, the lack of freshwater input, combined with the additional hydrologic modifications, has allowed for saltwater intrusion events that have negatively impacted the swamp, particularly near the margins of Lake Maurepas, which can receive saltwater input during drought or storm surge events (Shaffer et al. 2009, Shaffer et al., 2016). Saltwater intrusion into the Maurepas Swamp was exacerbated by the Mississippi River Gulf Outlet (MRGO), a deep draft shipping channel that was constructed in 1965 and increased saltwater and storm surge input from the Gulf of Mexico into the LPB. The MRGO was closed in 2009, and salinity in the Maurepas Swamp has since decreased. However, the lack of freshwater input, combined with periodic salinity intrusion due to drought and storm surge events, are likely to negatively impact the swamp in future decades.

Fresh Emergent Wetland

Although primarily swamp habitat, there is freshwater emergent wetland (marsh) present within the diversion influence area. National Wetlands Inventory data indicates that there are small areas of marsh south of Lake Maurepas, and near the southeast boundary of the diversion influence area adjacent to developed areas north of Airline Highway (USFWS,

2021). Additional remote sensing and ArcGIS analysis of the mitigation benefit area performed more recently indicates that approximately 10-20 percent of the swamp habitat within the mitigation area has converted to marsh (Saltus and Suir, 2021); it is likely that this is similarly true for the remainder of the diversion influence area. The marsh present largely results from habitat conversion as swamp degrades and is ultimately dominated by understory and shrub vegetation. The habitat present consists primarily of vegetation common in marsh settings (*i.e.*, hairypod cowpea, bulltongue arrowhead, pale spikerush, smooth beggartick, green arrow arum, aquatic plants) (Paille and Breaux, 2021).

Bottomland Hardwoods

Although primarily swamp habitat, the diversion influence area supports some BLH forest. BLH forests are generally located at higher elevations than swamp with lower flooding depths and frequencies, such as along the banks of natural water features and spoil banks along constructed canals. The BLH class in the diversion influence area is dominated primarily of ashes, roughleaf dogwood, water hickory, and water oak (Paille and Breaux, 2021). Within the diversion influence area north of Airline Highway, BLH is dominated by tallow, an invasive tree species that has colonized higher elevation and open canopy areas. In some areas, this tallow dominated low-quality BLH may exhibit characteristics of scrub-shrub habitat (dominated by woody vegetation <20 feet tall).

Proposed Construction Area

Swamp

The proposed construction area supports areas of swamp habitat that are similar to what is described for the diversion influence area (see discussion above).

Fresh Emergent Wetland

The proposed construction area contains areas of fresh emergent wetland (marsh) that are similar to what is described for the diversion influence area (see discussion above).

Bottomland Hardwoods

The proposed construction area includes BLH (mainly BLH-dry habitat), which is similar to the BLH described for the diversion influence area (see discussion above). The proposed construction area also contains a small area of BLH-wet habitat occurring in close proximity to the Mississippi River (batture). Woody species commonly observed in batture communities include Hackberry, species of Willow, American Sycamore, Swamp Privet and others.

3.2.2 Wildlife

Planning Area

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 LPB and the Mississippi River Basin (MSRB) provide important and essential 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, and raccoon, rabbit, white-tailed deer, and American alligator. Emergent saline marshes are typically used 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).

Deer populations estimate to approximately 500,000 individuals within Louisiana (LDWF 2021), and this estimate depends on levels of harvest and mortality. According to LDWF (2021), research on the Mississippi River batture had covered records from 1988 through 2016, including harvest records of 42,954 does and 3,588 bucks from both Louisiana and Mississippi. Influences from winter, spring, and summer flooding on doe body mass and lactation rates and antler mass of trophy bucks were assessed. Doe body mass and buck antler mass differed as result from seasonal flooding, but the significant difference occurred during summer floods when adult female lactation rates dropped by 18 percent (Jones et al. 2019).

Open water habitats, such as Lake Pontchartrain and Lake Borgne, provide wintering and multiple use functions for brown pelicans, seabirds, and other open water residents and migrants. Open water habitats in the planning area provide wintering and multiple use functions for brown pelicans, seabirds, dabbling and diving ducks, coots, and gallinules, as well as other open water residents and migrants (LCWCRTF & WCRA, 1999).

A list of common wildlife species found in the planning area and their scientific names can be found in Appendix B, Table 3.

BBA Alternative Project Areas

St. James - up to 1,246 Acres, up to 511 AAHU's

Wildlife species that have the potential to be found within all of these project areas when agriculture crops are present are skunk, rabbit, deer, various species of birds including eagles and other raptors, the red-winged blackbird, and various species of swallows. When crops are not present, the wildlife species would shift to a less diverse and abundant list including mice, raptors, cattle egret, and ibis. There are currently no documented bald eagle nests in any of the project areas. Prior to construction, a nest survey would be conducted to verify no eagle nests are found in the vicinity of the project area. If a nest is found, the National Bald Eagle Management Guidelines would be followed.

Pine Island – up to 1,965 Acres, up to 775 AAHU's

The coastal wetlands in the LPB and MSRB 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 and intermediate wetlands are typically used by many different wildlife species, including seabirds, wading birds, shorebirds, dabbling and diving ducks, raptors, rails, coots and gallinules, nutria, muskrat, mink, river otter, and raccoon, rabbit, white-tailed deer, and American alligator (LCWCRTF & WCRA, 1999). All of these species are likely to be found in or near the project area.

The LDWF has records of a wading bird nesting colony within 1 mile of the project site. The birds occasionally move their nesting sites so it is possible that a nesting site could be located in the vicinity of the project area.

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

MSA-2 Alternative Area

The swamp, BLH, and other wetlands in the proposed construction area provide birds and wildlife with shelter, nesting, feeding, roosting, cover, nursery, and other life requirements. Wetlands provide neotropical migrants with essential stopover habitat on annual migrations (Zoller 2004) and critical bird breeding habitat (Wakeley and Roberts 1996).

Birds: Wetlands within the area have historically supported an abundance of neotropical and other migratory and non-migratory birds, and colonial nesting waterbirds (e.g., herons, egrets, ibises, night-herons, and roseate spoonbills). It has also been associated with high stopover densities during spring migration throughout the Gulf of Mexico (Cohen et al. 2021).

Important Bird Area

MSA-2 falls within the West Pontchartrain-Maurepas Swamp Important Bird Area (IBA). The IBA contains high densities of breeding Prothonotary Warblers, Northern Parulas, and Yellow-throated. Active rookeries consist of White Ibis, Great Blue Heron, Great Egret, Little Blue Heron, Tricolored Heron, Green Heron, and Snowy Egret, and Bald Eagle also nest in the IBA. Duck species include Mallards, Wood Ducks, Gadwall, American Widgeon, Northern Pintail, Northern Shoveler, along with American Coot. Conservation issues to birds include loss of nesting sites resulting from tree mortality via saltwater intrusion and/or permanent flooding.

Invasive wildlife that threatens the IBA include nutria. Nutria are large, semi-aquatic rodents with webbed hind feet that originated in South America and reached Louisiana between the late 19th century up to the 1930s to support the fur trade (Pasko 2011). Nutria are herbivorous and cause extensive damage to wetlands as they burrow to eat the basal and root portion of wetland plants. Throughout the Maurepas Swamp, nutria eat seedling cypress and other swamp and wetland BLH tree species preventing regeneration (Shaffer et al., 2016).

Mammals: Since 1985, populations of furbearers, such as beavers, mink, nutria, foxes, and North American river otter, have typically remained stable across the Upper Pontchartrain Basin (LCWCRTF & WCRA 1999). The West Indian manatee, a federally listed endangered species, is known to occasionally enter the area (see Section 3.2.3 for more information on T&E species). During previous flooding events, white-tailed deer populations have a tendency to shift as a result of mortality of smaller fawns and reduced carrying capacity (MSU Deer Ecology and Management Lab 2021). Loss of forage and reduced lactation rates in adult females have also been reported (Jones et al. 2019).

Reptiles and Amphibians: The American alligator is a large crocodilian measuring between 10 to 14 feet in length. The alligator habitat range covers all of Louisiana, the Atlantic coast to North Carolina and the entire gulf coast down to the lower Rio Grande Valley (Vliet 2020). During the summer of 2019, LDWF estimated that approximately 68,000 alligator nests were present in coastal marsh habitats (a 26 percent increase from 2018). LDWF survey data between 1996 to 2000 showed alligator nest densities in the proposed construction area classified as medium (approximately 1 nest per 250 acres).

The alligator snapping turtles occupy swamp habitat and are common in freshwater lakes and bayous, feeding on other turtles, fish, aquatic snails, crustaceans, clams, carrion, and some plant matter.

Amphibians are great indicator species of wetland ecosystem health and are very abundant in the area. This group is especially vulnerable to saltwater impacts from hurricanes, considering their permeable membranes (Semlitsch et al. 1996; Balinsky 1981). LDWF has also provided a listing of reptiles and amphibians common within the proposed construction area, which includes 23 snake species, 5 lizard species, 13 turtle species, 15 frogs and toads, 7 salamanders, and 1 crocodilian (Michon, pers. comm. 2021).

Appendix B, Table 3 contains a listing of common wildlife species in the proposed construction area.

3.2.3 Threatened, Endangered and Protected Species

Planning Area

Within the State of Louisiana, there are 30 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. Of those 30, 10 animals and 1 plant (Table 3-3) are known to occur in the planning area. 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 ESA of 1973, as amended, but are not subject to ESA Section 7 consultation. Appendix B, Table 3 contains a list of Louisiana State listed species that could potentially occur.

Table 3-3: Species that May Occur in the Planning Area

Species	Parish	Critical Habitat	Status	Jurisdiction	
				USFWS	NFMS
Animal					
West Indian Manatee	A, EBR, EF, St. C, St. Ja, St. Jo, St. T, T		T	X	
Piping Plover	St. M, St. C	X	T	X	
Red Knot	Wherever Found				
Red Cockaded Woodpecker	L, St. C, St. T, T		E	X	
Gopher Tortoise	St. C, St. T, T		T	X	
Ringed Map Turtle	St. C, St. T		T	X	
Hawksbill Sea Turtle	St. C		E	X	X
Kemp's Ridley Sea Turtle	St. C		E	X	X
Leatherback Sea Turtle	St. C		E	X	X
Green Sea Turtle	St. C		T	X	X
Loggerhead Sea Turtle	St. C		T	X	X
Pallid Sturgeon	A, I, EBR, EF, PC, St. C, St. Ja, St. Jo, St. M, WBR,		E	X	
Gulf Sturgeon	A, L, St. B, St. C, St. J, St. T, O, T, St. H	X	T	X	X
Inflated Heelsplitter Mussel	A, L, EBR, EF, St. C, St. T. St. H		T	X	
Plant					
Louisiana Quillwort	St. C, St. T		E	X	

A = Ascension, EBR= East Baton Rouge, EF= East Feliciana, L=Livingston, St. C= St. Charles, St. Ja = St. James, St. Jo= St. John, St. T= St. Tammany, T= Tangipahoa, St. M= St. Mary, PC= Pointe Coupee, I= Iberville, WBR= West Baton Rouge

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

There are three listed T&E species in St. James Parish (West Indian manatee, Gulf sturgeon, and pallid sturgeon). Based on a parish search conducted on the USFWS endangered species website in March 2019, and verbal communication with USFWS on July 23, 2019, none of the species under USFWS and/or NMFS jurisdiction are expected to be found at this project site.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

Of the listed animal and plant species occurring in St. Tammany Parish, the West Indian manatee, Gulf sturgeon, and Kemp's ridley, loggerhead, and green sea turtles have the potential to be found in the proposed borrow area in Lake Pontchartrain. It would be highly unlikely that any of the listed species would be found in the proposed swamp creation area due to its shallow depths (around 2 feet) and extremely limited access. All these species are typically found in deeper water where they are able to maneuver and forage effectively.

West Indian Manatee

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

There have been 110 reported sightings of manatees in Louisiana since 1975 (LDWF 2005). Sightings in Louisiana, which have been uncommon and sporadic, have included occurrences in Lake Pontchartrain, as well as the Amite, Blind, Tchefuncte, and Tickfaw Rivers. Between 1997 and 2000, there were approximately 16 sightings in the Lake Pontchartrain area and a general increase in the number of manatees per sighting (Abadie et al. 2000). Sightings of the manatee in the LPB have increased in recent years, and in late July 2005, 20 to 30 manatees were observed in the lake from the air (Powell and Taylor 2005). To minimize the potential for construction activities to cause adverse impacts to manatees, the standard manatee protection measures found in Appendix K would be implemented when activities are proposed that would impact habitat where manatees could occur.

West Indian manatees are likely to occur in Lake Pontchartrain.

Gulf Sturgeon

The Gulf sturgeon was listed as threatened throughout its range on 30 September 1991. The Gulf sturgeon is an anadromous fish that migrates from salt water into coastal rivers to spawn and spend the warm summer months. Critical habitat units (areas) designated for the Gulf sturgeon in Louisiana include the eastern half of Lake Pontchartrain east of the Causeway, Lake Catherine, Lake Borgne, out into the Mississippi Sound (USACE 2006a). Studies conducted by the LDWF have shown the presence of Gulf sturgeon in Lake Pontchartrain during the winter and during periods of migration between marine and riverine environments. Most records of Gulf sturgeon from Lake Pontchartrain have been located east of the causeway, particularly on the eastern north shore. Gulf sturgeon have also been documented west of the Causeway, typically near the mouths of small rivers (USFWS and NMFS 2003).

Gulf sturgeon are likely to occur in Lake Pontchartrain.

Kemp's Ridley, Loggerhead, and Green Sea Turtles

The Kemp's ridley sea turtle was listed as endangered throughout its range on December 2, 1970; the loggerhead sea turtle was listed as threatened throughout its range on July 28, 1978; and the green sea turtle was listed as endangered on July 28, 1978. However, a May 6, 2016, listing superseded the 1978 listing of the green sea turtle. Three were listed as endangered (Mediterranean, Central West Pacific, and Central South Pacific) and eight were listed as threatened (North Atlantic, South Atlantic, Southwest Indian, North Indian, East Indian-West Pacific, Southwest Pacific, Central North Pacific, and East Pacific).

All three species of sea turtles have the potential to use Lake Pontchartrain as juvenile or adult foraging habitat.

Kemp's Ridley, loggerhead, and green sea turtles could occur in Lake Pontchartrain.

MSA-2 Alternative Area

A USFWS IPaC consistency letter generated November 9, 2021, (Appendix J) stated that four listed species and one candidate species may occur in the MSA-2 area. Of those five species, only the West Indian manatee (threatened), Gulf sturgeon (threatened), pallid sturgeon (endangered) and Monarch butterfly (candidate) are known to occur in the MSA-2 area. An email dated November 9, 2021, from USFWS stated that coordination for the candidate monarch butterfly is not necessary. The red-cockaded woodpecker (endangered) is not known to occur in the MSA-2 area due to lack of preferred habitat. Designated critical habitat does not occur within the MSA-2 area for the identified species. Bald eagles and colonial nesting birds are considered species of concern and do occur in the diversion influence area. These species are protected by the MBTA, and the bald eagle is additionally protected by the BGEPA.

Federally Listed Species (ESA)

Red-cockaded Woodpecker (Endangered)

The red-cockaded woodpecker is listed as federally endangered under the ESA. Red-cockaded woodpeckers live in mature pine forests—specifically those with longleaf pines averaging 80 to 120 years old and loblolly pines averaging 70 to 100 years old. Red-cockaded woodpeckers are unlikely to occur in the MSA-2 area as their preferred habitat does not exist.

West Indian Manatee (Threatened)

The West Indian manatee is protected under the Marine Mammals Protection Act and is also listed as federally threatened under the ESA. Sightings of West Indian manatees in Louisiana have occurred in the Amite, Blind, Tchefuncte, Tickfaw, and Atchafalaya Rivers, the MRGO, Lake Maurepas, Lake Pontchartrain, and in canals within the adjacent coastal marshes. There are no known sightings of West Indian manatee in Hope Canal. Manatees have not been recorded in the Mississippi River within the vicinity of the intake structure (Fertl et al., 2005; LDWF, 2020a, pers. comm.).

West Indian manatees are likely to occur in the diversion influence area, specifically Lake Maurepas, and could occur in the Blind River, as they prefer water deeper than five feet (LDWF, 2020a, pers. comm.).

Gulf Sturgeon (Threatened)

Gulf sturgeon are listed as threatened under the ESA. Gulf sturgeon are known to migrate through Lake Maurepas and upstream into the Amite River. Gulf sturgeon do not feed during in and out migrations. Gulf sturgeon are known to seasonally use Lake Maurepas from October to November and again from February through April during these migrations (Kirk et al., 2008). Gulf sturgeon occur in the northern reaches of Blind River during their migration to the Amite River, but do not occur in the southern reaches. Gulf sturgeon do occur in the Mississippi River, but they would not be anticipated to occur as far upstream as the proposed construction area (Kirk et al., 2008). The ERDC conducted a sampling near the location of the proposed diversion intake and no Gulf sturgeon were captured during the sampling event (see Appendix K for details). A lack of spawning habitat at any distance upstream from the Gulf of Mexico likely limits their frequency in the Mississippi River (Danube Watch, 2009). Gulf sturgeon are not known to occur in Hope Canal.

Gulf sturgeon could occur in the diversion influence area, specifically in Lake Maurepas and the northern reaches of Blind River. It has been assumed that they would not occur in Hope Canal or the Mississippi River.

Pallid Sturgeon (Endangered)

The pallid sturgeon is listed as endangered under the ESA. Pallid sturgeon are adapted to living close to the bottom of large, silty rivers with a natural hydrograph (USFWS, 2019). They often inhabit the main channels of large rivers and prefer deep, turbid river channels with strong demersal currents (USFWS, 1998) such as the Mississippi River. From 2001-2010, ERDC conducted samplings near the location of the proposed diversion intake and no pallid sturgeons were captured during this event. However, 51 pallid sturgeon were captured in the lower Mississippi River (below river mile 320). (see Appendix K for details). Pallid sturgeon would not be anticipated to occur in the swamp, Hope Canal, Blind River, or Lake Maurepas.

Pallid sturgeon are likely to occur in the proposed construction area, specifically in the Mississippi River main channel and secondary channels.

Species of Concern

The bald eagle was removed from the federal list of threatened and endangered species in 2007 but is protected under the BGEPA, which is enforced by the USFWS. In southeastern Louisiana, the bald eagle typically nests in mature trees near fresh to intermediate marsh or open water habitat (USFWS, 2011). In 2007, it was estimated that there were 32 active and inactive bald eagle nests in or near the Maurepas Swamp (Fox et al., 2007). Recent coordination with LDWF indicates that there are >20 bald eagle nests in the Maurepas swamp but no active bald eagle nests within the proposed construction area (LDWF, 2020a, pers. comm.). The nearest nest is approximately 1 mile from proposed excavation in Hope

Canal. The nearest nest to proposed pile driving activities is approximately 2 miles from the US 61 crossing. There is one active nest within the secondary mitigation area. Bald cypress trees would provide good nesting and loafing habitat. Lake Maurepas likely serves as a preferred foraging area. Bald eagles may also forage in the Mississippi River and the Blind River. They are not known to forage in Hope Canal likely due to the small canopy gap (Fox et al., 2007). Bald eagles are anticipated to use the swamp area year-round with nesting activities taking place from September through May.

Colonial Nesting Birds

Colonial nesting birds (e.g., herons, egrets, night-herons, ibises, and roseate spoonbills – [Order: Pelecaniformes], anhingas [Anhinga anhinga], and cormorants [Phalacrocorax spp.]) typically nest on islands or areas of higher ground that support small trees or shrubs. As of 2020, two colonies were identified in the proposed construction area (LDWF, 2020a, pers. comm.). There are currently five known colonial nesting bird rookeries in the Maurepas Swamp area. None of these rookeries are within 1,000 feet of any of the proposed construction features. Colonial nesting birds have been known to forage in Hope Canal, the swamp, Lake Maurepas, and the Blind River, but not in the Mississippi River due to high water velocities. Prior to construction, and during nesting season, a CEMVN biologist would conduct surveys to determine if any newly established rookeries are present.

3.2.4 Fisheries and Aquatic Resources

Planning Area

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) is the primary law governing marine fisheries management in United States federal waters; its goals are 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 planning area include the Mississippi River, Lake Maurepas, Lake Pontchartrain, Lake Borgne, Breton Sound, and Chandelier Sound. NMFS has indicated that these water bodies and adjacent wetlands provide nursery, foraging, and other important habitats that support varieties of economically important marine fishery species, including striped mullet, Atlantic croaker, Gulf menhaden, spotted and sand sea trout, southern flounder, black drum, and blue crab. Some of these species also serve as prey for other fish species managed under the MSFCMA by the Gulf of Mexico Fishery Management Council (e.g., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (e.g., billfishes and sharks).

A list of fish and aquatic species referenced in this document and their scientific names can be found in Appendix B, Table 5.

The existing emergent wetlands and shallow open water within the planning area provide important habitat and EFH, including transitional habitat between estuarine and marine

environments used by migratory and resident fish, as well as other aquatic organisms for nursery, foraging, spawning, and other life requirements. 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 (Rounsefell, 1964; Penland et al., 2002; O'Connell et al., 2009).

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project would occur on existing agricultural lands and therefore no fisheries or aquatic resources or EFH would be present.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

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

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

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

MSA-2 Alternative Area

Submerged aquatic vegetation (SAV) communities dominated by plants such as coontail, widgeon grass, and wild celery were historically more common in the proposed construction area but have been replaced by nuisance floating aquatic plants in many open water areas in Louisiana wetlands with low flow. Floating aquatic nuisance plants include water hyacinth

and giant Salvinia. These invasive species compete with native flora for resources such as nutrients and light, and in turn can negatively impact community structure and composition, and ecosystem processes.

Plankton and benthic organisms serve as the lowest food resource level for many species of fish and shellfish. Plankton can often indicate benthic, nutrient, and water quality health (Stone et al. 1980). Limited available data from Lake Maurepas suggests the dominance of Anabaena, dinoflagellates, diatoms, and cyanobacteria with occasional strong presence of chlorophytes (Atilla et al. 2007, 2016 WSLP EIS).

Benthic macroinvertebrates tend to dominate deepwater swamp invertebrate communities. Characteristic species include crayfishes, clams, oligochaete worms, snails, freshwater shrimp, midges, amphipods, and various immature insects (Mitsch and Gosselink 1993). Limited data exists on benthic communities in the proposed construction area. Species present are likely typical of deepwater forested wetlands and slow-flowing rivers in the region. Crawfish and crabs may be harvested in and within the vicinity of the proposed construction area (Fox et al. 2007).

The relatively low salinity of these waters provides typical habitat for freshwater and marine transient fishes and shellfish, and the area has good recreation fishing opportunities (USACE 2010). Freshwater fish, such as largemouth bass (and other sunfishes, catfishes, and crappie) are taken by recreational fishermen. Many fishes have been sampled in the area, including estuarine, freshwater, catadromous, and anadromous species, with spotted gar and striped mullet (being the most common according to one comprehensive study (Kelso et al., 2005).

3.2.5 Essential Fish Habitat

Planning Area

The public places a high value on seafood and recreational and commercial opportunities provided by EFH. Specific categories of EFH include all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), subtidal vegetation (seagrasses and algae), and adjacent intertidal vegetation (marshes and mangroves). Table 3-4 shows the EFH for the managed species in southeastern Louisiana.

Table 3-4: Summary of the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 104-297) Designation of Essential Fish Habitat for Coastal Louisiana

Species	Life Stage	EFH
Brown shrimp	Eggs Larvae Postlarvae/ juvenile Subadult Adult	(Marine system) < 110, demersal (Marine system) < 110 m, planktonic (Estuarine system) marsh edge, submerged aquatic vegetation, tidal creeks, inner marsh (Estuarine system) mud bottoms, marsh edge (Marine system) < 110 m, silt sand, and muddy sand
White shrimp	Eggs Larvae Postlarvae/juvenile, subadult Adult	(Marine system) < 40 m, demersal (Marine system) < 40 m, planktonic (Estuarine system) marsh edge, submerged aquatic vegetation, marsh ponds, inner marsh, oyster reefs (Marine system) < 33 m, silt, soft mud
Red drum	Eggs, larvae Postlarvae, early juvenile, late juvenile, Subadult Adult	(Marine system) planktonic (Marine and Estuarine systems) submerged aquatic vegetation, emergent marsh, estuarine mud bottoms, marsh/water interface (Estuarine system) oyster reefs, sand/shell/mud/soft bottom (Marine and Estuarine systems) Gulf of Mexico & estuarine mud bottoms, oyster reefs
Red snapper	Larvae, postlarvae/juvenile Adult	(Marine system) structure, sand/mud; 17-183 m (Marine system) reefs, rock outcrops, gravel; 7-146 m
Vermillion snapper	Juvenile	(Marine systems) reefs, hard bottom, 20-200 m
Spanish mackerel	Larvae Juvenile Adult	(Marine system) < 50 m isobath (Marine and Estuarine systems) offshore, beach, estuarine (Marine system) pelagic
Bluefish	Postlarvae/ juvenile Adult	(Marine and Estuarine systems) beaches, estuaries, and inlets (Marine and Estuarine systems) Gulf, estuaries, pelagic
Bull Shark	Neonate, juvenile	Estuarine waters

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project area contains no EFH.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

This project is located within an area identified as EFH for postlarval/juvenile brown shrimp; postlarval/juvenile white shrimp; and postlarval/juvenile and adult red drum. The 2005 generic amendment of the Fishery Management Plan for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council, identifies EFH in the project area to be estuarine intertidal wetlands, submerged aquatic vegetation, estuarine water column, and mud substrates.

This area would likely continue to be open water estuarine habitats and would serve as EFH in the future.

MSA-2 Alternative Area

The area is identified as EFH for larval, post larval, early and late juvenile, and adult red drum, early juvenile white shrimp, and neonate and juvenile bull shark (Table 3-5).

Table 3-5: Essential Fish Habitat

Common Name	Life Stage	EFH
Red drum	Larvae	Estuarine SAV, estuarine mud/soft bottom
	Post Larvae	Estuarine Emergent Marsh, Estuarine SAV, Estuarine Sand/Shell/Mud/Soft Bottom
	Early Juvenile	Estuarine Emergent Marsh, Estuarine Mud/Soft Bottom
	Lake Juvenile	Estuarine SAV
	Adult	Estuarine Emergent Marsh, Estuarine SAV, Estuarine Sand/Shell/Mud/Soft Bottom
White Shrimp	Early Juvenile	Estuarine Emergent Marsh, Estuarine Mud/Soft Bottom
Bull Shark	Neonate	Estuarine waters
	Juvenile	Estuarine waters

Some areas classified as EFH would likely continue to be open water estuarine habitats and would serve as EFH in the future.

3.2.6 Cultural Resources

Planning Area

Cultural resources include historic properties, archaeological resources, and Native American resources, including sacred sites and traditional cultural properties. Historic

properties have a narrower meaning and are defined in 36 CFR 800.16(l) of the NHPA; they include prehistoric or historic districts, sites (archaeological and religious/cultural), buildings, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP). Historic properties are identified by qualified agency representatives in consultation with State Historic Preservation Officers (SHPO), Tribes, and other consulting parties.

Federal regulations require CEMVN, as an agency responsible for funds appropriated by Congress, to identify if properties are historic (listed or eligible for listing in the NRHP) to assess the effects the work would have on historic properties; to seek ways to avoid, minimize, or mitigate any adverse effects to historic properties; and to evaluate the proposed action's potential for significant impacts to the human and natural environment. The consideration of impacts to historic and cultural resources is mandated under Section 101(b)4 of the NEPA as implemented by 40 CFR, Parts 1501-1508. Additionally, Section 106 of the NHPA, as amended (54 U.S.C. § 300101 et seq.), requires federal agencies to consider their effects on historic properties (i.e., historic and cultural resources) and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Section 106 lays out four (4) basic steps that must be carried out sequentially: 1) establish the undertaking and area of potential effects (APE); 2) identify and evaluate historic properties within APE; 3) assess effects to historic properties; and 4) resolve any adverse effects (avoid, minimize, or mitigate). An agency cannot assess the effects of the undertaking on historic properties until it has identified and evaluated historic properties within the APE. The federal agency must consult with the appropriate SHPO, Tribal Historic Preservation Officer/s (THPO) and/or Tribal officials, state and local officials, NFS/applicants, and any other consulting parties in identifying historic properties, assessing effects, and resolving adverse effects, and provide for public involvement.

In addition to cultural resources or historic properties considered eligible for the NRHP, USACE's 2012 Tribal Consultation Policy asks the agency to determine if any of three categories of resources would be significantly adversely affected by the proposed action. The three categories are: Tribal rights, Tribal lands, and protected Tribal resources (see Section 7. EO 13175 for more information on government-to-government consultation between federally recognized Tribes and USACE). Tribal interest varies by geographic limits and USACE uses the most inclusive approach to consultation and coordination. Nine federally recognized Tribes have an aboriginal/historic interest in the planning area. The Tribes are: 1) the Alabama Coushatta Tribe of Texas, 2) the Chitimacha Tribe of Louisiana, 3) the Choctaw Nation of Oklahoma, 4) the Coushatta Tribe of Louisiana, 5) the Jena Band of Choctaw Indians, 6) the Mississippi Band of Choctaw Indians, 7) the Muscogee (Creek) Nation, 8) the Seminole Nation of Oklahoma, and 9) the Tunica Biloxi Tribe of Louisiana.

Archaeological Site Distribution: The generalized pre-contact cultural chronology for Louisiana according to Rees (2010:12) is divided into five primary archaeological components or periods as follows: Paleoindian (11,500-8000 B.C.); Archaic (8000-800 B.C.); Woodland (A.D. 800 B.C.-1200.); Mississippian (A.D.1200-1700); and Historic (A.D. 1700 present). Regionally, these archaeological periods have been further divided into sub-periods based on their material culture, settlement patterns, subsistence practices, and sociopolitical organization. Specific sub-periods identified within the planning area include

Poverty Point; Tchefuncte; Marksville; Baytown; Troyville; Coles Creek; Plaquemine; and Mississippian. Post-Contact Period (ca.A.D. 1650 present) cultural affiliations follow the thematic approach set forth in the Louisiana Division of Archaeology's (LDOA) State of Louisiana Site Record Form (amended August 29, 2018) and are divided into the following temporal groups: *Historic Exploration* (A.D.1541-1803); *Antebellum Louisiana* (A.D.1803-1860); *War and Aftermath* (A.D.1860-1890); *Industrial and Modern* (A.D.1890-1945); and *Post-WWII* (A.D.1945 present).

Based on a review of the LDOA, *Louisiana Cultural Resources Map* (LDOA website), archaeological sites previously recorded within the current planning area collectively span the entire spectrum of pre-contact and post-contact archaeological components referenced above, encompassing some 10,000 years or more. It is also important to stress that many of the known sites in the diversion influence area have occupation spans encompassing more than one of these cultural/temporal periods. Moreover, many of these sites possess more than one archaeological component attesting to the long-ranging cultural importance of the region. Nevertheless, as compared to other areas of the state, relatively little survey work has been conducted within the planning area.

In lieu of additional survey data, Louisiana's Comprehensive Archaeological Plan (Girard, et al. 2018) provides a useful site distribution model that can be used for baseline planning purposes. To a great extent, the unique geomorphology and ecology of Louisiana has influenced site type and location. To examine how the physical landscape impacts the archaeological record, the LDOA divides the state into a series of regions that follow the ecoregions classification of the Western Ecology Division of the United States EPA (https://www.epa.gov/eco-research/ecoregion-download-files-state-region-6#pane-16). There are six regions at Level III, of which four fall within the present planning area (Mississippi Alluvial Plain, Mississippi Valley Loess Plains, Southeastern Plains, and Southern Coastal Plains). The Mississippi Alluvial Plain ecoregion covers most of the eastern half of northern Louisiana and forms a central corridor through the southern part of the state. The Mississippi Valley Loess Plains ecoregion occurs primarily within the central-southern half of the present planning area. The Southern Coastal Plain ecoregion comprises the northern central half of the present planning area, spanning the Louisiana/Mississippi border. The Southeastern Plains ecoregion lies in the northern part of the southeastern portion of the state, spanning the Louisiana/Mississippi border. A map displaying the locations of potential mitigation properties plotted against the EPA Level III Ecoregions is included as Figure A-5 in the aforementioned report.

Girard, et al., (2018:24-31) defines how the unique environmental, biological, and physiological characteristics of each region cumulatively influenced cultural development to provide context to the distribution of where sites are likely or unlikely to occur within each ecoregion as is summarized below:

The Mississippi Alluvial Plain

The region consists of major aggrading floodplain landforms and watercourses… In the southern portion of the [planning area] this region includes the Holocene-age deltaic lobes of

the Mississippi River… Sites are found predominantly on higher, better-drained landforms. These are typically natural levees along channels but may include point bars and other surfaces. In many areas, the distribution and age of sites on the modern surface reflects the geological history of that area, rather than its entire occupational history… The Inland Swamp sub-region represents the transition between freshwater back swamps to fresh, brackish, and saline waters of the deltaic marshes… Much of the land is low-lying and subject to seasonal flooding. Numerous bayous drain the region with their natural levees providing the only elevated ground… Sites are concentrated along natural levees. Channel migration has eroded many landforms, and sediment deposition has buried many others.

The Mississippi Valley Loess Plains

This region consists of rolling hills and bluffs immediately east of the Mississippi Alluvial Plain [and] is underlain by Miocene and Pliocene sand, silt, and gravel deposits in the northern half, and by Pleistocene age silts, sands, and clays in the south… The region is dominated by the thick layer of Late Pleistocene loess derived from the Mississippi River valley that is draped over the gently rolling topography… Sites are typically situated on higher ridge crests and along stream margins. Sites will occur in surface contents in higher elevations while occasional buried sites may be found in alluvial settings.

The *Southern Coastal Plain*

The uplands consist of gently rolling topography dissected by north-south trending streams and rivers…Holocene alluvial deposits are in floodplains and on low terraces along major streams…Sites in the upland areas are concentrated on higher ridge crests and overlooking streams. Most of these deposits are shallow with overlapping occupations and no opportunity for stratified sites. Buried and stratified sites may occur in the floodplains of the larger streams.

Southeastern Plains

[The region] consists of level to gently undulating plains formed in Pliocene and Pleistocene deposits that are covered by thin layers of loess in some areas. These deposits consist of sandy loams, silt loams, and clay loams with cherty gravels present. A series of north-south trending streams and rivers drain the region and cherty gravel bars are common. Most have moderately incised valleys with limited floodplain development, although the Bogue Chitto and Pearl Rivers can have broader floodplains with abandoned channels and ponded areas… Sites are typically situated on higher ridge crests and along stream margins. Sites will occur in surface contexts in higher elevations while occasional buried sites may be found in alluvial settings… Sites in surface contexts are impacted by agricultural and timber harvesting activities. Within the larger drainages, gravel-mining operations have destroyed sites within the limits of their activities.

Historic Properties: Preserving historic properties as important reflections of our American heritage became a national policy through passage of the Antiquities Act of 1906, the Historic Sites Act of 1935, and Section 106 of the NHPA, and it's implementing regulations, 36 Code of Federal Regulations [CFR] Part 800. The passage of the NHPA established the

NRHP and the process for adding properties to it. NRHP-listed properties typically fall into one of five categories: building, structure, object, site, and district. The National Park Service (NPS) uses the following definitions to differentiate NRHP historic resource types (NPS 1995):

- Building: A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn.
- Structure: The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter."
- Object: The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or a relatively small in scale and simply constructed. CEMVN's background research indicates that there are no NRHP-listed objects within the planning area.
- Site: A site is the location of a significant event, a prehistoric/historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.
- District: A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

In addition to the five common types of NRHP properties mentioned previously, the planning area also has the potential to contain National Historic Landmarks (NHLs) and archaeological sites not presently listed on the NRHP:

- NHL: The NPS has developed criteria for the recognition of nationally significant properties, which are designated NHLs and prehistoric and historic units of the NPS. NHLs are those districts, sites, buildings, structures, and objects designated by the Secretary of the Interior as possessing national significance in American history, architecture, archeology, engineering, and culture. NHLs are afforded a special level of protection and Section 110(f) of the NHPA, requires that before approval of any federal undertaking that may directly and adversely affect any NHL, the head of the responsible federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the ACHP a reasonable opportunity to comment on the undertaking.
- Archaeological Sites Not Presently Listed on the National Register: Not every archaeological site is eligible for the NRHP because not all archaeological sites possess both significance and sufficient integrity to be considered eligible for listing. Most eligibility determinations made pursuant to the Section 106 process are called "consensus determinations" because agreement between the federal agency and the SHPO/THPO is all that is normally required for federal

undertakings; no formal nomination to or listing on the NRHP is necessary. The LA SHPO maintains databases of all previously recorded sites within Louisiana. Individual alternative actions would be screened against the databases to determine if sites that have been identified as eligible for NRHP-listing, but not yet enrolled, exist within proposed work areas.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs; Pine Island – up to 1,965 Acres, up to 775 AAHUs

CEMVN has completed an initial review of existing conditions regarding cultural resources within the potential mitigation areas. Historic properties within the proposed APE for each mitigation property were identified based on CEMVN's review of the NRHP database, the *Louisiana Cultural Resources Map* provided by SHPO, historic map research, and a review of the EPA Level III Ecoregions. Six archaeological sites were identified within the BBA Alternative project area; no architectural sites were identified. CEMVN's preliminary review of the array of properties evaluated is summarized in Table 3-6.

Table 3-6: Cultural Resources within the BBA Alternative Project Area

Mitigation Site	Previously Recorded Archaeological Sites	Previous Survey	Previous Survey Coverage	Other Notes:
Pine Island	16ST45 16ST98	22-0824	Partial	Project area situated in dense cluster of sites. Primarily prehistoric. Little survey coverage of proposed mitigation area.
St. James	16SJ20 16SJ21 16SJ34 16SJ30	22-0665 22-3017 22-3693 22-3693 22-3713 22-4669 22-3017 22-3823 22-4043 22-0728 22-0727 22-3812	Partial	Multiple previously recorded plantation sites within project area: Wilton Plantation, Helvetia Plantation, St. Rose Plantation, and Columb Plantation (including cemetery within parcel).

MSA-2 Alternative Area

Historic Properties

The CEMVN identified historic properties within the proposed construction, mitigation, and diversion influence areas (collectively the APE) based on a review of the NRHP database, the LDOA Louisiana Cultural Resources Map (LDOA website), historic maps, pertinent regional and local cultural resources investigations, historic aerial photography, and other appropriate sources. This review identified 15 previous cultural resources surveys, 11 previously recorded archaeological sites, and three previously recorded architectural resources within the proposed construction, mitigation, and diversion influence areas.

Archaeological

A total of 11 archaeological sites are present within the APE. Two of these sites are not eligible for the NRHP, 16SJ73 (Blind River Timber Rail) and 16SJB68 (Angelina Plantation). (Note: Locus A of 16SJB68 is of unknown eligibility). Seven sites are listed as unknown eligibility (16AN8, 16LV24, 16LV73, 16LV74, 16LV103, 16SJ72, and 16SJB4). These sites include four prehistoric shell middens (16AN8, 16LV73, 16LV24, 16SJB4), two possible watercrafts/shipwrecks (16LV74, 16SJ72), one railroad bridge (16SJ72), and the Amite River Diversion Canal (16LV103). Two cemeteries are present within the APE (16SJ58, 16SJ61), both dating back to the Civil War (Table 3-6).

Fifteen previous cultural surveys have been performed within the APE. Most of these surveys did not discover existing cultural resources within the APE. A total of nine surveys occurred near or in the Angelina Plantation site (16SJB68). They are 22-3023, 22-3793, 22-4288, 22-4571, 22-4571-1, 22-4571-2, 22-4690, 22-5431, 22-6238. A *Phase I Cultural Resources Survey of the River Reintroduction Corridor, Maurepas Swamp (PO-29), St. John the Baptist Parish, Louisiana* was performed by Coastal Environments, Inc. in 2008, and included the proposed footprint of the Maurepas Diversion Canal corridor from I-10 to the Mississippi River (Wells 2008; 22-3023). No eligible archaeological sites were recorded as a result of this survey (Table 3-6).

Architectural

The proposed construction area located approximately 1 mile from the Garyville Historic District, a National Register Historic District listed in the NRHP in 1990. Tree coverage along the majority of LA-54 separates the Garyville Historic District from the proposed construction area. The proposed construction area is located west of LA-54 while the Garyville Historic District is located east of LA-54. No individual historic properties were identified as listed, or formally determined eligible for listing by the Keeper, in the NRHP within the proposed construction, mitigation, and diversion influence areas. No previously recorded built resources are located within the mitigation and diversion influence areas (Table 3-6).

Review of previous investigations revealed three built resources (Louisiana Historic Resource Inventory (LHRI) ID Number 48-01071, 48-01073, and 48-01089) within or adjacent to the proposed construction area that were individually documented in 1985. According to the LDOA Cultural Resources Map, these three resources are near River Road and the proposed headworks and intake structures. During the mid-1980's, many of the surveyed resources were identified by Post Office Box or only the street name. As a result, LHRI Numbers 48-01071, 48-01073, and 48-01089 do not have identifying street numbers and street names. Visual inspection via Google Street View suggests that these three (3) resources may have been demolished or their LHRI locations are plotted incorrectly on the LDOA Cultural Resources Map (Table 3-7).

The Earnest Amann Subdivision borders the proposed construction area to the east. Marigold Street runs parallel to the proposed construction footprint and was developed likely in the late 1950s with dwellings constructed on the east side of the street by the early 1960s (NETR 1961). A review of aerial photographs and historic USGS maps reveal that the east side of Marigold Street was fully developed by the early 1980s (NETR 1981). The west side of Marigold Street developed sometime after 1970 (NETR 1971). As a result, built resources 50 years of age or older are present adjacent to the proposed construction area.

Table 3-7: Summary of Cultural Resources and Surveys within the MSA-2 APE

Mitigation Site	Previously Recorded Cultural Resources	Previous Survey	Previous Survey Coverage	Other Notes:
MSA-2	16AN8 16LV24 16LV72 16LV73 16LV74 16LV103 16SJ58 16SJ61 16SJ73 16SJB4 16SJB68 48-01071 48-01073 48-01089	22-1086 22-2628 22-2683 22-3023 22-3793 22-3879 22-3879 22-4288 22-4571 22-4571-1 22-4571-2 22-4690 22-4868 22-4868 22-5158 22-5431 22-6238	Partial	Little survey coverage of proposed mitigation area.

Tribal

A total of nine federally recognized Tribes have an aboriginal/historic interest in the diversion influence area, which is inclusive of portions of St. John the Baptist, St. James, Ascension, and Livingston parishes. The Tribes are: 1) the Alabama Coushatta Tribe of Texas, 2) the Chitimacha Tribe of Louisiana, 3) the Choctaw Nation of Oklahoma, 4) the Coushatta Tribe of Louisiana, 5) the Jena Band of Choctaw Indians, 6) the Mississippi Band of Choctaw Indians, 7) the Muscogee (Creek) Nation, 8) the Seminole Nation of Oklahoma, and 9) the Tunica Biloxi Tribe of Louisiana.

According to available government records, there are no tribal lands, nor are there specific tribal treaty rights related to access or traditional use of the natural resources in the diversion influence area. There are, however, many protected tribal resources within the parishes. In a series of maps dating from the 1730s through the 1780s, the planning area near the Mississippi River is noted as occupied by the Acollapissa, Petit Acollapissa, and the Houmas (d'Anville, 1752; Demaringy, 1743 and Gauld, 1778). The Blind River was previously charted as the Houma Creek (Gauld, 1778) and later River Acadiens. Later in the 1830s, the Biloxi are noted as occupying the shores of Lake Maurepas in the vicinity of the mouth of Blind River to the south. This location has been recorded as archaeological site 16SJB4- Dutch Bayou, with earlier archaeological deposits also present dating back to at least the Troyville Period (A.D.700-1,100). In the vicinity of the mouth of Blind River to the north, the area is

recorded as archaeological site 16LV24 (the Blind River Site). This location is recorded as an archaeological midden site, as well as a series of small mounds. A contact period archaeological site, 16LV73 (the Neuschafer Site) reportedly contains up to 8 feet of midden deposits and would likely extend well back in time. The last site meeting the criteria of protected Tribal properties currently recorded in the diversion influence area is archaeological site 16AN8 (Alligator Bayou), at the intersection of the Blind River and Alligator Bayou and is recorded as a Troyville/Coles-Creek-Mississippi site. Swanton (1984) reports the entire areas as being occupied by the Acolapissa allied with the Tangipahoa in a series of six villages (p. 195-196). Native American occupation of the area clusters along the Mississippi River, the Blind River, and the shores of Lake Maurepas.

To augment CEMVN's background research into the interested federally recognized Tribes and the types of tribal resources that have the potential to be within the APE, CEMVN plans to consult with federally recognized Tribes on actions having the potential to significantly affect protected Tribal resources, Tribal rights, or Indian lands via teleconference. CEMVN will discuss the implementation plan for the programmatic agreement, titled, *Programmatic Agreement Among the U.S. Army Corps of Engineers, New Orleans District; Amite River Basin Commission; East Baton Rouge Parish; Louisiana Coastal Protection and Restoration Authority; Louisiana Department of Transportation and Development; Pontchartrain Levee District; Louisiana State Historic Preservation Officer of the Department of Culture, Recreation & Tourism; and Choctaw Nation of Oklahoma; Regarding the Bipartisan Budget Act of 2018 Compensatory Habitat Mitigation Program for the Comite River Diversion, East Baton Rouge Parish Watershed Flood Risk Management, and West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Projects In Louisiana* (BBA Alternative Habitat Mitigation PA; Appendix J), that will govern the NHPA Section 106 process and further discussions during implementation are planned (see Section 6.11).

3.2.7 Recreational Resources

Planning Area

Recreation areas were examined in and around the LPB, MSRB, and Mississippi Alluvial Plain. These projects are in proximity to seven National Wildlife Refuges (NWRs), more than 15 LA WMAs, seven LA state parks, and one national park, as well as other significant recreation areas. These areas are visited annually for recreational purposes and include miles of trails for hiking and biking, boat ramps, fishing piers, classroom spaces, visitor centers or museums, picnic shelters, and historic sites. These recreation areas provide opportunities for hunting, hiking, biking, boating, bird watching, fishing, and crabbing, crawfishing, shrimping, education, camping, picnicking, and playing. Appendix B, Table 6 lists the state and federal recreational facilities that are located in the LPB and Mississippi Alluvial Plain and provides information about size and recreational features.

The fishing industry alone is the second largest industry in Louisiana. The planning area encompasses over 50 percent of the state's resident fishing licenses and boat registrations according to the LDWF. Appendix B, Table 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 LPB and Mississippi Alluvial Plain.

Although fishing and boating marinas are periodically damaged or destroyed in hurricanes because of the high demand of this recreational activity, marinas typically rebuild almost immediately. This industry has proven to be strong, and it is important to maintain the land area surrounding these facilities, including the boat launches. People enjoy pleasure boating and fishing in and around these recreational boat launches.

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 LPB and Mississippi Alluvial Plain, SCORP Regions 1 through 3 include the LPB and Mississippi Alluvial Plain. The state and federally managed areas described previously represent just a portion of the recreational facilities inventoried for SCORP Regions 1 through 3. Federal, state, parish, and municipal public recreational facilities inventoried within Regions 1 through 3 provide approximately 341 parks for hunting, boat ramps, picnic areas, beaches, and camping with tent sites and trailer sites. The SCORP-prioritized needs in this region include improving access to enable fishing and boating, funding to support consumptive and non-consumptive activities on all public recreation areas, use of more sustainable building practices, more wilderness or primitive camping areas, identifying and acquiring large tracts of waterfront lands for large scale parks, and addressing the dwindling state of marine resources.

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.

Funds from the Land and Water Conservation Fund (LWCF) have supported more than 150 different recreational projects in the area encompassing the LPB and Mississippi Alluvial Plain since 1964. LWCF projects in the LPB and Deltaic Plain have provided numerous boat ramps, other facilities or lands that enhance opportunities for recreation. Actual LWCF expenditures not adjusted for inflation are in the millions in the LPB and Mississippi Alluvial Plain. Appendix B, Table 8 summarizes the number and cost of projects implemented in parishes in the LPB and Mississippi Alluvial Plain.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

Recreational use of the project area is minimal as the site is currently used for agriculture and no opportunities exist on-site. The occasional opportunity for bird watching and sightseeing exists from nearby roads into the site. Overall, the habitat around the project area exhibits moderate plant species diversity and moderately high animal diversity, creating opportunities for both consumptive and non-consumptive forms of recreation. The Great River Road, located near this site, is a National Scenic Byway and serves and as a source of non-consumptive recreation for travelers along the corridor.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

Recreational use of the project area is moderate as few opportunities exist on-site. The occasional opportunity for bird watching and sightseeing exists from the single gravel road into the site or by boat from the nearby natural bayous and man-made canals. Overall, the habitat around the project area exhibits moderate plant species diversity and moderately high animal diversity, creating opportunities for both consumptive and non-consumptive forms of recreation.

In 50 years, Pine Island would likely still be open water areas and fishing and hunting would be similar as they are today.

MSA-2 Alternative Area

Recreational resources are of high economic value and their contribution to local, state, and national economies. People place high value on recreational resources due to fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana, and the large per-capita number of recreational boat registrations in Louisiana (USACE and CPRA, 2010).

An unimproved single lane gravel boat launch is located at the very southern portion of Hope Canal near U.S. 61 (Airline Highway), in the MSA-2 area, to allow access to the Maurepas WMA. This boat launch is noted because it is the only recreation feature discussed in the Environmental Consequences section of this report. Currently, LDWF owns and operates the small boat launch, which consists of an earthen parking area with a gravel launch into Hope Canal. The parking area is less than 0.2 acres and can accommodate approximately 6 vehicles and boat trailers. The boat launch is closed to recreational access due to WSLP construction activities. There are no other features or facilities associated with the current boat launch.

Mississippi River

Recreational and subsistence fishing is common in New Orleans along the Mississippi riverbank. It is unknown if recreational or subsistence fishing is common within the river reach in the proposed construction area. A small access road to the west of the proposed intake structure would provide easy riverbank access during low water, but it is unknown if CEMVN would allow unrestricted use of this area (EPA, 2011b).

Recreational boating within the vicinity of the intake structure is likely limited by the heavy commercial use of the Mississippi River. Recreational fishing may occur along the Mississippi River near the proposed intake structure.

Maurepas Swamp

The Maurepas Swamp is used for wildlife viewing, hiking, birding, boating, fishing, and hunting. The creation and expansion of the Maurepas Swamp WMA in the proposed construction area, along with the Joyce and Rathborne WMAs and Tickfaw State Park have greatly increased public access to the swamp. There are several boat launches in the

Maurepas Swamp south of Lake Maurepas, including in Hope Canal and the Blind River. The many rivers and streams in the area are heavily used for water-based recreational activities. In addition, there are several portions of the swamp that can be accessed by foot (LDWF 2021).

Parts of the Blind River are designated under the Louisiana Scenic Rivers Program. Louisiana's Scenic Rivers Program was developed for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regimes of designated rivers. There are several swamp tour operators in the general area. Tours are typically given using air boats. However, swamp tours and other commercial activities are prohibited within the WMA.

Recreational hunting is common in the swamp and typically consists of white-tailed deer, waterfowl, eastern gray squirrel, common raccoon, rabbit, and American alligator. Deer are the most frequently hunted species in the Maurepas WMA, though contract trapping for alligator and nutria is also conducted. Recreational hunters may access the swamp from the sides of roads, such as I-10 and State Highway 641. Small "camps" or modest homes occur within the swamp, including along the Blind River and near the mouth of Lake Maurepas. These "camps" support temporary recreational hunting and fishing.

Recreational fishing occurs in the Blind River, bayous, and canals throughout the swamp. Recreational fishing in the swamp south of Lake Maurepas typically consists of catfish, largemouth bass, crappie, and sunfishes. Red swamp crayfish and white river crayfish are also fished in the swamp, but crawfish productivity has been declining over the recent years.

Lake Maurepas

Recreational boating in Lake Maurepas is common. Shallow areas along the western shoreline are commonly used to anchor and sunbathe, barbecue, and swim (EPA, 2011b). Recreational boaters may use the area to gather for special events. There are times in which up to 1,000 boats could be gathered.

Recreational fishing commonly occurs in Lake Maurepas, often for freshwater species that include largemouth bass, crappie, and sunfishes (Battelle, 2005). Channel catfish, bluegill, and warmouth are also recreationally caught in Lake Maurepas. The primary sought-after freshwater fish in Lake Maurepas is the catfish. Some people may fish for catfish by snorkeling and spearfishing. Blue crabs are also recreationally caught in Lake Maurepas (EPA, 2011b).

3.2.8 Aesthetic (Visual) Resources

Planning Area

Visually, the LPB, MSRB, and Mississippi Alluvial Plain is a complex series of landscapes that vary throughout the full spectrum of eco-regions, ecosystems, habitat types, and topography. From Baton Rouge, east to the Mississippi Sound; and from U.S. I-12, south to

the Mississippi River, this large basin has many different visually, culturally and historically significant areas that all add to the flavor and life of southeastern Louisiana.

Public and institutional visual relevance is derived from the many state parks and historic sites, NWRs, LA WMAs, scenic byways, and scenic streams that dot the landscape. These elements give cultural, recreational, historic, aesthetic, and archeological intrinsic value to the public (locally, statewide, and nationwide).

Technically relevant visual interests include those elements of design (be it natural or man-made) that make a place memorable and are of high visual quality. Typically, these areas are defined by form, line, texture, color, repetition, or other basic design elements that break down a scenic vista into its constituent parts. By doing this, the scenic vista can be better explained and quantified for basin. This is the “how” and “why” a resource is visually significant. Man-made elements with superior visual interest may include artistic, architectural and/or engineering marvels; while natural elements may include swamps and marsh where texture and color are in overabundance, open water framed by stands of cypress, or active habitat areas where flora and fauna create focal points and action for the viewer.

One other important factor to consider for visual resources is access. If no one can access it, then it does not bring any aesthetic or visual value to the public.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

The vicinity of the project area is characteristic of the Mississippi Alluvial Plain ecoregion.

- Existing Structures: The proposed site currently features gravel access roads used primarily for farm operations. Small storage barns for equipment and feed with livestock holding areas dot the southern end of the site.
- Water: There are no known, state designated scenic rivers or streams remotely near the project area. Other major water resources include the main river channel of the Mississippi River.
- Land Use: Land use in the area is primarily agricultural, although there are significant pockets of both multi-family and single-family residential.
- Landform and Vegetation: The surrounding habitat is composed of a broad mixture of open fields fronting the major thoroughfares of the region, surrounded by a backdrop of deep, wooded areas and the MRL, which acts as the dominant landform feature in the area. Overall, the habitat around the project area exhibits moderate plant species diversity and moderately high animal diversity. There are no known specifically identified protected trees or other plant materials in the immediate area.
- Access: Public visual access to the project site can be taken from Louisiana State Highway 44, River Road, and State Highway 3125. The drive along this thoroughfare is scenic and visually interesting.

- Other Factors that Affect Visual Resources: User activity is moderate in this region, and is primarily relegated to farm and truck traffic, though includes a small percentage of residential commuters.
- The St. James project area has no technical or institutionally recognized scenic qualities and limited public visual access. The St. James area is currently agricultural land.

In 50 years, the St. James project area would likely still be agricultural land given the area is remote and mainly suitable only for agriculture use. Therefore, the project area would continue to possess no technical or institutionally recognized scenic qualities and limited public visual access.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The vicinity of the project area is characteristic of the Mississippi Alluvial Plain ecoregion as it transitions from the Southern Coastal Plain ecoregion.

- Existing Structures: The proposed site currently features gravel access roads used primarily for access to recreation camps. Pipeline canals and former logging canals dissect the area.
- Water: There are no known, state designated scenic rivers or streams remotely near the project area. Other major water resources include natural bayous and man-made canals connecting to Lake Pontchartrain which is south of the project area.
- Land Use: Land use in the area is primarily swamp, although there are small pockets of cleared land along canals and bayous where a few recreation camps exist.
- Landform and Vegetation: The surrounding habitat is composed of a transitional swamp due to salinity infiltration. Evidence of canopy tree decline is evident and coastal prairie grasses are prominent. Overall, the habitat around the project area exhibits moderate plant species diversity and moderately high animal diversity. There are no known specifically identified protected trees or other plant materials in the immediate area.
- Access: Public visual access to the project site is limited to a single gravel road and boat traffic.
- Other Factors that Affect Visual Resources: User activity is limited in this region and is primarily relegated to a small number of camp owners.
- The Pine Island project area has no technical or institutionally recognized scenic qualities and limited public visual access. The Pine Island area is open water located in Lake Pontchartrain.

In 50 years, the Pine Island project area would likely remain open water and continue to possess no technical or institutionally recognized scenic qualities and limited public visual access.

MSA-2 Alternative Area

The Visual Resources Assessment Procedure for USACE (VRAP) (Smardon, et al., 1988) provides a method to evaluate visual resources affected by USACE water resources projects. The following VRAP criteria determines if any significant visual resources are in the planning area:

- Important urban landscapes including visual corridors, monuments, sculptures, landscape plantings, and greenspace.
- Areas that are easily accessible by a major population center.
- Projects that are highly visible and/or require major changes in the existing landscape.
- Areas that have low scenic quality and limited visibility.
- Historic or archeological sites designated as such by the National Register or State Register of Historic places.
- Parkways, highways, or scenic overlooks and vistas designated as such by a federal, state, or municipal government agency.
- Visual resources that are institutionally recognized by federal, state or local policies.
- Tourism is important in the area's economy.
- Area contains parks, forest preserves, or municipal parks.
- Wild, scenic, or recreational water bodies designated by government agencies.
- Public or privately operated recreation areas.

Specific information on relevant visual resources and ways to access the planning area is primarily described in the Cultural/Historic and Recreation Resources sections. Specific examples include the Louisiana's State Designated Natural and Scenic Blind River and the Maurepas Swamp WMA. The Maurepas Swamp WMA consists of two tracts totaling some 61,633 acres of mostly flooded cypress tupelo swamp. Water levels are influenced by rain, wind, and tides. Heavy rains accompanied with east winds can cause extensive flooding for days at a time. A description of the Maurepas Swamp area including ways to access can be located at https://www.wlf.louisiana.gov/page/maurepas-swamp.

3.2.9 Natural and Scenic Rivers

Planning Area

The Louisiana Natural Scenic Rivers Act prohibits certain activities on designated natural and scenic rivers because of their detrimental ecological impacts on streams. These include channelization, clearing and snagging, channel realignment, reservoir construction, and the commercial cutting of trees within 100 feet of the ordinary low water mark. Within the planning area there are many designated natural and scenic rivers. See Appendix A, Figure 11 for a map of natural and scenic rivers in Louisiana.

There are several scenic rivers in the planning area that are near the diversion impact area. Blind River stretches south 25 miles from Lake Maurepas, crossing under I-10 and ending near US-61 on the west side of the area. Bayous LaBranche and Trepagnier are located to

the east Blind River, each sourcing from Lake Pontchartrain and stretching south, crossing under I-10 and US-61 and ending near the Norco (Bayou Trepagnier) and Good Hope (Bayou LaBranche). The area surrounding Blind River is wooded swamp with bald cypress and water tupelo being the dominant tree species. Natural levees and spoil banks provide the only upland habitat near the river.

BBA Alternative Project Areas

There are no natural or scenic rivers in either the St. James or Pine Island project areas.

MSA-2 Alternative Area

Project features are adjacent to Blind River, which is listed as a Natural and Scenic River, Blind River's surrounding environment is described in the above section. These features include the embankment cuts and submerged rock rip-rap weirs in Bayou Secret and Bourgeois Canal (Table 2-4, Figure 2-2).

3.2.10 Air Quality

Planning Area

National Ambient Air Quality Standard Attainment Status

Areas that meet the NAAQS for all criteria pollutants are designated as being "in attainment;" areas where a criteria pollutant level exceeds the NAAQS are designated as being "in nonattainment." Areas that have improved the air quality after being in nonattainment are redesignated as in maintenance and classified as severe, moderate, or marginal. State, local and Tribal agencies will be able to use this information in developing emission reduction strategies, plans and programs to assure they attain and maintain the NAAQS.

Air quality within the planning area is not likely to be affected by the project over the next 50 years. Air quality pollutants considered by the NAAQS (Table 3-8) are minimally influenced by logging trends and urban development and are more influenced by industrial emissions.

Table 3-8: National Ambient Air Quality Standards (NAAQS)

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards would be addressed in the implementation rule for the current standards.

(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) would additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Table source: www.epa.gov/criteria-air-pollutants/naaqs-table, 30 March 2021

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

The project site is located in St. James Parish, which is currently in attainment of all NAAQS. In the next 50 years, the remote agricultural land of the St. James project area is likely to remain agricultural and is not likely to impact attainment status for the parish.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The project site is located in St. Tammany Parish, which is currently in attainment of all NAAQS. Pine Island is likely to remain open water over the next 50 years and would neither positively nor negatively impact attainment status for the parish.

MSA-2 Alternative Area

While there are few to no direct emissions of air pollutants within the Maurepas Swamp and Lake Maurepas, air quality remains a concern for those using these areas for recreational and educational uses, as well as having potential effects on wildlife and vegetation. The primary sources of air pollution in the surrounding areas are from nearby heavy industrial activity, especially adjacent to the Mississippi River and within the Mississippi River natural levee area. In addition, exhaust from automobiles is a significant source of air pollutants in developed areas and along major roadways.

National and state ambient air quality standards were developed for specific (criteria) pollutants to protect public health, safety, and welfare as a result of the federal CAA of 1970. The CAA Amendments of 1990 mandated a program by which air quality must be improved and maintained to meet the NAAQS, with frameworks for state and regional agency jurisdictions, accountability, and an established schedule. This program involves ongoing monitoring and reporting, from which regions are classified as to their attainment status for each criteria pollutant. Areas that meet the NAAQS for all criteria pollutants are designated as being “in attainment;” areas where a criteria pollutant level exceeds the NAAQS are designated as being “in nonattainment.”

Two of the four parishes, Ascension and Livingston, were redesignated to maintenance for 8-Hour Ozone on March 21, 2017 (https://www3.epa.gov/airquality/greenbook/anayo_la.html).

No Action Alternative (BBA Alternative)

Depending on which project(s) are implemented and classified as marginal for ozone (O_3) under the 8-hour standard (revised 2015). The marginal classification is the lowest risk of exceedance for a parish designated as maintenance. St. James Parish and St. John the Baptist Parish are currently in attainment status for NAAQS.

3.2.11 Water Quality

Planning Area

Section 305(b) of the CWA requires each state to monitor and report on surface and groundwater quality, which the EPA synthesizes into a report to Congress. The LDEQ produces a Section 305(b) Water Quality Report that provides monitoring data and water quality summaries for hydrologic units (subsegments) throughout the state.

Water quality criteria are elements of state water quality standards that represent the quality of water that would support a particular designated use. These criteria are expressed as constituent concentrations, levels, or narrative statements. There are currently seven designated uses adopted for Louisiana's surface waters: Primary Contact Recreation, Secondary Contact Recreation, Fish and Wildlife Propagation, Drinking Water Supply, Oyster Propagation, Agriculture, and Outstanding Natural Resource Waters. The water bodies in the planning area support a variety of the designated uses.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project area is not located in or near any state water bodies; therefore, no water quality standards or designations apply.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The water quality of the hydrologic unit, which this project is in, does not fully support one of its designated uses: Fish and Wildlife Propagation. The suspected sources of these impairments include loss of wetlands, littoral/shore area modifications, atmospheric deposition of toxins, and habitat modification. Lake Pontchartrain, the project's borrow source, is considered to fully support it designated uses.

MSA-2 Alternative Area

Water Quality Standards and Designated Uses

Section 303(d) of the CWA requires states to identify waterbodies that are impaired or in danger of becoming impaired due to exceedances of federally approved water quality standards. The State of Louisiana and the EPA have established surface water quality standards to provide a metric to assess ambient water quality conditions (Louisiana Administrative Code [LAC] 33:IX.1101). The LDEQ divides waterbodies into subsegments for water quality assessment purposes. Seven designated uses were established for surface waters in Louisiana: agriculture (irrigation and livestock watering), primary contact recreation (swimming), secondary contact recreation (boating), fish and wildlife propagation, drinking water supply, outstanding natural resource, and oyster propagation.

If a waterbody subsegment does not meet water quality criteria appropriate for its designated use, then it is designated as "impaired" with respect to those constituents for which criteria are not met. The development of a total maximum daily load is most often the

next step in the process. A total maximum daily load is a determination of the maximum amount of a given pollutant that a waterbody can receive and not exceed the water quality standards for its designated use. Based on LDEQ's most recent water quality assessment (LDEQ 2018), a summary of the suspected causes and sources of impairment for impaired subsegments of the Mississippi River and LPB is provided in Appendix B, Table 9.

Waterbodies

Dominant bodies of water in the proposed construction area include the Mississippi River to the south, Lake Maurepas to the north, and Blind River to the west. Between the Mississippi River and Lake Maurepas, tributaries that flow northward through Maurepas Swamp include Mississippi Bayou and associated canals (includes Dutch Bayou, Reserve Relief Canal and Hope Canal).

Water quality in the proposed construction area is influenced by basin elevations, surface water budget, land cover and use, coastal deltaic processes, and regional weather, as well as non-point source agricultural runoff. Lake Maurepas (Subsegment LA040602_00) is listed as impaired for low dissolved oxygen levels in the 2020 Integrated Report of Water Quality in Louisiana. See Appendix B, Table 9 for the 305(b) impaired waterbodies in the planning area from the LDEQ Final 2020 Integrated Report of Water Quality in Louisiana. No prior data has been collected on the tributaries that adjoin Lake Maurepas (LA040605_00).

The Mississippi River has one subsegment (Subsegment LA070301_00) in the proposed construction area at the conveyance channel intake structure, and it fully supports designated use for Primary Contact Recreation (swimming), Secondary Contact Recreation (boating), Fish and Wildlife Propagation (fishing), and Drinking Water Supply.

The conveyance channel from the Mississippi River follows the Hope Canal northward to the outlet north of I-10. Based on CRMS station data (LCPRA 2020) adjacent to the proposed construction area, the conveyance channel has a mean annual salinity of 0.15 ppt and a mean water level of 1.28 feet GEOID 12A (CRMS #5373). The benefitted areas by the outlet have a mean annual salinity of 0.14 and a mean water level of 1.22 feet GEOID 12A (CRMS #0063).

Louisiana Natural and Scenic River

Blind River is a LA-designated natural and scenic river. In 2016, the EPA listed Blind River as an impaired river due to organic enrichment/depletion of oxygen, mercury in fish tissue, and the presence of non-native aquatic plants (LDWF 2018). The EPA listed atmospheric deposition as a potential source of mercury contamination (EPA 2016).

Nutrient and Salinity

Concentration data for TN and total phosphorus (TP) accounts for runoff from fertilizers and is based on existing concentrations in the Maurepas swamp and in Lake Maurepas. Appendix B, Table 10 and Table 12 provide summaries of TN and TP data measured in the

Maurepas Swamp (Hope Canal, Mississippi Bayou, and Dutch Bayou) and in Lake Maurepas.

Appendix B, Table 11 has a summary of salinity data associated with Hope Canal (i.e. location of the proposed diversion), as well as Blind River, Mississippi Bayou, Reserve Relief Canal, and Pass Manchac based on existing datasets.

Algal Concentrations

Algae (singular “alga”) are simple, nonflowering, and typically aquatic plants of a large group that includes the seaweeds and many single-celled forms. Algae contain chlorophyll but lack true stems, roots, leaves, and vascular tissue and at high concentrations can result in harmful algal blooms (HABs) (Centers of Disease Control and Prevention 2021).

HABs have been attributed to three aquatic microscopic algae that grow like plants in direct sunlight: cyanobacteria (also known as “blue-green algae”) and dinoflagellates and diatoms that are associated with red tides. In fresh and brackish waters in the planning area, cyanobacteria, can grow rapidly in warm, nutrient-rich water, posing potential health threats to fish and wildlife resources as well as primary contact recreation. Appendix A, Figure 4 provides a conceptual model showing the formation of algal blooms as they occur in seawater.

In a swamp environment, the nutrient cycling component is influenced by surrounding wetland vegetation, as well as any landforms that reduce water flow and dissolved oxygen. Lake Maurepas and Lake Pontchartrain both have had periodic algal blooms in the past. Historical natural color satellite imagery documents the occurrence of algal blooms in Lakes Maurepas and Pontchartrain between 2000 and 2019 (See Appendix B, Table 13). Observed blooms were more common between May and August and within the northern region of each lake. Blooms were slightly more common in Lake Pontchartrain than Lake Maurepas, occurring in 23 months for the former and 18 for the latter.

To the northwest of the diversion influence area, the Amite River and tributaries is a major source of nitrogen and phosphorus runoff into Lake Maurepas. Previous impact analysis on the Amite River Diversion Canal (2010) indicated that algal blooms would continue in open waters and swamps with all past, present, and reasonably foreseeable future projects (see Appendix A, Figure 6; Appendix B Tables 16-18). These blooms occur when phosphorus sequestered in swamp sediments is released into surface waters.

Cyanobacteria concentrations within the planning area have been monitored regularly via satellites by the National Oceanic and Atmospheric Administration, National Centers for Coastal Ocean (2021) and data are available to the public.

3.2.12 Noise

Planning Area

The Noise Control Act of 1972 regulates and promotes an environment for all Americans free from noise that jeopardizes their health or welfare and the Occupational Safety and

Health Administration 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 (EPA 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. The A-weighted sound level, used extensively in this country for the measurement of community and transportation noise, represents the approximate frequency response characteristic of the average young human ear). 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 (EPA 1974).

Most parishes in the planning area have noise ordinances addressing loud machinery. Noise is typically associated with human activities and habitations, such as operation of commercial and recreational boats, water vessels, air boats, and other recreational vehicles; operation of machinery and motors; and human residential-related noise (air conditioner, lawn mower, etc.). The alternative areas are remote and uninhabited. The noise from distant urban areas surrounding the uninhabited portions of the alternative areas contributes little, if any, to the natural noise levels of the area. Construction equipment necessary for the initial construction phase for each alternative would possibly include dump trucks, bulldozers, tractors, graders, boats, airboats, and similar equipment. Appendix B, Table 14 presents the noise emission levels for construction equipment expected to be used during the proposed construction activities for each Alternative.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project is surrounded by agricultural land and industry where noise is produced by consistent and sporadically heavy traffic on adjacent and nearby roadways as well as industrial plant and agricultural operations. There are residential units located within 0.25

mile to the southeast and 1 mile to the west of the project area. The industrial facilities are within 1 mile of the project area.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

Pine Island has residential structures within 1,000 feet of the project. The area is adjacent to Lake Pontchartrain, which is regularly used by recreational boaters. Noise is produced by occasional boat traffic.

MSA-2 Alternative Area

There are noise ordinances in St. John the Baptist Parish. The maximum permissible sound levels for St. John the Baptist Parish during the hours of 7:00 a.m. to 10:00 p.m. are 70 dBA for residential areas and 75 dBA for business and commercial areas.

Background noise levels are variable depending on the time of day and climatic conditions. Near developed areas, automobile and train traffic, and to a lesser extent air traffic, contribute to the background noise levels.

A number of sensitive noise receptors are located adjacent to or near the proposed construction area such as parks, WMAs, and wildlife. These areas are sensitive noise receptors where serenity and quiet are an important public resource. The areas with the greatest number of sensitive noise receptors, which are places or areas where occupants are more susceptible to noise, such as residential homes and apartments, schools, churches, and parks, are in St. John the Baptist Parish.

3.2.13 Hazardous, Toxic, and Radioactive Waste

Planning Area

In accordance with ER 1165-2-100, identification and evaluation of all HTRW contamination within the vicinity of the proposed project is required. USACE policy is to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation of wastes (e.g., those regulated by the Resource Conservation and Recovery Act), pollutants and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act, would be treated as project costs if the requirement is the result of a validly promulgated federal, state, or local regulation.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project is located on agricultural land with several petroleum product pipelines and several plugged and abandoned oil/gas wells on site. An HTRW Phase I ESA was conducted for the St. James mitigation south and north sites. No Recognized Environmental Conditions (RECs) were identified at the south mitigation site and the probability of encountering HTRW is low. Several potential RECs were identified at the north mitigation site; therefore, further environmental evaluation is recommended at this location.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The project area consists of open water with no petroleum product pipelines. No oil/gas wells occur on site, no data base issues have been found within 1 mile of the proposed site, and no RECs have been identified. There is a low probability of encountering HTRW on this site.

MSA-2 Alternative Area

North of U.S. Hwy. 61 is mostly swamp land with several petroleum pipelines and plugged and abandoned oil/gas wells. No RECs were identified north of Hwy. 61. There is a low probability of encountering HTRW. In 50 years, these areas would likely remain as swamp and the probability of encountering HTRW in these areas would remain low.

South of U.S. Hwy. 61, a 2.5-million-barrel oil storage terminal is located west of the proposed construction area and residential areas are east of the proposed construction area. Several data base issues were noted within 1 mile of the proposed construction area, but no RECs were identified. There is a low probability of encountering HTRW. A full Phase I ESA has been conducted for the Mitigation area and the final Phase I ESA is provided in Appendix P. In 50 years, these areas would likely remain residential, commercial, and industrial, however, there would still be a low probability of encountering HTRW in these areas.

3.2.14 Socioeconomics/Land Use, Transportation, and Commercial Fisheries

Planning Area

Socioeconomics/Land Use

The planning area encompasses 11 parishes, the names of the individual parishes are given in the Table 3-9.

Table 3-9: Total Population (1990-2010) and Projections through 2040

Total Population, (Ths.) U.S. Census Bureau (BOC); Moody's Analytics (ECCA) Forecast						
	1990	**2000**	**2010**	**2020**	**2030**	**2040**
East Feliciana Parish	19.19	21.30	20.17	18.84	17.49	16.39
West Baton Rouge Parish	19.42	21.58	23.95	26.69	28.65	30.13
Iberville Parish	31.04	33.32	33.36	32.15	30.14	28.27
St. Tammany Parish	145.07	192.13	234.57	256.26	267.54	274.51
St. James Parish	20.84	21.20	22.01	22.10	23.07	23.67
Ascension Parish	58.41	77.33	107.85	128.73	144.11	156.46
East Baton Rouge Parish	381.20	412.96	440.73	445.44	435.40	422.16
Pointe Coupee Parish	22.48	22.76	22.76	21.63	20.53	19.35
St. Charles Parish	42.47	48.12	52.84	54.12	56.50	57.97
St. John the Baptist Parish	40.06	43.25	45.62	44.70	46.67	47.89
St. Mary Parish	57.99	53.38	54.54	52.63	51.57	50.84
Tangipahoa Parish	85.75	100.72	121.49	130.40	133.06	134.68

Population

Table 3-9 shows the population trend in the eleven-parish area from 1990 to 2010 and projections through 2040. Population is anticipated to grow statewide even though some parishes like St. Helena, East Feliciana, and Iberville Parish are expecting a decrease in their populations.

Unemployment Rate (%)

Table 3-10 shows the historic and projected trends in the unemployment rate in the diversion influence area. The unemployment rate serves as a proxy for the overall health of the local economy. The unemployment rate in the diversion influence area spiked between 2000 and 2010 likely in response to the 2008 economic recession. The unemployment rate in all the parishes is expected to increase slightly in the 2030 and then decline slightly in the year 2040.

Table 3-10: Unemployment Rate

Unemployment Rate (%) Bureau of Labor Statistics; Moody's Analytics (ECCA) Forecast						
	1990	**2000**	**2010**	**2020**	**2030**	**2040**
East Feliciana Parish	6.00	5.74	8.35	6.76	7.11	6.87
West Baton Rouge Parish	6.12	5.29	7.87	6.49	6.83	6.59
Iberville Parish	7.85	7.07	10.04	8.09	8.51	8.22
St. Tammany Parish	5.91	4.33	6.30	6.34	6.47	6.06
St. James Parish	7.87	8.59	11.66	9.45	9.64	9.02
Ascension Parish	6.45	5.29	7.45	5.90	6.20	5.99
East Baton Rouge Parish	4.84	4.62	7.60	6.15	6.47	6.25
Pointe Coupee Parish	9.41	6.31	8.67	7.68	8.08	7.80
St. Charles Parish	6.07	5.58	7.41	6.69	6.83	6.39
St. John the Baptist Parish	7.95	6.79	10.60	8.61	8.78	8.22
St. Mary Parish	6.28	7.39	9.41	9.05	8.90	8.49
Tangipahoa Parish	9.29	6.47	9.71	7.39	7.60	7.13

Community and Regional Growth Historic and Existing Conditions

Table 3-11 shows per capita income in the diversion influence area. Income per capita serves as a proxy for growth in the regional economy. Income per capita in the impact has increased steadily over time in response to regional economic growth as well as natural rates of inflation.

Table 3-11 Per Capita Income

Per Capita Income (Ths. $) U.S. Census Bureau								
	1970	1980	1990	2000	2010	2020	2030	2040
East Feliciana Parish	2.20	6.96	12.74	20.05	33.12	44.88	63.70	90.85
West Baton Rouge Parish	2.50	7.95	14.69	22.91	37.49	52.16	72.77	104.98
Iberville Parish	2.56	7.74	13.22	18.68	32.34	43.35	58.91	81.28
St. Tammany Parish	3.44	10.05	18.20	29.95	47.00	72.84	128.44	233.16
St. James Parish	2.76	8.38	13.92	18.72	38.42	50.76	73.42	111.56
Ascension Parish	2.84	8.64	14.98	24.05	39.42	52.59	70.17	98.01
East Baton Rouge Parish	3.71	10.41	18.01	27.23	39.65	52.79	68.92	91.60
Pointe Coupee Parish	2.35	6.97	12.63	21.70	34.89	48.96	67.35	95.36
St. Charles Parish	3.19	10.46	16.91	24.63	39.56	53.12	77.12	117.90
St. John the Baptist Parish	2.60	7.69	14.47	20.00	33.89	47.05	70.79	110.13
St. Mary Parish	2.92	8.74	12.72	21.60	35.40	43.99	59.89	82.42
Tangipahoa Parish	2.33	6.72	11.98	19.56	32.73	42.41	59.38	84.50

Commercial Fisheries

Economically important fisheries associated with the planning area include fisheries of oysters, crawfish, blue crab, blue catfish, shrimp, and channel catfish.

Navigation

The Mississippi River is the largest navigable waterway in the US. This river is supplemented by waters from the Gulf Intracoastal Waterway, which links the states of Texas, Louisiana, Mississippi, Alabama, and Florida. The lower portion of the river within the project area is one of the busiest shipping corridors in the U.S. and worldwide (EPA, 2011b). MSA-2 includes an intake structure located on the east bank of the Mississippi River in St. John the Baptist Parish, immediately west of Garyville, Louisiana, at RM 144 AHP. Project features at the river include an intake channel in the batture and an automated gate structure in the MRL. These features do not intersect with the river otherwise and would not affect the Mississippi River navigation channel.

The Port of South Louisiana (PSL), which runs along the Mississippi River for 54 miles (87 km) and is centered near LaPlace, Louisiana, is adjacent to MSA-2. According to the 2005 American Association of Port Authorities World Port Rankings, the PSL is the largest volume shipping port in the Western Hemisphere, as well as the ninth largest in the world. It is also the largest bulk cargo port in the world. Based on the PSL statistics for 2019, approximately 258,000,000 short tons were throughput at the port, carried in 3,945 vessels and 54,921 barges (PSL, 2020).

Local/domestic and international trade, as well as commercial navigation, are the most prominent uses of the Mississippi River and the ports in proximity of MSA-2. Industries within

the project area use barges and tanker vessels to receive goods and dispatch products on this waterway. Typical commodities include petroleum, petroleum products, chemicals, related chemical products, crude materials, and farm products (EPA, 2011b). The Mt. Airy terminal facility (formerly Pin Oak Terminal), adjacent to the project site, currently has capacity for one Suezmac 900-foot Tanker and six barge berths (Pin Oak Terminals, 2019). Over the next 50 years, commercial navigation would continue at current capacities.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project is located in St. James Parish. The population in St. James Parish increased by 5.6 percent from 1990 census to 2010 census. According to the 2019 American Community Survey (ACS), population in St. James Parish declined by 8.6 percent from 2010 to 2019. According to most recent population estimates, St. James parish is 21,096. Current estimates of income per capita in St. James Parish $26,739 according to the 2019 ACS. For comparison, according to 2019 ACS, the income per capita for the state of Louisiana is $27,923. The total proprietor profits increased from 17.9 million to 105.7 million from the year 2000 to 2010. Access to this area would be by LA Highway 3125. Annual average daily traffic count in 2018 was 5,252 on LA Highway 3125.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

This project is located in St. Tammany Parish. According to the 1990 and 2010 census, St. Tammany Parish had a 62 percent increase in their total population. For the future forecasted, even though the population grows, the growth is at much lower rate. The per person income in this parish was at around $46,995 in the 2010 census and this number is expected to rise to $72,842 by 2020. With higher population and an increasing population, the income per capita increase is also at a higher percentage. The total proprietor profits increased from 454.03 million to 1.1 billion by the year 2010 when looked at the 1990 and 2010 census. This rate of change is expected to be similar up to the year 2040. The farm use would continue to be very minimal in the earnings of the St. Tammany Parish. With a high population and steady growth, St. Tammany Parish has a bright future in economics standpoint. Access to this area would be via Guste Island Road, Grand Rue Port Louis Road and South Chenier Drive. Economically important fisheries associated with this project area include fisheries of blue crab, crawfish, blue catfish, and channel catfish.

MSA-2 Alternative Area

Population and Housing

Population Existing and Historic Conditions

Table 3-3 shows historic and future trends in population in the parishes within the proposed construction area. Trends in the diversion influence area show a steady increase in population over time. Estimates of current population in the diversion influence area is

44,700 in St. John the Baptist Parish, 128,730 in Ascension Parish, 144,550 in Livingston Parish, and 23,070 in St. James Parish according to 2020 census predictions.

Table 3-3: Parish Population Trends

Total Population, (Ths.) U.S. Census Bureau; Moody Analytics (ECCA) Forecast								
	1970	**1980**	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**
St. John the Baptist Parish	23.85	32.30	40.06	42.87	45.62	44.70	46.67	47.89
Ascension Parish	37.14	50.48	58.41	74.66	107.85	128.73	144.11	156.46
Livingston Parish	36.57	59.45	70.76	92.65	128.71	144.55	154.99	162.82
St James Parish	19.76	21.57	20.84	21.22	22.01	22.10	23.07	23.67

Table 3-13 shows the recent population trends in the communities within the diversion influence area. Population in Table 3-13 is based on the Census Bureau's American Community Survey five-year estimates. Laplace in the largest population center of all the communities in the diversion influence area. According to the ACS, the population in all three Census Designated Places (CDP) decreased over the past ten years. Population in Garyville declined from 2,687 in 2010 to 2155 in 2019. Population in Reserve declined from 9,471 in 2010 to 8,611 in 2019, and population in Laplace declined from 31,330 to 29,100.

Table 3-4: Community Population Trends

Total Population in CDPs, (Ths.) US Census Bureau American Community Survey (ACS) 5 yr. Estimates			
	2010	**2015**	**2019**
Garyville	2.69	2.31	2.16
Laplace	31.33	28.64	29.11
Reserve	9.47	9.61	8.61

Households Existing and Historic Conditions

Table 3-14 shows past trends in the number of households in the proposed construction area. Trends closely mirror the trends in the population. Over the past 40 years the number of households steadily increased. The number of the households in St. John the Baptist Parish in 2020 was estimated to be 16,450. The number of households in Ascension, Livingston, and St. James Parishes in 2020 was estimated to be 47,490, 54,330 and 9,550 respectively. Moody Analytic estimates that these trends are likely to continue.

Table 3-5: Housing Trends

Number of Households, (Ths.) U.S. Census Bureau, Moody Analytics								
	1970	**1980**	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**
St. John the Baptist Parish	5.77	9.42	12.73	14.38	15.88	16.45	18.05	19.24
Ascension Parish	10.04	15.62	19.40	27.00	38.05	47.49	55.85	62.96
Livingston Parish	10.37	18.67	23.89	33.00	46.30	54.33	61.14	66.65
St James Parish	4.63	6.07	6.42	7.00	7.69	8.16	8.96	9.55

Economic Indicators

In the coming figures, key economic indicators would be analyzed to forecast the economic condition of these parishes from past to the present. The data given would be recorded data from 1990 to 2010 and then forecasted to 2040.

Labor and Employment

Labor Force Existing and Historic Conditions

Table 3-15 shows the historic and projected trends in labor force and employment in the diversion influence area. The labor force includes all citizens over the age of the 16 that are willing and able to work. In large part, labor force and employment numbers mirror population and household trends. However, they are also influenced by the health of the local and national economy. For example, during periods of recession, some citizens drop out of the labor force in response to poor economic conditions. Labor force and employment numbers in the diversion influence area generally increased over time, with a few exceptions. From 2010 to 2020 the labor force in St. John the Baptist Parish declined likely due to an aging population and poor economic conditions; in the subsequent years, the labor force and employment numbers are expected to return to normal.

Table 3-6: Labor Force and Employment Trends

Labor Force and Employment Bureau of Labor Statistics; Moody's Analytics (ECCA) Forecast						
	1990	2000	2010	2020	2030	2040
Labor Force						
St. John the Baptist Parish	17.97	20.06	21.53	20.78	21.90	23.25
Ascension Parish	27.20	38.47	53.39	65.97	73.80	82.88
Livingston Parish	33.46	44.86	61.28	71.95	77.10	83.78
St James Parish	8.88	8.86	10.13	9.97	10.50	11.15
Employment						
St. John the Baptist Parish	16.54	18.70	19.25	18.99	19.98	21.34
Livingston Parish	31.11	42.33	56.67	67.58	72.18	78.62
Ascension Parish	25.44	36.43	49.41	62.08	69.22	77.92
St James Parish	8.18	8.10	8.95	9.03	9.49	10.15

Unemployment Rate

Table 3-16 shows the historic and projected trends in the unemployment rate in the diversion influence area, as well as the state of Louisiana. The unemployment rate serves as a proxy for the overall health of the local economy. Historically, unemployment rates in the diversion influence area are slightly higher than the unemployment rate of the overall state of Louisiana. St. James Parish consistently has the highest rate of unemployment of all four of the parishes. The unemployment rate in the diversion influence area spiked between 2000 and 2010 likely in response to the 2008 economic recession. The unemployment rate in all the parishes is expected to increase slightly in the 2030 and then decline slightly in the year 2040. Trends in unemployment are expected to continue over the next 50 years.

Table 3-7: Unemployment Trends

Unemployment Rate (%) Bureau of Labor Statistics; Moody's Analytics (ECCA) Forecast						
	1990	2000	2010	2020	2030	2040
St. John the Baptist Parish	7.95	6.79	10.60	8.61	8.78	8.22
Ascension Parish	6.45	5.29	7.45	5.90	6.20	5.99
Livingston Parish	7.02	5.65	7.52	6.07	6.38	6.16
St James Parish	7.87	8.59	11.66	9.45	9.64	9.02
Louisiana	6.18	5.28	7.94	7.90	7.05	6.69

Transportation Existing Conditions

Major transportation routes in the diversion influence area include I-10, Highway 44 and Airline Highway. Table 3-17 shows the annual average daily traffic in the major roads near the proposed construction area. The highways and interstates have a combined average annual daily traffic of nearly 40,000 vehicles.

Table 3-8: Average Annual Daily Traffic

Annual Average Daily Traffic (Ths.) Louisiana Department of Transportation (2017)	
Highway 61	13.43
Interstate 10	20.78
Highway 44	5.50

Community and Regional Growth Historic and Existing Conditions

Table 3-18 shows per capita income in the diversion influence area. The income per capita of the state of Louisiana is included for comparison. Income per capita serves as a proxy for growth in the regional economy. Income per capita in the impact has increased steadily over time in response to regional economic growth as well as natural rates of inflation. Income per capita in the diversion influence area is relatively similar to that of the overall state of Louisiana. Predictions from Moody Analytics show that income per capita is expected to rise over the next 20 years.

Table 3-9: Per Capita Income

Per Capita Income ($) Bureau of Labor Statistics; Moody's Analytics (ECCA) Forecast								
	1970	1980	1990	2000	2010	2020	2030	2040
St John the Baptist	2,597	7,692	14,470	20,002	33,894	47,054	70,793	110,131
Ascension Parish	2,837	8,639	14,977	24,052	39,416	52,587	70,172	98,014
Livingston Parish	2,748	7,765	13,170	21,521	32,621	44,366	60,836	87,144
St James Parish	2,761	8,378	13,920	18,722	38,421	50,758	73,418	111,557
Louisiana	3,195	8,849	15,369	23,943	37,649	50,037	-	-

3.2.15 Environmental Justice

Planning Area

EO 12898, Federal Actions to Address Environmental Justice for Minority and Low-Income Populations, directs all federal agencies to determine whether a proposed action would have a disproportionately high and adverse impact on minority and low-income populations (EPA

2011b). Disproportionate effects refer to circumstances where there exists significantly higher and more adverse health and environmental effects on minority populations and low-income populations (EPA 2019). The objective of the EJ policy is to ensure that minority and low-income populations are fully and equitably considered during the project development process.

Additionally, EO14008, Sections 219-222, stress the importance of achieving EJ. From EO 14008, “Agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts. It is therefore the policy of my Administration to secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care.”

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs and Pine Island – up to 1,965 Acres, up to 775 AAHUs

St. James Parish is a home to a majority of residents who identify as a minority. St. John the Baptist, the location of Pine Island, also is comprised of over 50 percent population identifying as a minority and is identified as an area of EJ concern.

MSA-2 Alternative Area

Minority Status

According to the U.S. Census Bureau, minority populations are those persons who identify as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander (EPA 2019). A minority population is present where the percentage of minorities within the affected area exceeds 50 percent or is meaningfully greater than the minority population for the State of Louisiana. The meaningfully greater threshold used in the analysis is 20 percent greater than the minority population for the State of Louisiana which is approximately 50 percent. Therefore, the threshold for determining an area of EJ concern is if 50 percent or more of the area population identifies as a minority. Areas meeting or exceeding 50 percent minority are considered areas of EJ concern. Tables 3-19 and 3-20 show the minority populations of areas within the larger planning area, including St. John the Baptist and the town of Garyville. Approximately 57 percent of St. John the Baptist population identifies as a minority, according to U.S. Census Bureau data for 2020, well above the State of Louisiana minority rate of approximately 43 percent. Approximately 47 percent of residents in the town of Garyville, LA, located along the Mississippi River in the area of the proposed action, identify as a minority, below the threshold of 50 percent used to identify areas of EJ concern.

Table 3-10: Minority Populations in St. John the Baptist Parish

Race	Minority Population
Black	24,305
White	13,877
Asian	317
Two or More Races	2,294
Other	1,505
Native American (Alaskan Native)	167
Pacific Islander	12
TOTAL POPULATION	42,477
PERCENTAGE Minority	**57.2%**
Percent Hispanic	7.7%
State of Louisiana Percentage Minority	**42.9%**

Note: Ethnicity can be of any race.

Source: U.S. Census Bureau, American Community Survey 2016-2020

Minority populations, according to the U.S. Census Bureau data for 2020, for each race in Garyville are shown in Table 3-11.

Table 3-11: Minority Populations in Garyville CDP*

Race	Minority Population
Black	993
White	1,025
Asian	0
Two or More Races	95
Other	7
Native American (Alaskan Native)	3
Pacific Islander	0
TOTAL POPULATION	2,123
PERCENTAGE MINORITY	**46.8%**
Hispanic Percentage	2.2%

Note: Ethnicity can be of any race.

*A Census Designated Place located in St. John the Baptist

Source: U.S. Census Bureau, American Community Survey 2016-2020

Low-Income Status

Low-income populations are those that fall below the poverty threshold determined by the U.S. Census Bureau and for a family of four for the year 2020 is $26,200 annually. Poverty populations, according to the U.S. Census Bureau data for 2020 in St. John the Baptist Parish and other Louisiana parishes, are shown in Table 3-12. According to EPA's EJ

Promising Practices document, a population living below poverty is meaningful and an EJ focus is necessary when the percentage of people living below poverty within the affected area exceeds the reference area, in this case the State of Louisiana's poverty rate, which in 2020 was 18.6 percent.

Poverty rates in Garyville and St. John the Baptist Parish, as compared to the region, metropolitan area, and U.S. are shown in Table 3-12. The percent of residents living below poverty in St. John the Baptist is comparable to the rate in the State of Louisiana, 15.4 percent and 18.6 percent, respectively, while the percent living below poverty in Garyville is higher at 23.6 percent. The threshold used to identify areas of EJ concern using the poverty criteria is 18.6 percent, which is the State of Louisiana poverty rate. If any area has 18.6 percent or more of its population living below poverty, that area is considered an area of EJ concern. Therefore, the town of Garyville, La is considered an area of EJ concern based upon the percent of population living below poverty is greater than that for the reference area of Louisiana.

Table 3-12: Poverty Populations in St. John the Baptist Parish Compared to the Region, Metropolitan Area, and U.S.

Location	Percent Living in Poverty
Garyville	**23.6%**
Ascension Parish	10.0%
St. John the Baptist Parish	**15.4%**
Orleans Parish	23.0%
Plaquemines Parish	17.8%
Jefferson Parish	15.2%
St. Bernard Parish	23.2%
St. Charles Parish	11.2%
St. James Parish	14.4%
State of Louisiana	**18.6%**
United States	12.8%

Source: U.S. Census Bureau, American Community Survey 2016-2020

Areas of EJ concern can also be shown at the Census Block Group level. A Census Block Group is a geographical unit used by the United States Census Bureau, which is, in size, between the Census Tract and the Census Block. It is the smallest geographical unit for which the bureau publishes sample data, i.e., data which is only collected from a fraction of all households. This data is available for the years between the decennial census (taken every 10 years). Typically, Block Groups have a population of 600 to 3,000 people. A more detailed analysis is possible by showing areas of EJ concern at the block group level.

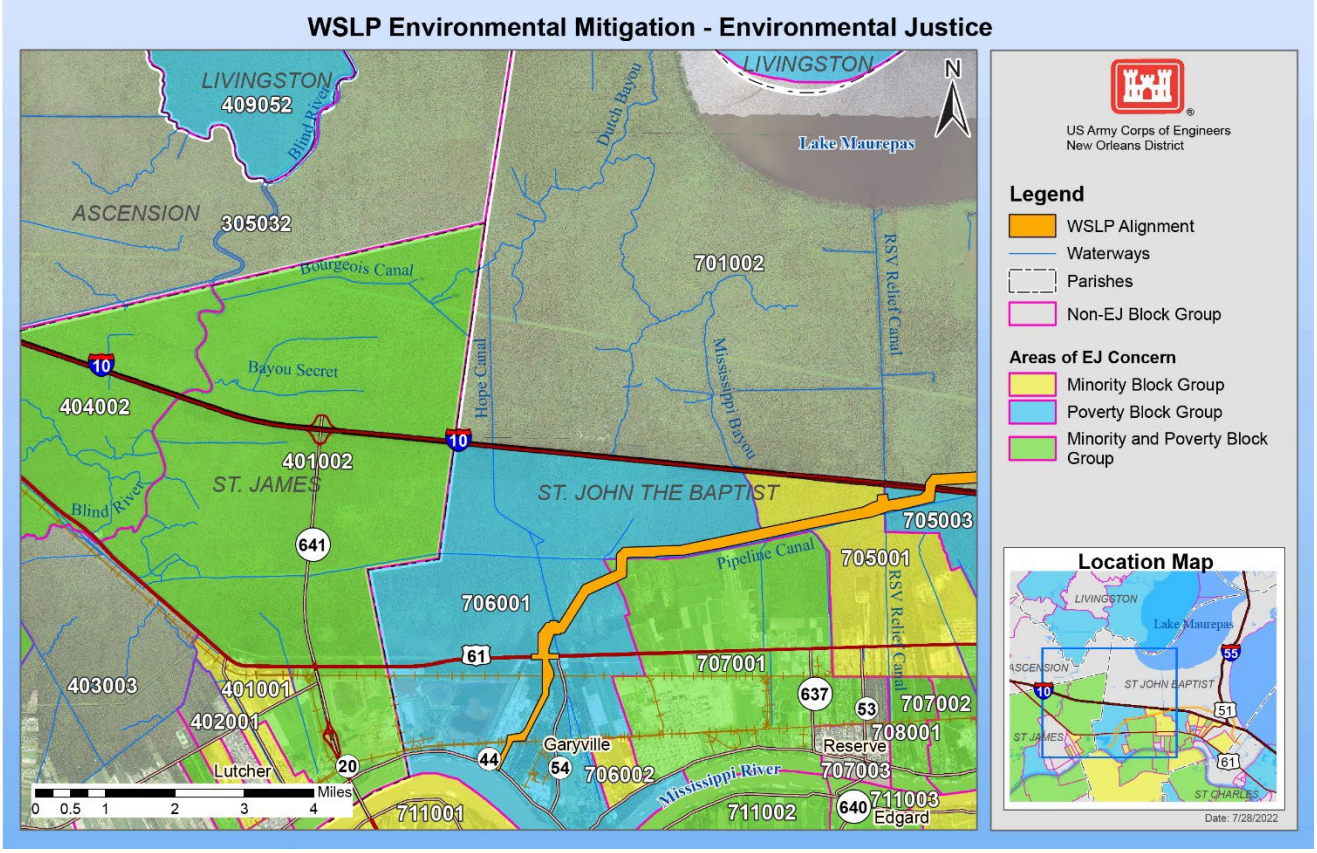

Figure 3-3: MSA-2 Areas of EJ Concern

The planning area, part of which is shown as the location map in the bottom right part of the Figure 3-3, is comprised of many Census Block groups that either meet or exceed the minority threshold of 50 percent or the poverty threshold of 18.6 percent, which makes them an area of EJ concern and a focus of the EJ analysis. Some block groups that are areas of EJ concern meet or exceed the thresholds for both minority and poverty populations and these are shown in the green color.

3.2.16 Prime and Unique Farmlands

Planning Area

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, 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. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. Appendix B, Table 15 provides the amount of farmlands in the planning area for 2007, 2012, and 2017.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

This project area contains prime farmlands; the soil types are as follows: Cancienne silt loam, 0 to 1 percent slopes (149.1 acres); Cancienne silty clay loam, 0 to 1 percent slopes (157.1 acres); Carville silt loam, 0 to 1 percent slopes (77.7 acres); Gramercy silty clay, 0 to 1 percent slopes (626 acres); Schriever clay, 0 to 1 percent slopes, rarely flooded (121.6 acres); and Vacherie very fine sandy loam, 0 to 1 percent slopes (221.6 acres) [personal communication with USDA-NRCS State Soil Scientist, Mike LIndsey (See Appendix J) on October 18, 2021].

Pine Island – up to 1,965 Acres, up to 775 AAHUs

This project occurs in open water and existing wetlands and therefore contains no prime or unique farmlands.

MSA-2 Alternative Area

The prime farmland soil types found within the proposed construction area for MSA-2 are Cancienne silt loam, 0 to 1 percent slopes (14.7 acres); Gramercy silty clay, 0 to 1 percent slopes (53.4 acres); and Schriever clay, 0 to 1 percent slopes, rarely flooded (24.8 acres) [personal communication with USDA-NRCS State Soil Scientist, Mike Lindsey (See Appendix J) on October 18, 2021].

3.2.17 Hydrology

Planning Area

Changes in the Mississippi River have been responsible for changes in the flow and water levels over several geological periods. Seasonal flooding of the Mississippi River historically contributed to the flow and water level characteristics throughout the planning area. Seasonal to episodic large flood events would bring freshwater, sediment and nutrients to the estuarine areas. However, construction of river levees, beginning at least as early as the 1700s by local landowners, interrupted this natural process and has permanently altered hydrology in the vicinity. Main stem Mississippi River water enters estuarine and marine waterways primarily at the river's passes. There are many passes, or distributary channels, near its terminus at the Gulf of Mexico, the largest of which is Southwest Pass. Not all Mississippi River water enters the Gulf of Mexico through its main stem. Approximately 30 percent of the river's flow is diverted into another major distributary network called the Atchafalaya River, whose waters enters the Gulf of Mexico estuaries approximately 120 miles northwest of Southwest Pass.

Outside of the immediate vicinity of the passes and distributary network described above, the planning area's water budget is primarily affected by precipitation, evaporation, winds, atmospheric pressure gradients, stream flow from local waterways, direct groundwater flows, and tidal flows.

Hydrologic conditions within estuarine habitats in the planning area are likely to shift in the future due to RSLR and land loss. For instance, this would cause waterways such as bays, bayous, and canals to become larger, which in turn would affect how much water they can carry, and the tidal flow.

BBA Alternative Project Areas

St. James – up to 1,246 Acres, up to 511 AAHUs

The project consists of farmland whose hydrology is likely to be affected by natural and anthropogenic factors. The primary natural factors are likely precipitation and evaporation. There could be anthropogenic factors, such as irrigation systems and pumping systems, that artificially alter the water available for crops and water levels within the project.

Pine Island – up to 1,965 Acres, up to 775 AAHUs

The project consists primarily of shallow open water ponds on the northern shore of Lake Pontchartrain, a large (approximately 630 square miles) oligohaline waterway with a small tidal range that can be less than 1 foot per day. Historic agricultural use of the project area and vicinity, which included diking and pumping, significantly altered the hydrology within the project area. This may have contributed to the conversion of habitats from a sheet flow dominated wetland complex to the series of mostly hydraulically disconnected shallow ponds that exist today. Currently, water level fluctuations are primarily driven by local precipitation, evaporation, winds, episodic storms, and tides.

MSA-2 Alternative Area

The mitigation area includes forested and marsh wetlands that historically received periodic input from the Mississippi River through overbank flow. Seasonal flooding of the Mississippi River historically contributed to the flow and water levels. Large flood events would bring freshwater, sediment and nutrients to the wetland areas. These waters would flow through trenasses and sheet flow throughout the back swamps during Mississippi River high water events. Management of the Mississippi River, especially construction and maintenance of levees, have drastically changed the hydrology in the area by interrupting this process.

In addition to the disconnection from the Mississippi River, the swamp's hydrologic issues have been exacerbated by the construction of highways, pipelines, railroads, the Amite River Diversion Canal, navigation canals, and oil and gas exploration canals, along with the spoil banks associated with canal excavation.

Currently, the area's water budget is affected by precipitation, evaporation, groundwater, stream flow from small bayous (e.g., Mississippi Bayou), canals (e.g., Reserve Relief Canal) and streams (e.g., Blind River), and tidal and land derived waters from Lake Maurepas. Water levels in bayous throughout the swamp are governed by the lake water level (Kemp et al., 2001) and drainage of the Amite River watershed, occasionally at significant flood levels after heavy rainfall upstream.

Much of the swamp habitats in the area are lower in elevation than the surface of Lake Maurepas, rendering flooding semi-permanent (Lee Wilson and Associates, Inc., 2001). The flow and exchange of water through the swamp is very low due to the low elevation of the swamp and to partial impoundment resulting from flood control levees, canal spoil banks, and abandoned railroad track embankments. This condition of semi-permanent flooding means that the swamp is inundated with stagnant and therefore oxygen-poor, nutrient-poor water (Lee Wilson and Associates, Inc., 2001). Shaffer and others (2001) concluded that stagnant water conditions and lack of nutrients have substantially limited the productivity and health of the Maurepas Swamp.

Lake Maurepas is a shallow, oligohaline basin receiving daily mean freshwater discharge, primarily from the Amite and Tickfaw Rivers; and to a lesser extent, the Blind River (American Institute of Hydrology, 2006). Drainage and tidal exchange occur through Lake Pontchartrain into Lake Borgne and from Lake Borgne to the Mississippi Sound to the Gulf of Mexico. Lake Pontchartrain is a shallow, oligohaline basin that receives freshwater discharge from the Tangipahoa, Pearl, and Tchefuncte Rivers, as well as Bayous Lacombe and Liberty, and many smaller creeks. Lake Borgne is a shallow brackish salinity basin that receives freshwater primarily through Pearl River and small creeks along the Mississippi coast. Mississippi Sound is a brackish to saltwater salinity basin that receives freshwater from small creeks along the Mississippi coast and opens in the northern Gulf of Mexico to the east and south.

Flood control measures and flow management have resulted in relatively consistent flows and water levels in the lower Mississippi River from 1978 to present in MSA-2 area and vicinity. The flow and water level of the lower Mississippi River are directly related and exhibit a seasonal pattern that could be related to snowmelt runoff and spring rains. High flows and water levels are typically characteristic of spring months (March 1 – May 31), while low flows and low water levels are typical from mid-summer to mid-fall (August 16 – November 15).

The topography of the natural levee of the Mississippi River in the project area ranges in elevation from over 10 feet (3 m) along the highest portions of the old natural levee of the Mississippi River to as low as 3 feet (1 m) at the northern margins of the agricultural land (north of US 61; URS et al., 2005). The area drainage system consists of a network of man-made ditches and canals. Drainage is by gravity via the channel network through culverts across US 61 and into a set of larger canals that flow northward into the swamp. Typical inverts of the drainage channels range from +5 to -1 foot (+1.5 to –0.3 m) NAVD 88 from south to north. During high swamp water levels, drainage is substantially reduced due to the very low gradient. The culvert draining into the Reserve Relief Canal is equipped with a gate that can be closed and a pump station is used to facilitate drainage during high swamp water levels. St. John the Baptist Parish maintains a second pump station near the St. John Airport in Reserve (URS et al., 2005).

There are many large and small industrial and municipal wastewater discharges along the Mississippi River natural levee. Most of these discharge to the Mississippi River, while others discharge to drainage ditches and canals flowing away from the river. Even though

the number of discharges in the vicinity of the proposed project is small compared to the total number of discharges along the entire length of the Mississippi River natural levee, this area is highly industrialized and there are approximately 92 permitted discharges. The vast majority (81) of these are “minor” discharges, and most of these are small industrial/business facilities. The remaining 11 are major discharges.

Section 4
Environmental Consequences

4.1 INTRODUCTION

This chapter describes the direct, indirect, and cumulative environmental consequences of the No Action and the MSA-2 alternatives. The order of discussion on resources mirrors that in Chapter 3.

The No Action Alternative includes the use of mitigation banks and the construction of the St. James and Pine Island projects (Figure 2-1) within the planning area. For mitigation banks, CEMVN would purchase sufficient in-kind credits from a mitigation bank within the LPB to satisfy the CZ swamp mitigation requirement. The particular bank(s) to be used is unknown at this time. Because permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect, or cumulative impacts to any of the resources would be incurred from the purchase of these credits. Therefore, the analysis of No Action Alternative impacts takes place only at St. James and Pine Island.

Future Conditions in Maurepas Swamp

If the BBA Alternative is selected, then the Maurepas Swamp diversion would not be constructed, and the area would not receive the benefits of a freshwater diversion to sustain a healthy swamp habitat.

The analysis of potential MSA-2 impacts takes place at multiple spatial scales as described below:

1. Planning Area PB cut by the CZ (Figure 2-1).
2. Diversion Influence Area - Diverted Mississippi River water is modeled representing the extent of nutrients, velocities, and water levels (Figure 2-6).
3. Mitigation Area - Primary, secondary, and tertiary benefit areas (Figure 2-5).
4. Proposed Construction Area – delineates the extent of construction activity (Figure 2-2).

For all alternatives, the potential effects were evaluated, as appropriate. The interagency assessment of project impacts determined that the habitat resources in the project area are significant. This determination is based upon the factors of significance and the magnitude of unavoidable project impacts. Appendix B, Table 1 presents additional information characterizing the significance of the resources from a national, regional, and state perspective. Based upon the types of habitat in the benefit area, the interagency team determined that Table 4-1 displays the model output results for each of the impacted habitat types. Additional details on the use of the model and the results of the analysis are presented in Section 2.3, 2.5 and Appendix E, and additional information regarding the MSA-2 impacts to marsh and BLH can be found in Section 5. A summary assessment of the potential impacts for MSA-2 are listed in Table 4-2.

Table 4-1: Unavoidable Fish and Wildlife Habitat Impacts from WSLP and MSA-2

Habitat Type Impacted	WSLP	MSA-2
Cypress Swamp	~947 AAHUs	~206.5 AAHUs
Freshwater Marsh	~293 AAHUs	~35.8 AAHUs
Bottom Land Hardwood	0	~19.5 AAHUs

Table 4-2: Summary of Potential Impacts for MSA-2

	Significant Adverse Impacts	Insignificant Adverse Impacts	Beneficial Impacts	Resource Unaffected by Action
Wetlands	☐	☐	☒	☐
Wildlife	☐	☒	☐	☐
Threatened/Endangered and protected species	☒	☐	☐	☐
Fisheries and Aquatic Resources	☐	☐	☒	☐
Essential Fish Habitat	☐	☐	☐	☒
Cultural Resources	☐	☒	☐	☐
Recreational Resources	☐	☒	☐	☐
Aesthetic (Visual) Resources	☐	☐	☒	☐
Natural and Scenic Rivers	☐	☐	☐	☒
Air Quality	☐	☒	☐	☐
Water Quality	☐	☐	☒	☐
Noise	☐	☒	☐	☐
HTRW	☐	☒	☐	☐
Socioeconomics/Land Use, Transportation, and Commercial Fisheries	☐	☐	☒	☐
Socioeconomics/Navigation	☐	☐	☐	☒
Environmental justice	☐	☒	☐	☐
Prime and Unique Farmlands	☐	☒	☐	☐
Hydrology	☐	☐	☒	☐

4.1.1 Wetlands

No Action Alternative (BBA Alternative)

Direct Impacts

The St. James Project would result in construction of approximately 1,246 acres of wetlands, offsetting up to approximately 511 AAHUS of impacts to CZ swamp incurred by construction of WSLP. The Pine Island Project would result in construction of approximately 1,965 acres of wetlands, offsetting up to approximately 775 AAHUS of CZ swamp impacts incurred by construction of WSLP. For information about the calculation of benefits for the BBA Alternative projects, see EA #576, Appendix F, WVA Model Assumptions. Swamp habitat lost by impacts incurred by the WSLP project would be replaced by construction of all or part of the St. James and Pine Island projects (depending on how many mitigation bank credits could be purchased), resulting in no loss or gain of wetland resources.

There would be no direct impacts to wetlands from the Pine Island Project, as the project would be constructed in an open water area with no wetlands present. There would be no direct impacts to wetlands through implementation of St. James, as the project would be constructed in existing agricultural lands, with no wetlands currently present.

Indirect Impacts

There would be no indirect impacts to wetlands as a result of the BBA Alternative, as implementation of the St. James and Pine Island projects would prevent an overall loss of CZ swamp habitat from the planning area by replacing swamp habitat lost due to construction of WSLP.

Cumulative Impacts

Coastal wetlands in the planning area have experienced a decline over the past century. The St. James and Pine Island Projects, with other past, present, and reasonably foreseeable future ecosystem restoration and mitigation projects in the planning area (Appendix A, Figure 6; Appendix B, Tables 16-18) would retard the loss of swamp habitat. There would be no cumulative impacts resulting from the St. James and/or Pine Island Projects, as they would replace swamp lost through the construction of WSLP; however, would not reverse the current overall trend of wetland loss that is occurring or prevent it from accelerating in the future.

<u>Future Conditions in Maurepas Swamp</u>

If the No Action Alternative is selected and MSA-2 is not constructed, it is likely that in the next 50 years, much of swamp within the diversion influence area would continue to decline so that the area supports fewer areas of forest and increased areas of marsh and open water (Shaffer, et al. 2016).

Maurepas Swamp Alternative - 2 (MSA-2: Public Lands Only; Preferred Alternative)

Direct Impacts

Swamp and Bottomland Hardwoods

Construction of MSA-2 would result in approximately 95 acres of direct, negative impacts to CZ swamp habitat (approximately 52 AAHUs), and approximately 79 acres of direct, negative impacts to CZ BLH habitat (approximately 29 AAHUs). These impacts would result from construction within the project right-of-way and includes in-situ borrow areas, railroad shoofly, staging areas, temporary and permanent access roads, weirs, embankment clearing, excavation and spoil areas, culverts, docks, intake structures, levee ties, and coffer dam associated with the construction footprint. At this stage of design, for direct impacts, all potential temporary impacts were assumed to be permanent (Paille and Breaux, 2021). For a detailed explanation of the calculation of direct impacts, see Maurepas Swamp Project Draft Wetland Value Assessment Project Information Sheet, Direct Impacts Wetland Value Assessment Project Information Sheet, page 33. See Table 4-3 for impacts to wetlands by construction feature and habitat type. See Table 4-4 for total direct impacts to BLH and swamp Incurred by construction of MSA-2. Swamp impacts resulting from MSA-2 would be mitigated through construction and operation of MSA-2 as discussed throughout this document. The BLH impacts resulting from MSA-2 would be mitigated per the approved mitigation plan discussed in EA #576 as summarized in Section 5 of this document.

Table 4-3: Total direct Impacts to Wetlands Incurred by MSA-2 by Construction Feature and Habitat Type

Diversion Influence Area	Habitat Type	Impacts (Acres)	Impacts (AAHUS)
Conveyance Channel and Associated Features	Swamp	86.2	47.7
	BLH	79.4	29.1
Weir and Embankment	Swamp	8.7	4.7
Total		173.4	81.5

Table 4-4: Total Direct Impacts Incurred by Construction of MSA-2 for Swamp and BLH

Habitat Type	Impacts (Acres)	Impacts (AAHUs)
BLH	79	29.1
Swamp	95	52.4

As a result of MSA-2 construction, there would be significant adverse impacts to CZ BLH and CZ swamp. Because all impacts would be appropriately mitigated, there would be less than significant direct impacts resulting from implementation of MSA-2.

Fresh Emergent Wetland

There would be no overall direct impacts to fresh emergent wetland resulting from construction of MSA-2.

Indirect Impacts

Swamp and Bottomland Hardwoods

There are two general areas that would experience indirect impacts to forested habitat from operation of the diversion. The first area is north of I-10 and north of the conveyance channel. The second area is between I-10 and Hwy, 61.

North of I-10 and north of the conveyance channel

Operation of MSA-2 would have indirect positive impacts to swamp as a result of the introduction of flowing, nutrient-rich, oxygenated water and fine sediment into the existing swamp north of I-10. Nutrient-rich and oxygenated water are expected to increase growth rates of Cypress and Tupelo trees and support the health of other wetland vegetation (Effler et al., 2006, and Shaffer et al., 2016, Paille and Breaux, 2021). Relative to existing conditions, no new acres of habitat would be created; however up to approximately 5,316 acres of CZ swamp would be prevented from converting to another habitat type (e.g., marsh or open water) by approximately year 45 of project life (Paille and Breaux, 2021). The operation of MSA-2 would also sustain the health of the swamp by reducing saltwater stress that is likely to occur within the project life due to RSLR. In addition, if any tropical weather events or drought occur, project implementation would improve conditions by flushing out high salinity water. Such flushing would be dependent on the time of year these events occurred and whether Mississippi River stages were sufficient to operate the diversion. There would be approximately 8,814 acres receiving positive indirect impacts to CZ swamp habitat (approximately 1,239 AAHUs) within the MSA-2 benefit areas from diversion flows. See Table 4-5 indicating acres and AAHUs of indirect positive impacts to CZ swamp that would result from MSA-2.

Table 4-5: Acres and AAHUs of Indirect Positive Impacts to CZ Swamp Resulting from Implementation of MSA-2

Maurepas Diversion Benefit Area	MSA-2	
	Acres	AAHUS
Primary Benefit Area	3,651	634.7
Secondary Benefit Area	2,839	408.2
Tertiary Benefit Area	2,324	196.6
Total	8,814	1,239.4

The acres of swamp receiving positive indirect impacts north of I-10 would likely extend beyond the primary, secondary, and tertiary benefit areas into the diversion influence area. Generally, positive indirect impacts north of I-10 are expected to decrease with distance from the outflow. For an explanation of the changes to hydrology that would result from MSA-2, see Section 4.2.17. Because the Mississippi River water would reach swamp within the diversion influence area outside of the primary, secondary, and tertiary benefit areas, a portion of that swamp would likely receive benefit from nutrient input and flowing water. As a result, positive indirect impacts would likely occur within the larger diversion influence area, although the extent and specific location of these impacts are uncertain.

Between I-10 and Hwy. 61

Approximately 154 AAHUs of negative indirect impacts to 7,539 acres of CZ swamp between I-10 and Hwy. 61 would result from altered hydrology associated with MSA-2 construction and operation. The constructed features associated with MSA-2 and WSLP would change hydrology for existing swamp south of I-10, east and west of the conveyance channel (See 4.2.17 for details). These changes would result in increased inundation, reduced flow and reduced drainage. Operation of LDVs along the conveyance channel would reduce and minimize these negative impacts, as would the introduction of river water and associated nutrients. Overall, however, the indirect impacts to swamps in this area would be negative, as canopy cover would decrease and conversion to marsh or open water would slightly increase due to increased water surface elevations, reduced sheet flow and drainage potential, and reduced exchange (of aquatic organisms, water flow) between Hope Canal and the adjacent swamps. Swamp impacts resulting from MSA-2 would be mitigated through construction and operation of MSA-2 as discussed throughout this document.

Approximately 7 AAHUs of negative impacts to approximately 1,830 acres of CZ BLH would occur due to construction and operations of MSA-2. The nature of these impacts would be like those described in the preceding paragraph for swamp. BLH impacts resulting from MSA-2 would be mitigated per the plan discussed in EA #576 as summarized in Section 5 of this document.

Fresh Emergent Wetland

Overall, the area of fresh marsh in the primary, secondary, and tertiary benefit areas is predicted to increase (net gain of approximately 61 acres) as a result of operation of MSA-2; however, WVA model results indicate that there would be overall negative AAHUs for the intermediate RSLR scenario (Paille and Breaux, 2021). This is because the Fresh/Intermediate Marsh WVA gives greater benefit to marsh landscapes with a lower marsh:open water area ratio than the predicted FWP condition. Due to the conflicting nature of this model result, the HET (USFWS, CPRA, USACE, and NMFS) assumed there would be no overall indirect impacts to fresh emergent wetland resulting from MSA-2 operation north of I-10 (see USFWS, Maurepas Diversion – Receiving Area Marshes Wetland Value Assessment Project Information Sheet, August 6, 2021).

Approximately 19.5 AAHUs of negative indirect impacts to 2,743 acres of CZ marsh between I-10 and Hwy. 61 would result from construction and operation of MSA-2. These impacts

would be associated with increased water surface elevations, reduced sheet flow and drainage potential, and reduced exchange (of aquatic organisms, water flow) between Hope Canal and the surrounding marshes. Marsh impacts resulting from construction and operation of MSA-2 would be mitigated through construction of one or a combination of mitigation bank credit purchase and the Guste Island marsh creation project as discussed in Section 5 of this document.

As a result of MSA-2 operation, there would be significant adverse impacts to CZ BLH, CZ swamp, and CZ marsh. Because all impacts would be appropriately mitigated, there would be less than significant adverse indirect impacts resulting from MSA-2. Overall, there would be beneficial impacts to swamp through the enhancement of 8,814 acres of CZ swamp resulting from implementation of MSA-2.

Cumulative Impacts

MSA-2, when combined with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the planning area (Appendix A, Figure 6, Appendix B, Tables 16 and 17) would help retard the loss of wetlands. Implementation of MSA-2, combined with other swamp enhancement and restoration projects in its vicinity, such as Hydrologic Restoration of the Amite River Diversion Canal, CPRA PO-142, and Pontchartrain Conservancy's Maurepas Landbridge Swamp Restoration Project (Hillmann et al., 2020), would slow the decline of swamp habitat but not appreciably change the overall trend of forested wetland loss. Overall, there would be no significant cumulative impacts as a result of MSA-2 implementation.

Future Conditions in Pine Island and St. James

The St. James project area contains no wetland resources. In 50 years, this project area would likely continue to support no wetland resources. In 50 years, the Pine Island project area is likely to support decreased wetland resources as a result of erosion, SLR, and subsidence.

4.1.2 Wildlife

No Action Alternative (BBA Alternative)

Direct Impacts

Approximately 1,246 acres of agricultural land and 1,062 acres of shallow open water would be converted to forested wetland habitat. The coastal wetlands in the LPB and MSRB 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 and intermediate wetlands are typically used by many different wildlife species, including seabirds, wading birds, shorebirds, dabbling and diving ducks, raptors, rails, coots and gallinules, nutria, muskrat, mink, river otter, and raccoon, rabbit, white-tailed deer, and American alligator (LCWCRTF & WCRA, 1999). All of these species are likely to be found in or near the project area. During construction, the aquatic organisms located in the disposal sites of Pine Island would experience demise, as

well as some slower moving animals (e.g., moles and snakes) in the agricultural lands of St James. Similar shallow open water exists in abundance near the Pine Island project area. These impacts would result in insignificant effects to these species' populations and would be temporary in regard to terrestrial species since their populations would naturally expand after construction is complete. As such, there would be insignificant adverse direct impacts to wildlife populations from implementation of this alternative.

Indirect Impacts

More mobile wildlife species present at the time of construction in and adjacent to the construction footprint would be temporarily displaced to adjacent habitats due to noise, movement, turbidity and vibration, which could cause populations to exceed the carrying capacity for the adjacent habitat. However, these effects would be temporary, displaced animals could return once construction is complete, and the construction of high-quality forested wetland habitat would provide additional area for the expansion of existing populations. If bald eagle nests are discovered near the project area, the National Bald Eagle Management Guidelines would be followed during construction to avoid and minimize impacts to this species. If colonial nesting birds are found nesting near the project area, CEMVN would coordinate with USFWS and no work zones would be implemented based on the species present or bird abatement measures would be implemented to prevent nesting. Bird abatement measures would cause colonial nesting birds to relocate, but extensive similar adjacent habitat exists that could support nesting. As such, there would be insignificant adverse indirect impacts to wildlife populations from implementation of this alternative.

Cumulative Impacts

This alternative, in conjunction with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the project area would help retard the overall decline of wildlife species within the area and would be beneficial in preserving species biodiversity. With the replacement of this habitat, wildlife populations would have opportunity to expand and increase in the plain thereby only resulting in a shift in where these populations reside. As such, there would be little to no adverse cumulative impacts to wildlife populations from implementation of this alternative. See EA #576 for detailed impacts of each individual project within the BBA Alternative.

Future Conditions in Maurepas Swamp

If the BBA Alternative is selected, then the Maurepas Swamp diversion would not be constructed, and the area would not receive the benefits of a freshwater diversion to sustain a healthy swamp habitat. Wildlife populations in the MSA-2 area would likely reduce over time as swamps become more degraded over the course of the 50-year period of analysis.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

Construction Area

As described in Section 3.2.2 Wildlife, terrestrial wildlife, including birds, reptiles, amphibians, and mammals are those that either fully use terrestrial (upland) habitat, a mixture of terrestrial and wetland habitat, or wetland habitat above the water. Select terrestrial wildlife species and the habitats that they use are included in Appendix B, Table 3.

Impacts from construction would occur within, and in close proximity to, the footprint of each individual construction component, such as riverside features (e.g. automated gate structure, cofferdam, levee tie-in), access roads, and embankment features for excavated spoil placement. The anticipated impact associated with land clearing is expected to be minimal and would not have a long-term negative impacts on any wildlife populations that may be present in the construction area. During construction, some slower moving wildlife species (e.g., moles and snakes) may experience demise. More mobile wildlife species would relocate to adjacent, undisturbed habitat during construction activities. These populations would rebound or species return to use those areas where permanent features are not located once construction is complete. The permanently disturbed areas do not support large enough wildlife populations to affect these species overall populations with their demise or significantly affect the carrying capacity of adjacent habitat with their permanent relocation as extensive forested areas and suitable habitat is readily available within the vicinity of the construction area. As such, there would be insignificant adverse direct impacts to wildlife populations from implementation of this alternative.

Operation and Maintenance

Although occasional flooding of the Maurepas swamp naturally occurs from tropical storm events or wind driven tidal events, the yearly operation of the diversion during the spring/early summer would regularly elevate water levels in the diversion influence area to between approximately 1 to 2 feet within the Maurepas WMA. While there is an anticipated increase in water surface elevation from the diversion operations, this is primarily confined to the diversion influence area, with the greatest water surface elevations occurring near the outfall and gradually falling as one moves away from the outfall (i.e. as one moves closer to the extent of the diversion influence area). The diversion would not be operated when there is a weather event that could adversely affect tidal flooding (see hydrology Section 4.1.17). The LDWF has concerns about the effects of water level increases on the WMA. Increased water levels could result in reoccurring adverse impacts to terrestrial species, including alligator and deer populations. Specific to deer, reduced lactation rates in does (Jones et al. 2019), along with reduced forage quality and increased vulnerability to predators within the WMA, could result in further mortality during operation. Peak fawning typically occurs in late July into early August (Bordelon 2021; personal coordination), and potential operation during that timeframe could pose an additional risk to deer populations.

In personal communication with LDWF's Deer Program Manager, John Bordelon (See Appendix J) on September 1, 2021, there is not a large enough sample size of monitored deer in the Maurepas WMA to provide a representative impact analysis for FWP conditions at this time. In the past, LDWF has modified deer seasons and harvest recommendations in specific areas due to the anticipated impacts to recruitment in response to late summer flooding. Further management measures (such as hunting season reductions or closures) by LDWF could potentially mitigate impacts to deer that would occur during diversion operation.

The WMA closes to deer hunting when the U.S. Geological Survey water level gauge CRMS 5373 is at or above 3 feet mean sea level (msl) and reopens when water levels recede to 2.5 msl feet following a closure (Figure 4-1).

Figure 4-1: CRMS Station 5373

The operation of the diversion could lead to mortality, especially for less mobile species and adjacent alligator nests (Lance et al. 2010). An increase in water levels would negatively affect the size of suitable habitat for nesting. Flooding of nests and the concentrate of predators and harmful insects, such as fire ants, would negatively affect hatching success.

Impacts to alligator populations would be similar, but less intense for adults given their resilience to flood conditions. There can be much variation in directional shifts of alligator populations following tropical storm events, and some of the changes are more the effect of prey availability in lower salinity areas (Strickland et al. 2020). Recent high-water has had significant impact on egg harvest within the WMA. LDWF determines the price per alligator egg the agency receives back from hunters and selects commercial alligator egg hunters via a bid process. Reduced nesting, reduced nesting success, and the effects these reductions have on the overall alligator population from operation of the diversion negatively impacts the income of commercial alligator hunters and the revenues LDWF receives back from these hunters. Further management measures (such as hunting season reductions or closures) by LDWF could potentially mitigate impacts to alligator populations that would occur during diversion operation. With implementation of management measures, little to no significant adverse direct impacts to wildlife populations are anticipated from implementation of this alternative.

Indirect Impacts

Construction Area

Indirect impacts would occur not only in the construction footprint, but also in a larger area or at a later point in time that would be dependent on the specific activity being conducted. For example, noise associated with construction would affect the construction area and extend beyond the footprint of the construction components, to the distance at which noise attenuates back to ambient conditions (within about 0.5-mile; see Section 4.1.12 Noise). Mobile terrestrial wildlife species that use swamp habitat near the constructible features would be temporarily displaced to adjacent similar habitat from disturbance. However, once construction is complete, these wildlife species would be expected to return. Permanently disturbed areas within the construction footprint do not support large enough wildlife populations to significantly affect the carrying capacity of adjacent habitat with their permanent relocation. Once benefits are gained from improved habitat quality, many terrestrial species using the existing swamp habitat would thrive with the additional foraging, cover, and resting habitat the alternative would create. As such, there would be insignificant adverse indirect impacts to wildlife populations from implementation of this alternative.

Operation and Maintenance

Indirect impacts from the operation of the diversion would occur in the diversion influence area and would vary depending upon the nature of the impact. For example, there is potential for increased herbivory outside of the diversion influence area, which in turn may have an impact on the forested wetland ecosystems in close proximity to the Maurepas Swamp (see Section 4.1.1). Increases in herbivory would be linked to an expended range for such species during operation of the diversion. Since operation of the diversion is periodic, forested wetland ecosystems would have time to rebound between diversion operations. Additionally, runoff from urban and agricultural areas entering the Mississippi River upstream of the proposed diversion, could affect water quality in the diversion influence area when the diversion is operating, the extent of which would be driven by the composition of the runoff and its concentration within the water column. In the case of agricultural runoff, nutrient

loading in the Mississippi River would be offset by the process of nutrient assimilation within the mitigation area and the diversion influence area. Additionally, sensors designed to detect chemical spills would be built into the diversion's intake structures, so that when a spill occurs, an alarm would be triggered and the gated intake structure closed to prevent harmful chemicals from entering the conveyance channel, mitigation area, and diversion influence area. Thus, harmful impacts to wildlife would be avoided. As such, there would be insignificant adverse indirect impacts to wildlife populations from implementation of this alternative.

Cumulative Impacts

This alternative would help to offset an overall loss in the deltaic plain of swamp habitat necessary for many wildlife species. In coordination with Bradly Breland of LDWF on August 23, 2021, there is a potential negative impact from increasing water levels from operation of multiple flood risk reduction projects to deer and alligator population in the Maurepas WMA. Limited availability of natural ridges and suitable forage would likely reduce the carrying capacity of deer populations and increases risk of mortality from predators and starvation. This alternative, when combined with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the planning area (Appendix A, Figure 6, Appendix B, Tables 16 and 17) would help retard the loss of wetlands. Implementation of MSA-2, combined with other swamp enhancement and restoration projects in its vicinity, such as hydrologic restoration of the Amite River Diversion Canal, CPRA PO-142, and Pontchartrain Conservancy's Maurepas Landbridge Swamp Restoration Project (Hillmann et al., 2020), would prevent the net loss of swamp function and overall decline of wildlife species within the LPB and would be beneficial in both preserving the species biodiversity and combating the current trend of conversion of coastal wetlands to open water, which would be accelerated due to sea level rise. Throughout the operational life of this alternative, there would be some adverse cumulative impacts to some wildlife species (i.e., deer and alligators). These impacts would primarily be confined to the diversion influence area, with the greatest impacts occurring near the outfall where water surface elevations would be the greatest during the diversion's operation. However, as water levels gradually decline as one moves away from the outfall and the benefit area, long-term benefits would increase for most species given the diversion would replace the lost functions of the swamp habitat over time. Therefore, overall cumulative impacts would not be anticipated to increase throughout the operational timeline of this alternative.

Future Conditions in Pine Island and St. James

In 50 years, the St. James project area would likely still be agricultural land given the area is remote and mainly suitable only for agriculture use. Wildlife populations would continue to favor species that can live in these disturbed areas. In 50 years, Pine Island would likely still be open water areas and favor the same species listed for this area in Section 3.2.2.

4.1.3 Threatened, Endangered and Protected Species

No Action Alternative (BBA Alternative)

Pine Island is the only project in the No Action Alternative that may affect listed species as no listed species are present in the St. James project area and since permitted banks exist as reasonably foreseeable projects in the FWOP conditions.

Direct Impacts

No listed species are expected to be directly impacted within the Pine Island swamp mitigation area since their use of the shallow water depths in the site (typically less than 2 feet) is unlikely and access is extremely limited. The borrow area could potentially be used by manatees, sturgeon and sea turtles; however, the presence of construction-related activity, machinery, and noise is expected to cause these species to avoid the project area during the construction period. Additionally, direct impacts to Gulf sturgeon and sea turtles from construction related activities are not anticipated as hydraulic cutterhead dredges are slow moving and use of them is not known to impact these species. Manatee would potentially be affected by dredging operations, but the impacts would be avoided by implementation of standard manatee protection measures developed by the USFWS. Eagle nest and colonial nesting bird surveys would be conducted prior to construction to confirm locations of nests and/or rookeries (if any). The Bald and Golden Eagle Protection Guidelines found in Appendix K would be followed to prevent direct impacts to any nesting eagles if present. The guidelines developed in coordination with USFWS and LDWF, found in Appendix K, would be followed to prevent any direct impacts to colonial nesting birds if rookeries are found within the project area.

There would be less than significant direct impacts to listed and protected species through implementation of Pine Island, because of the type of dredge to be used and because best management practices (BMP) would be used.

Indirect Impacts

Potential indirect impacts from the Pine Island project would primarily consist of effects from dredging operations, notably noise and turbidity, and the loss of foraging habitat. Although the rise in turbidity would immediately reduce water quality in the project area, those effects would be temporary and would be reduced by movement of the tides. Any manatees, sturgeon and sea turtles in the area could relocate during construction since the project area encompasses only a small section of Lake Pontchartrain. The indirect impacts resulting from the loss of the borrow area as foraging habitat would be insignificant given the small size of the project area compared to the overall size and similar habitat within Lake Pontchartrain. Additionally, the depth of material being removed from the borrow area is not anticipated to result in exposure of a different substrate type. As such, future recolonization of the forage species used by Gulf sturgeon is anticipated in the borrow site. Therefore, the indirect impacts to manatees, sturgeon and sea turtles are anticipated to be minimal. Indirect impacts to eagles and colonial nesting birds (if present) would be avoided and/or minimized by following the guidelines mentioned above and through coordination with USFWS and

LDWF. Indirect benefits to bald eagles and colonial nesting birds would be the replacement of habitat lost due to construction of the WSLP project.

There would be less than significant indirect impacts to listed and protected species through implementation of Pine Island due to the temporary and minimal nature of the indirect impacts.

Cumulative Impacts

Potential cumulative impacts to the threatened or endangered species and other protected species from the Pine Island project are anticipated to minimally increase indirect impacts to manatees, sturgeon, sea turtles, bald eagles, and colonial nesting birds in the LPB.

There would be less than significant cumulative impacts to listed and protected species through implementation of Pine Island because of the temporary and minimal nature of the impacts.

Determination

CEMVN has determined that the No Action Alternative may affect, but is not likely to adversely affect, federally listed species and other protected species. NMFS concurred in a letter dated November 21, 2019, and USFWS concurred in a letter/email dated January 28, 2020.

Future Conditions in Maurepas Swamp

Under the No Action Alternative, the BBA projects would be constructed and the Maurepas Swamp would not receive the benefits of freshwater introduction. Without the introduction of freshwater, which would increase nutrients and flow, the existing swamp habitat would continue to decline. With the decline of the swamp habitat, the listed and protected species that now use the Maurepas Swamp would lose existing nesting and roosting habitat in that area.

Maurepas Swamp Alternative - (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

There would be no direct impacts to the red-cockaded woodpecker as they are not expected to be found in the MSA-2 area due to lack of preferred habitat. Direct impacts to the West Indian manatee would be avoided and minimized by implementation of standard manatee protection measures developed by the USFWS. Minimal direct impacts would potentially occur in the form of avoidance during construction of the weirs in Bayou Secret and Bourgeois Canal due to noise and potential increase in turbidity. Gulf sturgeon are unlikely to be directly affected by the diversion due to the unlikelihood of their presence in the Mississippi River, Bayou Secret, or Bourgeois Canal. Adult and subadult pallid sturgeon are relatively abundant in the lower Mississippi and would potentially be directly affected by the construction of the proposed diversion due to construction activities, including noise, vibration, and presence of construction personnel and equipment. Pallid sturgeon would also

be directly impacted by the operation of the diversion by way of entrainment. This impact would be reoccurring over the 50-year project life. The operation plan can be found in Appendix N. Juvenile pallid sturgeon are assumed to have a “low” entrainment risk due to low likelihood of their occurrence in the project area. There is an assumed “medium” risk of entrainment by adults and subadults due to the likelihood of presence and their relatively low burst swimming speeds compared to intake velocities (Kirk et al., 2008). Management recommendations (Appendix K) would be followed to reduce or mitigate chance of entrainment. A Biological Assessment with detailed impacts can be found in Appendix J. A USFWS Biological Opinion with Reasonable and Prudent Measures (RPMs) and terms and conditions can also be found in Appendix J. RPMs are listed in section 8.4 of this SEIS.

Eagle nest and colonial nesting bird surveys would be conducted prior to construction to confirm locations of nests and/or rookeries and to determine if any new nests are established. Currently, there are no active eagle nests within the proposed construction area. There is one active eagle nest within the secondary mitigation area where no construction activities would take place. Therefore, no impacts are expected to any of the active nests. The Bald and Golden Eagle Protection Guidelines found in Appendix K would be followed to prevent direct impacts to any nesting eagles. CEMVN would also coordinate with USFWS to determine if an incidental take permit would be needed if eligible eagle nests are found. The guidelines developed in coordination with USFWS and LDWF, found in Appendix K, would be followed to prevent any direct impacts to colonial nesting birds if rookeries are found within the area.

There would be significant direct impacts to listed species, namely pallid sturgeon, and less than significant direct impacts to protected species through implementation of MSA-2.

Indirect Impacts

There would be no indirect impacts to the red-cockaded woodpecker as they are not expected to be found in the MSA-2 area due to lack of preferred habitat. There would potentially be minimal indirect impacts to the West Indian manatee as the operation of the diversion would slightly increase turbidity in the Blind River. This slight increase in turbidity would be no different from the increase in turbidity during high rain events and high river flow. Models predict approximately 20-30 percent of river water reaching Like Maurepas near the Blind River, which is part of the migration route for Gulf sturgeon. This slight increase in turbidity would be no different from the increase in turbidity during high rain events and high river flow and would have minimal to no indirect impact on the Gulf sturgeon. Pallid sturgeon would potentially be indirectly impacted during construction. Construction activities have the potential to stir up pollutants and/or debris, which could adversely affect any pallid sturgeon in the area. This indirect impact to pallid sturgeon would be temporary.

There would be less than significant indirect impacts to listed and protected species through implementation of MSA-2 due to the temporary and minimal nature of the indirect impacts.

Cumulative Impacts

Potential cumulative impacts to the threatened or endangered and other protected species from the proposed alternative are anticipated to minimally increase indirect impacts to manatees, Gulf sturgeon, bald eagles, and colonial nesting birds in the LPB. The cumulative affects to pallid sturgeon would be the combined entrainment of individuals due to the operation of the Bonnet Carré and the Maurepas diversion.

There would be moderate to significant cumulative impacts to listed and protected species, namely pallid sturgeon, and less than significant direct impacts to protected species through implementation of MSA-2.

Determination

CEMVN has determined that the proposed MSA-2 would have no effect on the red-cockaded woodpecker and Gulf sturgeon; may affect and is likely to adversely affect the pallid sturgeon; may affect but is not likely to adversely affect the West Indian manatee, and other protected species. A BO dated June 23, 2022, has been received and ESA consultation is complete.

Future Conditions in Pine Island and St. James

Under the MSA-2, the diversion would be constructed and operated, and the BBA projects would not be constructed. Without the restoration of swamp habitat in the Pine Island and St James project areas, the listed and protected species would not benefit from replacement of habitat lost due to construction of the WSLP.

4.1.4 Fisheries and Aquatic Resources

No Action Alternative (BBA Alternative)

Direct Impacts

The St. James project would convert farmland to wetlands. Wetlands act as filtering systems, removing sediment, nutrients and pollutants from water, thereby improving water quality. Converting crop land to forested wetlands would benefit fisheries and aquatic resources by restoring these functions to the mitigation area and therefore enhancing water quality. Since the area is not adjacent to open water, fishes inhabiting it is unlikely. However other aquatic species, such as crayfish and other macroinvertebrates, are likely to colonize the newly created habitat, and fishes may be able to use this habitat during periods of flooding. Fisheries access to adjacent flooded forests can provide important foraging habitats and refugia (Barko et al., 2006). Water quality benefits would extend outside of the St. James project area when water drains from the St. James Project area into other waterways.

For Pine Island, approximately 1,965 acres of open water and mud substrate would be replaced with swamp increasing spawning, nursery, forage and cover habitat for fisheries. During construction of this project, fish species would be forced to relocate to similar

adjacent habitat. Less mobile aquatic species could experience mortality. The depth restriction on the borrow pit (-19 feet NAVD 88) would minimize the chance that a different substrate would be exposed. Fish species could return to the borrow area and benthic species could rebound after construction.

Benefits associated with the restored swamp would be delayed after construction because aquatic species access to the restored swamp would be extremely limited until the fill material has consolidated and settled to an elevation of a natural swamp. Once target elevations have been achieved and swamp habitat established (estimated to be approximately 3 years after construction), this area would serve its historic functional role for aquatic resources and fisheries. Fisheries access to adjacent flooded forests can provide important foraging habitats and refugia (Barko et al., 2006). Water quality benefits would extend outside of the St. James project area when water drains from the Pine Island project area into Lake Pontchartrain.

Indirect Impacts

For Pine Island, aquatic resources and fisheries in the borrow area would be indirectly affected during project construction due to dredging operations. Turbidity during borrow excavation and fill placement would impact fishes in many ways, such as temporarily impairing visual predators and reducing the foraging ability of filter feeders. The depth restriction on the borrow pit would minimize the chance the area would suffer from low oxygen conditions and a different substrate would be exposed. As such, future recolonization by similar benthic species and the restoration of foraging habitat in the borrow area is anticipated once construction is complete.

Cumulative Impacts

This alternative would restore coastal swamp habitats in the planning area for fisheries and aquatic resources. These habitats are likely to decrease over the next 50 years. If constructed, these areas would likely become more important on the landscape because other habitats like this are expected to decline. Coastal Louisiana has one of the highest land loss rates in the country and this is exacerbated by human activities and climate change (Couvillon et al., 2017). Much of this land loss is important habitat for fisheries and aquatic resources. Future predictions indicate that coastal land loss would continue (e.g., Barras et al., 2003; Reed et al., 2020) and fishes and aquatic organisms' abundances and distributions would change as well (Nyman et. al., 2013).

Future Conditions in Maurepas Swamp

Under the No Action Alternative, the BBA projects would be constructed and the Maurepas Swamp would not receive the benefits of freshwater introduction. Because of this, low salinity forested habitats within the Maurepas Swamp and vicinity would be expected to decline in the future; as such fisheries and aquatic resources would be expected to shift from those that prefer forested habitats and freshwater bayous to those that prefer fresh and intermediate marsh and low salinity open water habitats.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

During construction, fishes and other motile aquatic organisms would be forced to relocate from the construction area to similar adjacent habitat. Some non-motile aquatic organisms would experience mortality. However, it is expected that nearby populations unaffected by construction would be able to re-colonize the area. Therefore, direct negative impacts to fishes and aquatic organisms associated with construction is expected to be temporary and minor.

Implementation of MSA-2 would cause an initial, temporary shock to habitats in the receiving area that have been without Mississippi River input for hundreds of years. This would likely negatively affect fisheries and aquatic resources in the first several years as the aquatic community adapts to MSA-2 operation. It is expected that aquatic organisms and fisheries would adjust to implementation of MSA-2 and this impact would be temporary and likely be most evident near the outfall area.

Diverted Mississippi River water from MSA-2 would directly affect water level, turbidity, temperature, salinity, nutrient levels and other water quality parameters within waters receiving Mississippi River water in the long-term. These, in turn, would alter the aquatic environment, especially areas closest to the diversion outfall. Some shift in the aquatic organism and fish community would be expected within this area, but it is not expected to be significant because most aquatic organisms that exist in this area are highly adapted to a changing ecosystem (Appendix B, Table 19). Furthermore, the expected continued decline of the Maurepas Swamp would likely cause a larger shift in aquatic organism assemblages and fish species than what would be expected by implementation of MSA-2. Therefore, the aquatic organism and fish community is expected to be more similar to the existing community with implementation of MSA-2 than what is to be expected for the future without MSA-2 condition for the diversion influence area.

Re-introduction of nutrient laden river water would be expected to increase nutrient levels and thus productivity of the wetlands and waterways. This would be most likely to occur within areas close to the diversion outfall. Hydrological modeling indicates nutrient level increases may be highest within the wetland area dominated by cypress-tupelo swamp habitats (Appendix M). Increased nutrient levels would increase productivity in what is likely a nutrient starved system (Lane et al., 2003). This increase in productivity would likely be beneficial to many aquatic organisms and fishes within the diversion influence area.

Fisheries and aquatic organisms would likely have an overall net direct beneficial impact with implementation of MSA-2 because of increased productivity associated with re-introduction of nutrient laden Mississippi River water, and maintenance a more similar aquatic organisms and fish community. It is expected that this benefit would be larger than the temporary negative impacts associated during the first several years of operations and long-term impacts to aquatic organisms and fish communities.

Indirect Impacts

There could be negative indirect impacts associated with MSA-2 due to excess nutrients contributing to episodic eutrophication, algal blooms, and low dissolved oxygen levels. These impacts would likely be episodic and hydrological modeling suggests that the majority of MSA-2 derived nutrients would remain in the wetlands where they would be assimilated and beneficial to aquatic organisms. The hydrological modeling did not assess specific weather patterns, so during specific weather events high levels of nutrients could escape the wetlands and streams into Lakes Maurepas and Pontchartrain. If these occur during specific meteorological and oceanographic conditions, Mississippi River nutrients from MSA-2 could contribute to eutrophication in the Lake Pontchartrain Basin, which would negatively affect some aquatic species and fisheries through harmful algal blooms and decreased dissolved oxygen levels.

Pine Island and St. James

Areas associated with the No Action Alternative, Pine Island and St. James, would not be converted from their existing condition to swamp habitat. St. James would likely continue to be used as agricultural land. It is expected that open water areas in Pine Island would continue to be open water. They would likely become deeper and some or all of these open water areas may become part of Lake Pontchartrain as land is lost around its rim.

Cumulative Impacts

Any nutrient inputs that leave the wetland area could contribute to episodic eutrophication, algal blooms, and low dissolved oxygen level events, which occur within the Pontchartrain Basin primarily during the summer and early fall. These events are sometimes correlated with freshwater discharges, such as the Bonnet Carré Spillway, but can also occur when the Spillway is not operating. Nutrients that escape into Lake Maurepas and further down basin could provide some incremental increase in negative impacts associated with eutrophication. Hydrological modeling suggests that the majority of MSA-2 derived nutrients would remain within wetlands where they would be assimilated and not reach Lake Maurepas. Based on that, MSA-2's contribution to episodic eutrophication, algal blooms, and low dissolved oxygen level events within the Pontchartrain Basin is expected to be minimal.

This project would improve the health and functions and values of existing forested wetlands that are expected to continue to decline in the long-term. This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin (Appendix A, Figure 6; Appendix B, Tables 16-18) would help retard the loss of wetlands and combat the current trend of conversion of wetlands to open water.

<u>Future Conditions in Pine Island and St. James</u>

Areas associated with the no action alternative, Pine Island and St. James, would not be converted from their existing condition to swamp habitat. St. James would likely continue to be used as agricultural land. It is expected that open water areas in Pine Island would continue to be open water. They would likely become deeper and some or all of these open water areas may become part of Lake Pontchartrain as land is lost around its rim.

4.1.5 Essential Fish Habitat

No Action Alternative (BBA Alternative)

Direct Impacts

The existing EFH in the Pine Island area includes estuarine water bottom, estuarine water column, and submerged aquatic vegetation. These habitats would be converted to estuarine intertidal forested wetlands (swamp). Benthic resources within the borrow site for Pine Island would be lost until they can re-colonize the borrow area, which should occur following project construction. The borrow area would not be excavated more than -20 feet NAVD88 plus a 1-foot allowable over depth, thereby minimizing the possibility of anoxic conditions forming. The adverse impacts to EFH that would result from the proposed action may affect, but should not adversely affect, managed species considering the small acreage involved relative to the size of Lake Pontchartrain.

There would be no significant direct impacts to EFH through implementation of St. James because there is no EFH within this project area and vicinity.

Indirect Impacts

Temporary indirect impacts to managed species within the Pine Island area include increased turbidity and disturbance of Lake Pontchartrain in the vicinity of the borrow area. Some species may be temporarily displaced to similar adjacent habitats.

There would be no significant indirect impacts to EFH through implementation of St. James because there is no EFH within this project area and vicinity.

Cumulative Impacts

The permanent loss of up to approximately 1,965 acres of EFH in the Pine Island area would contribute cumulatively to the overall loss of habitat in the basin, but no permanent significant adverse impacts are anticipated because this habitat is prevalent throughout the basin. Furthermore, open water is expected to increase within the project area and vicinity in the most likely future scenarios.

There would be no significant cumulative impacts to EFH through implementation of St. James because there is no EFH within this project area and vicinity.

Future Conditions in Maurepas Swamp

Within the Maurepas Swamp and vicinity, some areas classified as EFH would likely continue to be open water estuarine habitats and would serve as EFH in the future. Future RSLR conditions would also likely lead to the conversion of forested habitats to open water and marsh. Therefore, there could be an increase in EFH within the Maurepas Swamp and vicinity if MSA-2 is not implemented.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

There is no EFH within the direct construction area and within the benefit areas for this alternative. Lake Maurepas does contain EFH. There could be a slight decrease in salinity associated with implementation of MSA-2 that would affect EFH. However, the hydrological modeling suggests that low percentages of MSA-2 derived water would occur within much of Lake Maurepas (Appendix A, Figure 5). Additionally, Lake Maurepas salinities are typically low, and EFH would likely support species adapted to variable and low salinity waters. Therefore, the anticipated impact associated with salinity is expected to be slight and may not affect EFH or the use of EFH species in the diversion influence area.

Sustaining the swamp would likely provide water quality benefits that outweigh any impacts associated with salinity.

Indirect Impacts

There could be slight impacts to EFH associated with eutrophication. These would be similar to those discussed in the Fisheries and Aquatic Resources section (section 4.1.4).

Cumulative Impacts

There could be slight incremental impacts to EFH associated with eutrophication. These would be similar to those discussed in the Fisheries and Aquatic Resources (section 4.1.4).

Future Conditions in Pine Island and St. James

Areas associated with the No Action Alternative, Pine Island and St. James, would not be converted from their existing condition to swamp habitat. Pine Island would likely continue to be open water estuarine habitats and would serve as EFH in the future. St. James would likely continue to be agricultural land and there would be no impacts to EFH associated with not implementing this project feature.

4.1.6 Cultural Resources

No Action (BBA Alternative)

Direct and Indirect Impacts

Depending on which project(s) are implemented under the No Action Alternative, activities associated with those projects have the potential to directly and indirectly impact existing and previously undocumented cultural resources that may exist within the project areas. The CEMVN developed and executed on March 4, 2020, a programmatic agreement with the LA SHPO, the ACHP, federally recognized Tribes, and other interested parties, titled, *Programmatic Agreement Among the U.S. Army Corps of Engineers, New Orleans District; Amite River Basin Commission; East Baton Rouge Parish; Louisiana Coastal Protection and Restoration Authority; Louisiana Department of Transportation and Development; Pontchartrain Levee District; Louisiana State Historic Preservation Officer of the Department*

of Culture, Recreation & Tourism; and Choctaw Nation of Oklahoma; Regarding the Bipartisan Budget Act of 2018 Compensatory Habitat Mitigation Program for the Comite River Diversion, East Baton Rouge Parish Watershed Flood Risk Management, and West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Projects In Louisiana (Appendix J). The programmatic agreement outlines the steps necessary to identify and evaluate cultural resources and complete the Section 106 process. If significant historic properties are identified within any of the project areas, strategies would be developed to avoid those resources or to minimize or mitigate for adverse effects.

Cumulative Impacts

Cumulative impacts to cultural resources would likely be the additive combination of impacts by this and other federal, state, local, and private restoration efforts. Impacts to cultural and historic resources in southern Louisiana have resulted from both natural processes, (e.g., erosion) and human activities (e.g., land development, dredging, agriculture, and vandalism). Impacts to cultural and historic resources in the area would likely continue at current trend because of both natural processes, including anthropogenic modifications of the landscape, as well as human alterations.

Impacts to historic, cultural, and tribal resources in southern Louisiana have resulted from both natural processes, (e.g., erosion) and human activities (e.g., land development, dredging, agriculture, and vandalism). Impacts to historic, cultural and tribal resources within the planning area are expected to continue over the next 50 years at the current trend because of both natural processes, including anthropogenic modifications of the landscape, as well as human alterations.

Future Conditions in Maurepas Swamp

Cultural resources located within the MSA-2 area would be at continued risk of ongoing industrial and residential development, as well as natural erosion caused by wetland degradation over the next 50 years

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct and Indirect Impacts

Activities associated with the proposed alternative have the potential to directly and indirectly impact existing and previously undocumented cultural resources that may exist within the proposed construction footprint, mitigation, and diversion influence areas. A review of the Louisiana cultural resources map (online), existing cultural resources survey reports, and other available documentation identified eleven previously recorded archaeological resources and three previously recorded architectural resources within the proposed construction footprint, mitigation, and diversion influence areas. Much of the proposed construction footprint, mitigation, and diversion influence areas have not been previously surveyed for cultural resources and those areas would require cultural resources surveys should MSA-2 become the selected plan. CEMVN would follow the steps as outlined in the programmatic agreement (Appendix J) to identify and evaluate cultural resources and

complete the Section 106 process. If significant historic properties are impacted or new historic properties are identified within the proposed construction footprint, mitigation, and diversion influence areas, strategies would be developed to avoid those resources or to minimize or mitigate for adverse effects, in accordance with the programmatic agreement.

Cumulative Impacts

Cumulative impacts to cultural resources would likely be the additive combination of impacts by this and other federal, state, local, and private restoration efforts. Impacts to cultural and historic resources in southern Louisiana have resulted from both natural processes, (e.g., erosion) and human activities (e.g., land development, dredging, agriculture, and vandalism). Impacts to cultural and historic resources in the area would likely continue at current trend because of both natural processes, including anthropogenic modifications of the landscape, as well as human alterations. To reduce impacts to cultural resources resulting from the implementation of MSA-2, CEMVN would follow the steps as outlined in the programmatic agreement (Appendix J) to identify and evaluate cultural resources and complete the Section 106 process. If significant historic properties are impacted or new historic properties are identified within the proposed construction footprint, mitigation, and diversion influence areas area(s), strategies would be developed to avoid those resources or to minimize or mitigate for adverse effects, in accordance with the programmatic agreement.

Future Conditions in Pine Island and St. James

Impacts to historic, cultural, and tribal resources in southern Louisiana have resulted from both natural processes, (e.g., erosion) and human activities (e.g., land development, dredging, agriculture, and vandalism). Impacts to historic, cultural and tribal resources within the Pine Island and St. James project areas would likely continue over the next 50 years at the current trend because of both natural processes and anthropogenic modifications of the landscape. Cultural resources located within the St. James project area would likely be at particular risk from continued industrial development, while cultural resources within the Pine Island project area would likely be at particular risk to continued dredge material acquisition and Lake Pontchartrain shoreline retreat that may affect archaeological deposits.

4.1.7 Recreational Resources

No Action Alternative (BBA Alternative)

Direct Impacts

Recreational opportunities are likely to experience insignificant adverse direct impacts from implementation of this alternative. During construction, the aquatic organisms located in the disposal sites of Pine Island would experience insignificant adverse direct impacts through temporary decline, as well as some slower moving animals (e.g., moles and snakes) in the agricultural lands. Recreational hunting and fishing that rely on these organisms would be insignificantly impacted from this alternative.

Direct impacts to recreational resources from the BBA swamp mitigation sites range from no direct impacts if mitigation banks are used, to enhancement of existing recreation

opportunities, to potential new recreational use of areas that could be developed under the other swamp mitigation projects. New recreational opportunities, such as wildlife viewing, canoeing, and fishing could be enhanced directly and indirectly with construction of these projects as current recreational opportunities are limited due to the shallow open water that encompasses some of the BBA sites.

Indirect Impacts

Converting agricultural land to swamp habitat would not indirectly impact recreational resources since recreational opportunities do not currently exist on these lands. For BBA sites that are open water or that lend themselves to recreational use, there may be temporary construction related impacts to recreational use. Turbidity and noise would increase during construction of the swamp habitat, which could also affect recreational fishing. Over time as the swamp habitat matures, recreational opportunities could increase. There would be insignificant adverse indirect impacts to recreational resources with implementation of this alternative.

Cumulative Impacts

There would be insignificant adverse cumulative impacts to recreational resources with implementation of this alternative. Cumulative impacts to recreational resources would continue in the project areas with perpetual conservation of the site. Other similar activities that reclaim open water in the vicinity have and would continue to affect recreational quality in the region. Projects of this scope would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat, which promote recreation opportunities.

Recreational opportunities would continue to increase on the site as the habitat matures over time and would be maintained with perpetual conservation of the site. Other similar activities that enhance habitat in the vicinity have and would continue to affect recreational quality in the region. Projects of this scope would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat which promote recreation opportunity.

Future Conditions in Maurepas Swamp

Swamp in these areas would likely be in a more degraded state in 50 years, and many swamp areas might transition to open water areas and marsh areas. With the possible transition to open water of many swamp areas, fishing and hunting opportunities may decrease or change depending on which species populate the open water areas.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

Direct short-term impacts to recreational resources could occur during construction of the diversion. Temporary construction activity impacts include increased noise, transportation and navigation interruptions in Lake Maurepas, Maurepas Swamp and the Blind River.

Impacts from noise could affect hunters, fishers, and birders by causing wildlife and/or marine and estuarine fauna to leave the area. Boaters and vehicles may have to avoid certain proposed construction areas for a limited time. These potential impacts would be limited to the immediate vicinity of the proposed construction areas.

Although occasional flooding of the Maurepas Swamp naturally occurs from tropical storm events or wind driven tidal events, the yearly operation of the diversion during the spring/early summer would regularly elevate water levels in the benefit area between approximately 1 to 2 feet within the Maurepas WMA, which would result in reoccurring adverse impacts to terrestrial species, including alligator and deer populations. During flooding events, the size of white-tailed deer populations may be affected by the mortality of smaller fawns and a reduction in the area's carrying capacity (due to a reduction in the amount of sub-areal land masses and their associated vegetation). Loss of forage and reduced lactation rates in adult females have been reported from late summer flood events in habitats similar to the Maurepas swamp. Similarly, an increase in water levels affects the size of suitable habitat for nesting and the hatching success of alligator populations. Additionally, the reduction in sub-areal land masses concentrates predators and harmful insects, such as fire ants, that can negatively affect wildlife populations. LDWF determines the price per alligator egg the agency receives back from hunters and selects commercial alligator egg hunters via a bid process. Reduced nesting, reduced nesting success, and the effects these reductions have on the overall alligator population from operation of the diversion would negatively impact the income of commercial alligator hunters and the revenues LDWF receives back from these hunters. In the past, the LDWF has modified deer seasons and harvest recommendations in specific areas due to the anticipated impacts to recruitment in response to late summer flooding. Further management measures by LDWF (such as hunting season reductions or closures) could potentially mitigate impacts to deer and alligator populations that would occur from diversion operation. With implementation of management measures, little to no significant adverse direct impacts to wildlife populations are anticipated from implementation of this alternative.

Indirect Impacts

There would be insignificant adverse indirect impacts to some wildlife species through temporary decline with implementation of this alternative, particularly, to deer and alligator species nearer the outfall canal. These adverse indirect impacts to deer and alligator species are mainly due to increased water levels during operation of the diversion. Impacts to deer and alligator species and to hunting opportunities become much less severe and insignificant the farther one moves away from the outfall.

Indirect short-term impacts could occur to recreational fishing within the proposed construction area during construction. Construction activities could cause temporary decrease in water quality due to increased turbidity and temporary prey population decrease due to habitat disturbance both indirectly affecting the opportunity to recreationally fish.

Indirect impacts from diversion operations are expected to have **l**ong-term positive impacts and benefits to recreational fishing. The majority of MSA-2 derived nutrients would remain in

the wetlands where they would be assimilated and thus benefit aquatic organisms, which should result in improved fishing opportunities.

Positive long-term benefits to recreational resources, including tour operations and wildlife viewing, should improve once the swamp habitat matures. Other recreational opportunities would increase, such as fishing and hunting.

Cumulative Impacts

Throughout the operational life of this alternative, there would be some adverse cumulative impacts to some wildlife species (i.e., deer and alligators). These impacts would primarily be confined to the diversion influence area, with the greatest impacts occurring near the outfall where water surface elevations would be the greatest during the diversion's operation. However, as water levels gradually decline as one moves away from the outfall and the benefit area, long-term benefits would increase for most species given the diversion would replace the lost functions of the swamp habitat over time. Therefore, overall cumulative impacts would not be anticipated to increase throughout the operational timeline of this alternative.

Freshwater diversions can add to the outfall areas' nutrient base and cause an increase in risk of algae blooms. The existing swamp around the diversion outfall could assimilate nutrients and potentially reduce the risk for algae blooms. However, there remains a chance that algae blooms could occur in the planning area as a result of diversions. As salinity in the swamp decreases, freshwater fish abundance would be anticipated to increase, which could benefit freshwater fisheries in the swamp. Crawfish populations would also be anticipated to increase due to increased flow, increased dissolved oxygen, increased vegetative productivity, and decreased salinity. This could benefit crawfish fisheries in the Maurepas Swamp and Lake Maurepas. In addition, increases in vegetation could increase foraging and nursery habitat for fish, which could also benefit the recreational fishery. White shrimp populations could increase, which could benefit shrimp fisheries in the lake.

Additionally, the current design of the WSLP levee and associated Hope Canal drainage features directly impact access to an existing boat launch--a one-lane, gravel unimproved boat launch at Hope Canal and U.S. Highway 61 (Airline Hwy.). Access to the location of the existing boat launch would require a bridge over Hope Canal and require significant integration with crossing the WSLP levee and associated drainage features.

CPRA is proposing to construct a replacement boat launch along the western guide levee of the MSA-2, just north of U.S. 61 (Airline Hwy.) See the following map for the design and location of the proposed boat launch (Appendix A, Figure 9). This would allow for access into the MSA-2 conveyance channel (which follows Hope Canal) and would allow for equal public access via boat to the LDWF Maurepas WMA. A parking lot to accommodate an equal or greater than number of vehicles and trailers would be constructed.

The timing for construction for the new, replacement boat launch is uncertain, but would be untaken as soon as is practicable. Consequently, recreational access at this location may

not be available for a maximum of 3 years (the entire construction period MSA-2). There are no other boat launches in the immediate vicinity.

Future Conditions in Pine Island and St. James

In 50 years, the St. James project area would likely still be agricultural land given the area is remote and mainly suitable only for agriculture use. Therefore, recreational opportunities would not differ from what they are today, which is very minimal opportunities. In 50 years, Pine Island would likely still be open water areas and fishing and hunting would be similar as they are today.

4.1.8 Aesthetic (Visual) Resources

No Action Alternative (BBA Alternative)

Direct Impacts

The visual resources of the St. James or Pine Island mitigation sites would be temporarily directly impacted by construction activities related to implementing the proposed action and by transport activities needed to move equipment and materials to and from the sites. Other direct impacts caused by this alternative are based on impacts detailed in the cultural and recreational resources' sections; these impacts include the introduction of potential elements into the project area's viewshed that may be visually unpleasing to some. There would be insignificant adverse direct impacts to visual resources with implementation of this alternative.

Indirect Impacts

Visual resources may indirectly benefit based on positive changes to wildlife habitat and biodiversity that should increase the visual complexity of the project area. There would be beneficial indirect impacts to visual resources with implementation of this alternative.

Cumulative Impacts

This alternative, in conjunction with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the project area would help retard the overall decline of existing landforms within the area and would be beneficial in preserving wildlife species diversity and recreational opportunities. Cumulative impacts to the visual character could continue in the project area with implementation of the proposed action. Other similar activities in the vicinity have and would continue to affect visual quality in the region. Projects of this scope would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat in significant contrast to man-made land use patterns that involve striping natural landscape features. There would be beneficial cumulative impacts to visual resources with implementation of this alternative.

Future Conditions in Maurepas Swamp

In 50 years, swamp in these areas would likely be in a more degraded state and many swamp areas might transition to open water areas and marsh areas. Aesthetics and visual values for the area would not change significantly with the transition of the landscape.

Maurepas Swamp Alternative - 2 (MSA-2: Public and Private Lands)

Direct, Indirect, and Cumulative Impacts

The alternative would indirectly benefit visual resources based on positive changes to wildlife habitat that should increase the visual complexity of the Maurepas Swamp WMA area; this area is frequented by outfitters exposing tourists to the natural and cultural amenities located in the area. Other direct, indirect and cumulative impacts caused by this alternative are based on impacts detailed in the cultural and recreational resources' sections; these impacts may include the introduction of potentially visually distressful elements into the alternative's viewshed and any alternative related alterations to the Louisiana natural and scenic rivers system. Additional impacts may be caused by modifications to the built environment that involves elevating or demolishing historic structures. There would be insignificant adverse direct impacts to visual resources with implementation of this alternative. There would be beneficial indirect and cumulative impacts to visual resources with implementation of this alternative.

Future Conditions in Pine Island and St. James

In 50 years, the St. James project area would likely still be agricultural land given the area is remote and mainly suitable only for agriculture use. Therefore, the project area would continue to possess no technical or institutionally recognized scenic qualities and limited public visual access. In 50 years, the Pine Island project area would likely remain open water and continue to possess no technical or institutionally recognized scenic qualities and limited public visual access.

4.1.9 Natural and Scenic Rivers

No Action Alternative (BBA Alternative)

Direct, Indirect, and Cumulative Impacts

No impacts would result to this resource from this alternative.

Future Conditions in Maurepas Swamp

Wildlife populations in the MSA-2 area would likely reduce over time as swamps become more degraded state in 50 years. See Section 3.2.1 for this alternative for further details.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only)

Direct, Indirect, and Cumulative Impacts

No impacts would result to this resource from this alternative. On August 25, 2021, LDWF determined that no permit would be required for the proposed access to the embankment cuts based on using existing right-of-way located more than 100 feet from mean low water of Blind River. Four service conditions for the determination are included in more detail in Appendix J.

Future Conditions in Pine Island and St. James

Both the St. James and Pine Island project areas contain no natural and scenic rivers.

4.1.10 Air Quality

No Action Alternative (BBA Alternative)

Depending on which project(s) are implemented, these mitigation projects are located within the following parishes: Pine Island is in St Tammany Parish, and St. James is in St. James Parish. These two parishes are within attainment of the NAAQS. Detailed analysis is not required due to no construction in Ascension and Livingston Parishes and the remote location lacks sensitive receptors.

Direct Impacts

During construction of this project, an increase in air emissions is expected. These emissions would include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth disturbance. Emission of fugitive dust near the proposed construction area is not anticipated to be a problem as the site is rural and not highly populated.

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. The project areas are in parishes in attainment of NAAQS; therefore, a conformity determination is not required.

Indirect Impacts

There would be no adverse indirect impacts to air quality in the parishes with construction of the proposed action. As a mitigation project, after the construction is completed, there is no mechanical emission source of greenhouse gases. There are no current models that can accurately quantify the greenhouse gas emission and carbon sink values for this environment, although new vegetation is expected to become a carbon sink.

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 area that may be occurring

concurrently would be temporary and minimal. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the proposed action. Cumulative impacts to air quality in the project area due to construction of this project, in addition to the other construction activities within the area that may be occurring concurrently, would be temporary and minimal. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the proposed action.

Future Conditions in Maurepas Swamp

Swamp in these areas would likely be in a more degraded state in 50 years, and many swamp areas might transition to open water areas and marsh areas. The habitat shift would have no impact on the attainment status of the parishes within the planning area.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

This alternative is within or immediately adjacent to four parishes: St. John the Baptist Parish, Ascension Parish, St. James Parish, and Livingston Parish. A majority of the activity would occur within St. John the Baptist Parish, approximately 1.3 miles west of the St. James Parish border. The extension canal between Hope Canal and the Blind River would occur mostly within Ascension Parish, with one endpoint at the border of Livingston Parish and the other endpoint in St. John the Baptist Parish near the junction of St. James Parish, Ascension Parish, and St. John the Baptist Parish.

St. James Parish and St. John the Baptist Parish are in attainment of all six NAAQS. Ascension Parish and Livingston Parish are in attainment of five of six NAAQS and have been redesignated to maintenance on March 21, 2017, for the 8-hour ozone standard. (EPA 2021)

During construction of this alternative, an increase in air emissions is expected. These emissions would include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth disturbance. Emission of fugitive dust near the proposed construction area is not anticipated to be a problem as the site is rural and not highly populated. The areas of Ascension and Livingston Parishes, which could be affected by this alternative, are remote, isolated, and not likely to contribute to the 8-hour ozone concentration. This alternative is not likely to adversely affect the air quality in these four parishes.

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. The alternative is within or adjacent to four parishes that are in attainment of NAAQS; therefore, a conformity determination is not required.

Indirect Impacts

There would be no adverse indirect impacts to air quality in the four parishes with construction of the proposed action. As a mitigation project, after the construction is completed, there is no mechanical emission source of greenhouse gases. There are no current models that can accurately quantify the greenhouse gas emission and carbon sink values for this environment, although new vegetation is expected to become a carbon sink.

Cumulative Impacts

Cumulative impacts to air quality due to construction of this alternative, in addition to the other construction activities within the area that may be occurring concurrently, would be temporary and minimal. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the proposed action.

Future Conditions in Pine Island and St. James

In the next 50 years, the remote agricultural land of the St. James project area is likely to remain agricultural and is not likely to impact attainment status for the parish. Pine Island is likely to remain open water over the next 50 years and would neither positively nor negatively impact attainment status for the parish.

4.1.11 Water Quality

No Action Alternative (BBA Alternative)

Direct Impacts

Pine Island and St. James both have the potential to directly impact water quality. Wetlands act as filtering systems removing sediment, nutrients and pollutants from water, thereby helping sustain the water quality. The Pine Island project would ultimately be of benefit to water quality by restoring these functions to the area and therefore potentially enhancing water quality adjacent to Lake Pontchartrain.

BMP would be implemented to prevent or minimize any material due to construction activities from entering the river. There would be insignificant adverse direct impacts to water quality with implementation of this alternative.

Indirect Impacts

Temporary indirect water quality impacts from turbidity during construction of Pine Island and St. James are not anticipated to be substantial enough to cause impairment of the waterbody's designated uses as defined under the standards of Louisiana Administrative Code, Title 33, Part IX, Chapter 11. Water quality impacts in the fill area of Pine Island would temporarily add to the water quality impairment of this sub-segment, but these impacts would be minimized through BMPs and would diminish to background levels after construction. There would be insignificant adverse indirect impacts to water quality with implementation of this alternative.

Cumulative Impacts

This alternative, in conjunction with other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the project area, would support improved water quality within the area. There would be insignificant adverse cumulative impacts to water quality with implementation of this alternative. See EA #576 for detailed impacts of each individual project within the BBA Alternative.

Past, present, and future sources of nutrient runoff in the larger planning area (Figure 2-1) could result in temporary harmful algal bloom impacts in north Lake Maurepas and Lake Pontchartrain.

Future Conditions in Maurepas Swamp

TN and TP concentrations would be expected to increase in the next 50 years from additional fertilizer runoff within the watershed. Cyanobacteria concentrations within the planning area have been monitored regularly via satellites by NOAA, National Centers for Coastal Ocean (2021). Over the next 50 years, these concentrations would fluctuate within the MSA-2 area based on sea level rise and other water quality factors.

Maurepas Swamp Alternative - 2 (MSA-2 Public Land Only; Preferred Alternative)

Direct Impacts

Potential construction impacts on water quality would occur within the immediate vicinity (within 0.5-mile) of all active construction areas. A rise in turbidity during construction activities would potentially immediately reduce water quality in the area; however, those effects would be temporary and would be reduced by normal flow and rainfall. Direct impacts would also occur in the area downstream or down gradient of construction in both the Mississippi River and Lake Maurepas, respectively. During operations, direct impacts would occur to water quality in the southern part of Lake Maurepas from the outflow from the Mississippi River (see diversion influence area in Figure 2-6). No impacts to water quality are anticipated in the Mississippi River once construction is complete. There would be insignificant adverse direct impacts to water quality with implementation of this alternative.

Indirect Impacts

Indirect impacts from proposed construction features would occur in a larger area of the basin or Mississippi River and would vary depending upon the nature of the impact. For example, runoff from the proposed construction area would potentially impact water quality downstream depending on the amount of the release, what countermeasures are in place, the timeliness of the response action, and the weather conditions at the time of the release.

Indirect impacts during operations would also occur in the same area as direct impacts and may extend beyond the areas directly impacted by a proposed alternative. MSA-2 operation impacts on surface water and sediment quality may also indirectly impact other natural resources (e.g., wetlands; threatened, endangered and protected species; fisheries and aquatic resources; and recreational resources).

Wetlands in coastal Louisiana have been shown to provide long-term nutrient loading benefits as “assimilation wetlands,” that treat effluent and improve water quality (Day Jr. et al. 2019; Hunter et al. 2009).

As such, water quality impacts from the MSA-2 would be offset by the process of nutrient assimilation. Lane et al. (2003) found that the Maurepas Swamp is nitrogen limited compared to phosphorus, and dissolved inorganic nitrogen, especially nitrate, is the most important nutrient in the formation of phytoplankton blooms in Lake Maurepas. Nitrates in Mississippi River runoff from the MSA-2 would likely be removed via denitrification in the water column or uptake in wetland plants. Operating the diversion with 2,000 cfs outflow, majority of the introduced nutrients in the diversion influence area would be removed from the water column within approximately 3-4 miles from the diversion outflow north of I-10. By the time the outflow reaches Lake Maurepas, any remaining nutrients would consist mostly of organic nitrogen, which is not available for algal uptake unless it is first converted back to inorganic nitrogen (i.e. ammonium) through the slow process of mineralization. The above mechanisms of nutrient assimilation would help the Gulf Hypoxia Task Force to achieve its goals in the Gulf Hypoxia Action Plan. Both CPRA and CEMVN are signatories to this action plan.

See Figures 1 and 2 (Appendix A) for modeled TN and TP impacts and Figure 3 (Appendix A) for salinity impacts associated with the freshwater diversion. These figures represent modeling runs over 20-day periods at year 0 and 50. There would be insignificant adverse direct impacts to water quality with implementation of this alternative.

There would be beneficial indirect impacts to water quality with implementation of this alternative.

Cumulative Impacts

Cumulatively, impacts with adjacent state-sponsored restoration projects and the Amite River Diversion Canal could coincide and result in localized short-term impacts within canals in the Maurepas Swamp and adjacent waterbodies. As stated above, these impacts would vary depending upon the nature of the impact. The process of nutrient assimilation would reduce potential impacts from the diversion canal outflow while any additional releases of runoff (e.g. wastewater treatment facilities and agriculture) in the vicinity of the TSA could elevate nutrient levels. Short-term hydrologic impacts from hurricanes, wave fetch over lakes, etc. could further limit potential for algal blooms.

While there would be a slight alteration in water elevation along Bayou Secret and Bayou Bourgeois Canal, there would be minimal impacts in Blind River, as a LA scenic river, from algal blooms and other water quality changes. Increases in agricultural runoff upstream in the Blind River watershed would likely elevate the impact to nutrients in Blind River, but current data and trends indicate a low risk. The TSA would likely route future commercial agricultural fertilizer, pesticides, and other constituents in river water into Maurepas Swamp and adjacent waterbodies, but nutrient loading and assimilation in existing swamp vegetation would result in a minimal impact. Such conditions that result in algal blooms would likely continue to occur in the northern planning area (Figure 2-1) around northern Lake Maurepas

and Lake Pontchartrain. There would be beneficial cumulative impacts to water quality with implementation of this alternative.

Future Conditions in Pine Island and St. James

This St. James project area is not located in or near any state water bodies; therefore, no water quality standards or designations apply. In 50 years, Pine Island would likely still be open water areas and have similar water quality impairments as listed above.

4.1.12 Noise

No Action Alternative (BBA Alternative)

Swamp Mitigation Sites

Direct Impacts

The St. James site is approximately 1,246 acres in size and is mostly agricultural in nature. The Pine Island site is approximately 1,965 acres of open water.

Depending on which projects are implemented, up to approximately 1,246 acres of agricultural land at St. James and up to approximately 1,965 acres of open water at Pine Island would be converted to forested wetland habitat. Due to the effects of noise from the construction, fish and wildlife present at the time of construction would be temporarily displaced to adjacent habitats due to noise, movement, and vibration. Some slower moving animals (e.g., moles and snakes) may experience demise during construction. It is anticipated that displaced animals would return once construction is complete, and that the construction of high-quality forested wetland habitat would provide additional area for the expansion of existing wildlife populations. Migratory birds would likely avoid the area during construction. Construction equipment necessary for the initial project construction phase would possibly include dump trucks, bulldozers, tractors, graders, boats, airboats, and similar equipment. Appendix B, Table 14 presents the noise emission levels for construction equipment expected to be used during the proposed construction activities. This table shows the anticipated noise levels at various ranges based on data from the Federal Highway Administration (FHWA 2006).

No significant direct impacts from noise would result with the implementation of St. James and/or Pine Island.

Indirect Impacts

Noise levels may result in fish and wildlife avoiding the project area during construction; however, movement of equipment during construction would result in the same avoidance behaviors from wildlife species. Nearby residences 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.

No significant indirect impacts from noise would result with the implementation of St. James and/or Pine Island.

Cumulative Impacts

Construction of these projects is not anticipated to add significantly to the cumulative effect of noise as the construction activities in the project vicinity would be temporary during the period of construction, restricted to daylight hours and avoidance of the project area by wildlife normally occurs from the movement of agricultural machinery in the area even without the additional noise. It is anticipated that displaced wildlife would return to the area when construction ceases.

No significant cumulative impacts from noise would result with the implementation of St. James and/or Pine Island.

Future Conditions in Maurepas Swamp

In 50 years, the areas north of U.S. Hwy. 61 would likely remain swamps and the ambient noise level is not expected to significantly increase. The areas south of U.S. Hwy. 61 are mostly residential, commercial, and industrial areas. Due to expected population increases, a slight increase in the ambient noise level is expected.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

Direct impacts from noise to residential areas would occur due to construction of MSA-2 features. Increases of noise in air and in water would occur temporarily due to operation of construction equipment, such as excavators and pile drivers. Due to the short-term nature of the proposed construction and reduced construction hours, noise impacts to residential neighborhoods are anticipated to be minor.

Direct impacts from noise in the Maurepas Swamp area could occur to wildlife, including colonial nesting birds, due to construction of the secondary outfall management structures and widening of Hope Canal. The potential noise levels are anticipated to be minor.

No significant direct impacts to residential areas and wildlife are anticipated with the implementation of this alternative.

Indirect Impacts

Noise levels may result in wildlife avoiding the proposed construction area during construction; however, movement of equipment during construction would result in the same avoidance behaviors from wildlife species. It is anticipated that wildlife would return to the area once construction has been completed.

No significant indirect impacts to residential areas and wildlife are anticipated with the implementation of this alternative.

Cumulative Impacts

No significant long-term cumulative impacts from noise are expected from MSA-2 and other reasonably foreseeable projects in this area.

Future Conditions in Pine Island and St. James

In 50 years, the St. James project area would likely remain mostly agriculture; however, as the area's population increases and residential and commercial development increases, a slight increase in ambient noise is expected. In 50 years, Pine Island would likely continue to be open water areas and no significant increases in the ambient noise levels would be expected.

4.1.13 Hazardous, Toxic, and Radioactive Waste

No Action Alternative (BBA Alternative)

Mitigation Banks

Direct, Indirect, and Cumulative Impacts

The particular bank(s) to be used is (are) unknown at this time. Since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts due to HTRW would be incurred from the purchase of these credits for the BBA construction mitigation.

Swamp Mitigation Sites

Direct Impacts

The St. James site is mostly agricultural in nature. The St. James mitigation area consists of two parcels of land – south mitigation site and north mitigation site. Some residences exist within 0.25 to 1 mile of the project sites. Industrial facilities are located within 1 mile of the project sites. Several petroleum pipelines and abandoned oil/gas wells exist within and/or near the south mitigation area. Due to construction methods, there would be a slight probability of encountering substances of concern or petroleum products in the soil near these wells; however, no significant direct impacts are anticipated. An ASTM 1527-13 Phase I Environmental Site Assessment (ESA), HTRW 22-03 dated November 7, 2022, has been completed for the south and north mitigation sites (Appendix P). The probability of encountering HTRW for the proposed action at the south mitigation site was determined to be low based on the initial assessment.

The Phase I ESA identified several potential RECs at the St. James north mitigation site. Based on the identification of potential RECs, additional environmental investigation and evaluation are recommended at the north mitigation site prior to conducting any mitigation activities.

The Pine Island site is currently open water. It would be filled with dredged material from Lake Pontchartrain. No RECs have been identified in the project area or borrow site. Neither

site is included in the National Priorities List (Superfund). Low probability of encountering HTRW. No direct impacts are anticipated.

Indirect Impacts

No HTRW or RECs were identified at the St. James south mitigation site or the Pine Island mitigation site or the borrow site. No indirect impacts from HTRW are anticipated due to construction at either of these sites.

Several potential RECs were identified at the St. James north mitigation site. Minimal indirect impacts may occur due to construction.

Cumulative Impacts

No cumulative impacts from HTRW or RECs are anticipated. Due to construction methods, there is a low probability of encountering HTRW.

Future Conditions in Maurepas Swamp

In 50 years, these areas would likely remain residential, commercial, and industrial; however, there would still be a low probability of encountering HTRW in these areas.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts, Indirect Impacts, Cumulative Impacts

An HTRW Phase I ESA was completed on September 2, 2021, for MSA-2 (Appendix P). No HTRW and no RECs were identified; therefore, no direct, indirect, or cumulative impacts from HTRW were identified and none are anticipated. An update to the September 2, 2021, Phase I ESA was completed on November 8, 2022 (Appendix P). No HTRW and no RECs were identified during the updated ESA; it remains that no direct, indirect, or cumulative impacts from HTRW are anticipated.

Future Conditions in Pine Island and St. James

An HTRW Phase I ESA was completed on November 7, 2022, for the St. James south and north mitigation sites. No RECs were identified at the St. James south mitigation site; however, several potential RECs were identified at the St. James north mitigation site. In 50 years, some of the agricultural land at the St. James sites may be developed into residential areas. The probability of encountering HTRW at the St. James south mitigation site would remain low. The probability of encountering HTRW at the St. James north mitigation site would increase slightly due to the presence of the potential RECs.

4.1.14 Socioeconomics/Land Use, Transportation, and Commercial Fisheries

No Action Alternative (BBA Alternative)

Socioeconomics

Direct Impacts

There would be negligible direct impacts to socioeconomics for this alternative. There are no residential plots within the BBA Alternative project area. There are some existing agricultural structures that would have to be demolished prior to construction. Many of the BBA Alternative projects involve converting agricultural land to swamp habitat; this would lead to a decline in the production of agricultural products within the region, though there would not be any major shifts in agricultural production. There would be temporary increases in employment and income for those involved in construction of various projects.

Indirect Impacts

There would be negligible indirect impacts to the socioeconomics for this alternative.

Cumulative Impacts

The BBA Alternative would temporarily increase employment and income during the duration of construction of the various projects. There would be minor changes to the agricultural sectors because many of the BBA Alternative project areas involve converting agricultural land to swamp habitats. Healthier swamp habitats could lead to increased eco-tourism creating a boost to the local economy. There would be positive impacts with the implementation of this project.

Transportation

Direct Impacts

The BBA Alternative would have no significant impacts on transportation. There would be increased traffic during construction of various projects, but no anticipated major increases in traffic.

Indirect Impacts

The BBA Alternative would have no significant indirect impacts on transportation. There may be minor increases in travel time during construction of the various projects.

Cumulative Impacts

The BBA Alternative would have no significant impacts on transportation. Minor increases in traffic and travel time are expected during the duration of project construction.

Navigation

Direct Impacts

The BBA Alternative would have no significant impacts on navigation.

Indirect Impacts

The BBA Alternative would have no significant indirect impacts on navigation.

Cumulative Impacts

The BBA Alternative would have no significant impacts on navigation.

Future Conditions in Maurepas Swamp

Socioeconomics

Trends in population, income, profits, and transportation are expected to continue over the next 50 years.

Maurepas Swamp Alternative - 2 (MSA-2: Public Lands Only; Preferred Alternative)

Socioeconomics

Direct Impacts

There would be temporary positive impacts on the socioeconomics of the area. MSA-2 would temporarily increase employment and income during construction, leading to a boost in the local economy. The action alternative impacts 41.56 acres of developed land, much of this land is owned by the oil and gas industry. The action alternative is expected to have a negligible effect on housing. Of the 41.56 acres of developed land, only 1.12 acres are residential land. The residential land consists of a few empty lots in Mt. Airy and a few camps along the Hope Canal and Blind River. There is one camp along Hope Canal that would have to be acquired before construction begins.

The MSA-2 would not vastly increase water levels during operation, which would only have negligible impacts on public health and safety by increasing the frequency of tidal flooding in the Maurepas Swamp area outside levee protection. Since there are no inhabited communities in this immediate area, impacts on public health and safety in mitigation-area communities within federal levee systems would be negligible, as still water levels are not expected to exceed authorized levee heights for federal levee systems within the mitigation area during periods when the diversion is operating above base flow.

Operation of the MSA-2 would have minor impacts on public health and safety risks associated with storm hazards in communities outside the federal levee systems in the diversion footprint (Ascension, St. James the Baptist, St. Charles, and Livingston Parishes). The MSA-2 is designed to be operated by a SCADA system allowing for immediate closure when a storm or adverse surge impacts are projected. Therefore, the project is not projected

to cause an increase in storm surge elevations in the Maurepas Swamp area near Hope Canal, the WSLP levees, or near Reserve during storm events. The operations plan would describe conditions for the entire range of events requiring closure.

Indirect Impacts

There would be positive indirect impacts on the socioeconomics of the area. A healthier swamp habitat could lead to increased eco-tourism, boosting the retail and hospitality industries in the local economy. In addition, farming and fisheries could see increased revenues with a healthier swamp environment.

Cumulative Impacts

MSA-2 has positive short-term and long-term impacts on the socioeconomics on the region. During construction, some industries would see a boost in employment and income. MSA-2 impacts a few residential plots, but there would be a negligible effect on housing. In the long run, restoration and mitigation projects would increase eco-tourism in St. John the Baptist Parish, creating a boost to the regional economy. There would be positive impacts to socioeconomics with the implementation of this project.

Transportation

Direct Impacts

MSA-2 would lead to increased traffic on Highway 44, Highway 54, Interstate 62 and, Interstate 10 during construction. Portions of Airport Road and River Road would be reconstructed in construction of the action alternative. Due to this, River Road and Airport Road would be closed at different points throughout the construction phase. Traffic would be routed through detour roads while the roads are being reconstructed. Traffic would increase on detour roads throughout the duration of road closures on River Road and Airport Road.

Indirect Impacts

MSA-2 would lead to increased travel time due to the temporary closure of River Road and Airport Road during construction. In addition, detour roads would see increased traffic during the road closures.

Cumulative Impacts

MSA-2 would temporarily increase traffic congestion on main roads. In addition, the closure of River Road and Airport Road would increase traffic on detour roads and increase travel time. There would be no significant long-term impacts to transportation with the implementation of this project.

Navigation

Direct Impacts

With the implementation of MSA-2, though unlikely, there could be a direct short-term, minor, disruption to some ship/barge traffic at the Mt. Airy terminal facility during construction. Construction using tugboats and/or barges would occur approximately 400 feet (122 m) from the current dock facility. Construction of these MSA-2 features is a short-term activity and once in place, they would not impede commercial vessel traffic into the docking facility as it is located on the batture. A study of how MSA-2 docking facility would impact river flow, “Simulation of Flow near Proposed Docking Facility and Freshwater Diversion,” concludes that in both high and low flows the proposed alternative would have no significant impacts on the navigation channel and therefore have no significant impact on navigation resources (Meselhe et al. 2015).

Indirect Impacts

The MSA-2 would have no significant indirect impacts on navigation resources.

Cumulative Impacts

The MSA-2 would have no significant impacts to Mississippi River navigation resources. During the construction phase, there may be minor disruptions in navigation traffic, but they would be temporary, and near the diversion’s inlet feature, and any disruptions would not have a significant impact on Mississippi River navigation. There are no expected long-term effects on navigation due to the MSA-2.

Navigation

In the Maurepas Swamp area, the MSA-2 would cause moderate increases in dredging in the section of canal where the sedimentation basin is located. MSA-2 impacts on navigation traffic in the area during construction and operations would be negligible to minor.

During construction, the MSA-2 would have moderate, temporary, adverse impacts on the safety and efficiency of shallow-draft vessels transiting past the proposed MSA-2 site in the Mississippi River due to waterway obstructions associated with the proposed cofferdam of the river intake system. During operations, the MSA-2 would have moderate, intermittent but permanent, adverse impacts on marine traffic efficiency and safety for shallow-draft vessels in the Mississippi River due to crosscurrents extending into the channel from the proposed intake of water into the diversion. Some congestion may be unavoidable and could cause transit delays. The MSA-2 would also cause minor to moderate, permanent, adverse increases in dredging requirements in some portions of the Mississippi River navigation channel downriver of the proposed diversion site due to MSA-2-induced changes to typical shoaling patterns and locations. There would be no significant impacts to navigation with the implementation of this project.

Land Side Conveyance Channel

North of the Mississippi River, the MSA-2 includes approximately 5.5 miles of conveyance channel to divert water from the river to the receiving area. The first 2.25 miles of the conveyance channel would require excavation of existing land where there is currently no navigation. The remaining 3.25 miles of the conveyance channel north of US 61 (Airline Hwy.) would connect to the existing Hope Canal. From that point on, Hope Canal would be dredged to deepen and widen the existing canal to convey required flow. Dredging operations would have a temporary adverse impact during construction to recreational navigation. There is a small recreational boat launch owned by the LDWF near the beginning of Hope Canal north of US 61. This boat launch would be replaced by a larger, expanded capacity boat launch and parking facility. This would ultimately have permanent beneficial impacts to recreational boat navigation on Hope Canal post construction. There is currently no commercial navigation on Hope Canal.

Real Estate Impacts

Private land would be impacted within the diversion channel and construction footprint, the diversion channel outfall area, the LDV inundation areas, and the acreage needed for mitigation.

The diversion channel is approximately 5.5 miles long and impacts both public and privately held land between the Mississippi River and the outfall area just north of I-10. The diversion channel itself is estimated to impact approximately 11 private landowners and 57 acres of private land.

Although most of the diversion outfall area is within the Maurepas Swamp WMA, there are six private ownerships that also fall within the expected inundation limits. These private ownerships are not within the boundaries of the mitigation benefits area, but since there are no physical demarcations between the privately owned lands and the publicly owned lands, flow of water from the conveyance channel would enter the private lands. For this reason, a Flowage Easement would be acquired over these six privately-owned parcels totaling approximately 1,872 acres of wetlands. Estate language for the Flowage Easement can be found in Appendix Q: Supplemental Real Estate Plan.

A Flowage Easement would also be acquired over approximately 3,022 acres of private lands south of I-10 and north of Hwy 61, which would impact approximately 16 private landowners. The LDVs will be located on either side of the diversion channel and will impact water levels on public and private lands both east and west of the channel. The areas impacted by the LDVs south of 1-10 are wet already and located on the unprotected side of the WSLP project levee alignment.

Additionally, Fee Excluding Minerals would be acquired over lands needed to mitigate for the impacts of MSA-2. Marsh impacts resulting from construction and operation of MSA-2 would be mitigated through a combination of purchasing mitigation bank credits and/or construction of the Guste Island marsh creation project. Approximately 75 acres would be acquired from

private landowners to mitigate for approximately 20 AAHUs impacted by the MSA-2 footprint.

The acquisition of LERRD not owned by local government agencies is estimated to impact approximately 48 private landowners and over 5,000 acres.

Please refer to the Supplemental Real Estate Plan located in Appendix Q for additional details on real estate impacts.

River Side Impacts

The location of the intake structure and all temporary construction staging, including the earthen cofferdam, are located in the Mississippi River batture at RM 144.2. Current conditions in the area include docking facilities and associated infrastructure (pipe racks, walkways, pilings) for the MPLX Terminals. The MPLX infrastructure is on the riverside of all construction activities, prohibiting any shallow-draft vessels from transiting near the proposed MSA-2 site in the Mississippi River. Therefore, during construction the MSA-2 would have no adverse impacts on the safety and efficiency of shallow-draft vessels transiting past the proposed MSA-2 site.

Previous modeling efforts (Meselhe, E., Richardson, J., Lagumbay, R., Allison, M., Jung, H. (2015 - Simulation of Flow near proposed Dock Facility and Freshwater Diversion Reserve, Louisiana at River Mile 144.2. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.) showed that water entering the intake of the MSA-2 follows the shoreline near the water surface. Additionally, modeling showed that velocities in the navigation channel were not affected by the diversion running. Therefore, during operations, the MSA-2 would have no adverse impacts on marine traffic efficiency and safety for shallow-draft vessels in the Mississippi River. Because modeling showed no impacts to velocities in the navigation channel, it is not anticipated that the MSA-2 would cause any adverse increases in dredging requirements to any portions of the Mississippi River navigation channel downriver of the proposed MSA-2 site.

Future Conditions in Pine Island and St. James

Trends in population, income, profits, and transportation are expected to continue as described above over the next 50 years in the St. James project area. Trends in population, income, profits, and transportation are expected to continue as described above over the next 50 years in the Pine Island project area.

4.1.15 Environmental Justice

No Action Alternative (BBA Alternative)

EJ is institutionally significant because of EO 12898 of 1994. An EJ analysis focuses on the potential for disproportionately high and adverse impacts to minority or low-income populations during construction or operation of the proposed action. The CEMVN EJ team analyzed the BBA mitigation projects and determined that the type of construction activities taking place at the mitigation projects would not cause high, adverse impacts to any

communities that are in the vicinity of the action, nor would there be permanent high, adverse impacts to communities. Therefore, EJ is not considered a significant resource for this proposed mitigation action. Nonetheless, BMPs would be used during construction of the mitigation sites that would avoid or minimize potential minor construction-related impacts (noise and minimal truck traffic) to communities. Finally, there are no communities within 1 mile of either of the proposed BBA Alternative sites (St. James and Pine Island). Additionally, there is a significant amount of farmland in St. James Parish and the conversion of farmland to wetlands (see Section 4.1.1) would not cause high, adverse disproportionate impacts to areas of EJ concern.

Future Conditions in Maurepas Swamp

In 50 years, the minority and low-income composition of the area is expected to be similar as it is today unless unforeseen economic changes occur, which may change the demographics of the population.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

There are no direct, adverse disproportionate impacts from construction of MSA-2 to low-income and minority communities (referred to as areas of EJ concern) since there is no housing directly adjacent to the proposed diversion. Direct impacts include effects to structures within the proposed footprint of the diversion. There are no structures within the footprint of the diversion. There is, however, property that would need to be acquired for construction of the diversion. There would be no change of use of any of the parcels needed for the diversion construction. Impacts to property owners are minimized by the purchase of flowage easements, which is discussed below.

MSA-2 is located to the west of the WSLP project floodwall; the floodwall provides a buffer between the diversion and an area of EJ concern located east of the structural levee. Figure 4-2 depicts the location of MSA-2 features, including the currently under construction WSLP project levee and the proposed diversion. The area of EJ concern (along Marigold and Marquez Streets) located just east of the WSLP project, is a minority community and an area of EJ concern based upon 2020 U. S. Census Bureau data. The human environmental impacts of constructing the WSLP project were identified in the 2014 WSLP EIS and SEA #571 (which supplements the 2014 WSLP EIS with the latest design changes). The WSLP project would provide an increased level of risk reduction to residents of all races and income levels within St. John the Baptist Parish. The MSA-2 diversion footprint is just to the west of the WSLP project and there is no housing directly on either side of the proposed diversion. The WSLP project would provide protection to those communities to the east of the proposed diversion and the structural levee.

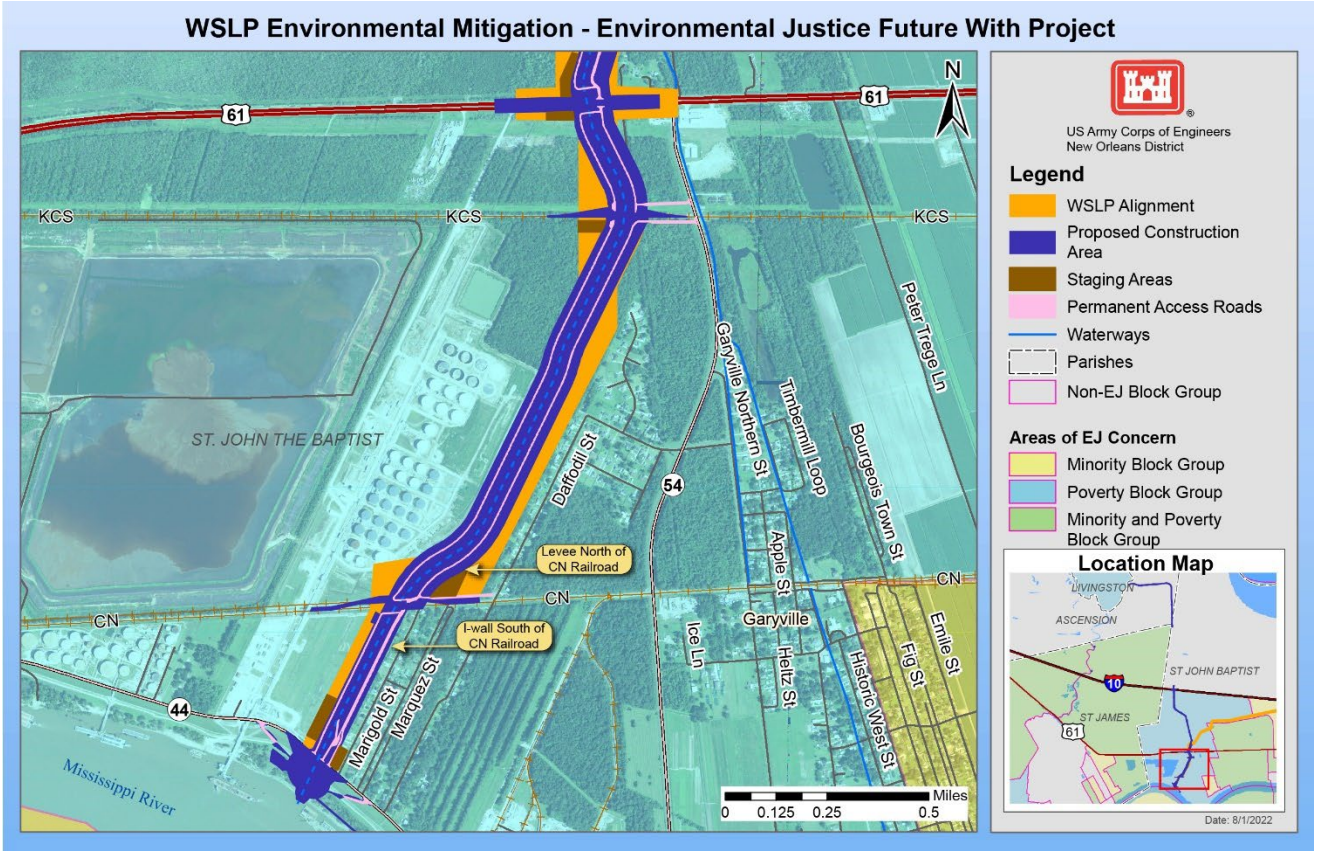

Figure 4-2: MSA-2 Areas of EJ Concern (Future with Project)

Water flowage easements would be acquired in areas where the MSA-2 conveyance channel adds water onto marsh lands, mainly north of Hwy 61 and north of I-10. Additionally, easements would be acquired for lands impacted by the footprint of the diversion channel. Although the location of the easements necessary to construct MSA-2 may be located in areas of EJ concern, the impacts to owners of these lands is expected to be minimal as the land is either currently vacant or already consisting of wetlands, which would have more water with the operation of the diversion. Easement acquisition is not expected to cause a high, adverse disproportionate impact to areas of EJ concern.

There would be temporary positive impacts on the socioeconomics of the area, including to those in areas of EJ concern. MSA-2 would temporarily increase employment and income during construction, leading to a boost in the local economy. MSA-2 impacts 41.56 acres of developed land; much of this land is owned by the oil and gas industry. MSA-2 is expected to have a negligible effect on housing. Of the 41.56 acres of developed land, only 1.12 acres are residential land. The residential land consists of a few empty lots in Mt. Airy and a few camps along the Hope Canal and Blind River. There is one camp along Hope Canal that would have to be acquired before construction begins.

Indirect Impacts

The areas indirectly impacted by MSA-2 construction are similar to the areas impacted in the WSLP EIS, which found that, while minority and low-income populations are present, no notably short- or long-term, direct or indirect, high adverse community impacts are anticipated with this alternative; thus, impacts to minority and low-income populations do not appear to be disproportionately high and/or adverse.

The indirect impacts of constructing MSA-2 may present temporary impacts associated with regular construction activities, such as traffic interruptions, noise and dust. These impacts would be spread throughout the greater area and be temporary and minor. BMPs would be used to avoid/reduce or minimize construction-related activities and are discussed below. There would be insignificant adverse indirect impacts to areas of EJ concern with implementation of this alternative.

Cumulative Impacts

Cumulative impacts would include any historical storm impacts to low lying elevations and communities in the proposed construction area, as well as any measures or projects constructed by local, county, and state agencies as a result of past storm or flood events. Additional impacts would be the incremental direct and indirect temporary adverse impacts of implementing more modern storm and flood damage risk reduction measures in the area, plus the direct and indirect beneficial impacts on minority and low-income populations from flood risk and hurricane storm damage risk management projects within the Pontchartrain Basin. Potential construction impacts resulting from the proposed action would be temporary in nature and would impact all communities regardless of race or poverty level, equally.

Mitigation of Possible Project Impacts

BMPs include several impact avoidance features, which are included as integral components of the proposed action to minimize impacts to vehicular transportation. Specific routes would be designated for construction-related traffic to minimize residential disturbance and traffic congestion and include temporary routes to the west of the proposed diversion and away from residential neighborhoods. USACE contracts would designate specific routes for construction-related traffic to avoid residential areas, to the maximum extent practicable, and staging areas for construction equipment and personnel would be located away from heavily populated areas. If any existing streets that would serve construction-related traffic are used, they would be resurfaced, if needed and as appropriate and maintenance of those streets would be provided during the construction period. Appropriate detour signage would be placed to preserve access to local streets during construction activities. Off-street parking would be provided for construction workers, and shuttle vans would be used to transport construction workers to the work sites, if necessary. Streets that are damaged by any and all construction activities would be repaired.

Noise along all segments of diversion construction would increase due to the temporary operation of equipment and vehicles used during construction. While noise impacts may cause a temporary inconvenience to EJ residents and facilities in the immediate area, noise

levels associated with construction activities would be temporary and monitored to ensure acceptable standards are maintained. No permanent noise impacts as a result of construction are anticipated, and all noise emissions are expected to be short term, lasting only as long as construction activities. No long-term indirect effects on noise are anticipated.

Short-term noise impacts will be avoided, minimized or mitigated by use of the following BMPs:

- The contractor, as a BMP and as practicable, would restrict work to regular business hours (approximately 0700-1900) on weekdays to reduce potential effects from noise and increased truck traffic to the identified existing EJ community and general public.
- Placement of temporary noise barriers adjacent to construction activities.
- If machinery causing vibrations is used, the following noise and vibration monitoring language will be included in the contract specifications for specific work items:
- Monitoring of noise levels to verify adherence to contract specifications.
- Limit pile driving activities (if any) to daylight hours.
- Use vibration monitoring equipment that measures surface velocity waves caused by equipment and monitor vibration up to a threshold value established and approved in writing by CEMVN. Such measurements would only be taken near residences and occupied buildings that could be adversely affected by excessive ground vibrations.
- Construction equipment noise would be minimized during construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications), and by shrouding or shielding impact tools.
- All equipment, haul trucks, and worker vehicles would be turned off when not in use for more than 30 minutes.
- Equipment warm-up areas, water tanks, equipment storage areas, and staging areas would be located as far from existing residences as is feasible.

Air quality Impacts to areas of EJ concern are expected to be minor and short term. Temporary increases in air pollution could occur from the use of construction equipment (combustible emissions). Combustible emission calculations were made for standard construction equipment, such as bulldozers, excavators, pumps, front end loaders, backhoes, cranes, and dump trucks. Analyses were made for the type of equipment, duration of the total number of days each piece of equipment would be used, and the number of hours per day each type of equipment would be used.

Future Conditions in Pine Island and St. James

With uncertainty in predicting socio-economic changes in 50 years, the minority and low-income composition of the St. James and Pine Island project areas would be difficult to predict. Most likely the areas would continue to be areas of EJ concern unless unforeseen economic changes occur and the area transitions to a wealthy area, thereby no longer being

a low-income area of EJ concern. Changes to the large percent minority population, however, is unpredictable if this occurs.

4.1.16 Prime and Unique Farmlands

No Action Alternative (BBA Alternative)

Direct Impacts

Pine Island occurs in open water and existing wetlands and therefore contain no prime or unique farmlands. Prime farmland would be impacted by the St. James project. If this project site were developed for mitigation, up to approximately 1,350 acres would not be used as productive farmland in the future. There would be significant adverse direct impacts to prime and unique farmlands with implementation of the St. James project.

Indirect

Pine Island occurs in open water and existing wetlands and therefore contain no prime or unique farmlands. Since the majority of the St. James project area is presently under agricultural use, current agricultural production in the parish would be affected and would be expected to decrease minimally. There would be insignificant adverse indirect impacts to prime and unique farmlands with implementation of the St. James project due to the small amount of farmland affected within the parish.

Cumulative Impacts

Pine Island occurs in open water and existing wetlands and therefore contain no prime or unique farmlands. The implementation of the St. James project would affect prime farmland. The cumulative impacts to prime farmlands would be the impacts of the St. James project combined with other losses of prime farmland soils resulting from natural processes and development in the project parishes. A negligible adverse effect on agricultural production in St. James parish would occur due to the small amount of prime farmland affected. There would be insignificant adverse cumulative impacts to prime and unique farmlands with implementation of the St. James project due to the small amount of farmland affected within the parish.

Future Conditions in Maurepas Swamp

In 50 years, the MSA-2 mitigation area would likely still contain these prime farmland areas north of Hwy. 61 given the area is primarily wetlands and remote; however, there may be slight decrease in prime farmland areas south of Hwy. 61 due to climate change, urban, and industrial development.

Maurepas Swamp Alternative - 2 (MSA-2: Public Land Only; Preferred Alternative)

Direct Impacts

There would be direct long-term impacts to prime farmland classified soil areas where MSA-2 features are planned to be located. The construction of the proposed alternative features

would remove up to approximately 93 acres of prime farmland soils. There would be significant adverse direct impacts to prime and unique farmlands with implementation of this alternative.

Indirect Impacts

The construction of the proposed alternative features would remove prime farmland soils. Potential agricultural production in the parish would be affected and would be expected to decrease minimally. There would be insignificant adverse indirect impacts to prime and unique farmlands with implementation of this alternative due to the small amount of farmland affected within the parish.

Cumulative Impacts

The implementation of MSA-2 would affect prime farmland. The cumulative impacts to prime farmlands would be the impacts of the proposed alternative combined with other losses of prime farmland soils resulting from natural processes and development in the parish. A negligible adverse effect on agricultural production in the parish would occur due to the small amount of prime farmland affected. There would be insignificant adverse cumulative impacts to prime and unique farmlands with implementation of this alternative due to the small amount of farmland affected within the parish.

Future Conditions in Pine Island and St. James

In 50 years, the St. James project area would likely still contain these prime farmland areas given the area is primarily used for agricultural production; however, there may be slight decrease in prime farmland areas due to climate change and urban development. The Pine Island project area occurs in open water and existing wetlands and therefore contains no prime or unique farmlands.

4.1.17 Hydrology

No Action Alternative (BBA Alternative)

Direct Impacts

Pine Island would restore a swamp hydrology to the area with sheet flow through the newly created forested habitat. The increase in substrate elevation would reduce water surface elevation for this project. There would still be tidal exchange with Lake Pontchartrain.

St. James would restore a swamp hydrology to the area with sheet flow through the newly created forested habitat. Water surface elevations would increase within the project area. Water exchange between the St. James project area and surrounding habitats would increase.

Indirect Impacts

Increasing surface water exchange between forested wetlands and other habitats would provide access for many organisms and within the project area and vicinity. See fisheries and aquatic resources and EFH sections for more information.

Cumulative Impacts

Construction and maintenance of these projects would increase surface water exchange between forested wetlands and other habitats, which is likely to decrease as forested wetland habitats decrease in the future. Benefits associated with increasing exchange between forested wetlands and other habitats are discussed in other resource sections.

Future Conditions in Maurepas Swamp

Forested wetlands in the area are expected to continue to decline and some experts predict that most or all of these forests would be lost within the next 50 years (Shaffer et al., 2016). Hydrology in the Lake Maurepas and swamp habitats would change to more open water, more emergent marsh habitats, and more tidal influence. Lake Maurepas is likely to become bigger as land is lost around its rim.

The Mississippi River is likely to be maintained as a deep draft navigation channel with similar water level patterns as observed today. Implementation of MSA-2 is not likely to significantly affect Mississippi River hydrology.

Maurepas Swamp Alternative - 2 (MSA-2: Public Lands Only; Preferred Alternative)

Direct Impacts

MSA-2 would restore Mississippi River water into the diversion influence area. The influx of river water would increase water surface elevations within the diversion influence area when operating and would increase and/or restore sheet flow throughout the swamps and marshes in the outfall area. Hydrological impacts to wetland habitats are anticipated to be beneficial for the receiving area. Based on hydrological modeling results, some Mississippi River water would reach Lake Maurepas, especially in the vicinity of the mouths of Blind River to Reserve Relief Canal (Appendix A, Figure 5). There are no anticipated impacts to structures associated with any changes in hydrology. See hydrological modeling in Appendix M for more details.

Water diverted from the Mississippi River would be up to approximately 2,000 cfs, which would reduce the Mississippi River's total flow downstream of the MSA-2 project area by approximately the same amount. The maximum capacity of the MSA-2 channel decreases as Mississippi River discharge decreases. Impacts to the hydrology of the Mississippi River are expected to be minimal, because the amount of water diverted for MSA-2 would be much smaller than the discharge of the Mississippi River. See the operations manual in Appendix N for more information.

Direct impacts to the hydrology of Lake Maurepas are expected to be minimal because the MSA-2 would only provide water part of the year, these waters are expected to primarily impact part of the Lake (Appendix A, Figure 5), and a maximum discharge of 2,000 cfs is typically lower than other riverine water sources into Lake Maurepas (e.g., Amite River has a baseline flow of 1,000 to 2,500 cfs with flows over 10,000 cfs being common during high rainfall events).

Additionally, there is no anticipated tidal flooding to occur near the diversion structure at the Mississippi River. While there is an anticipated increase in water surface elevation from the diversion operations, this is primarily confined to the uninhabited portion of the Maurepas Swamp area bounded by Blind River to the west, Lake Maurepas to the north, Reserve Canal to the East, and I-10 to the south (see Figure 4-3 below). Also, the diversion would not be operated when there is a weather event that could adversely affect tidal flooding.

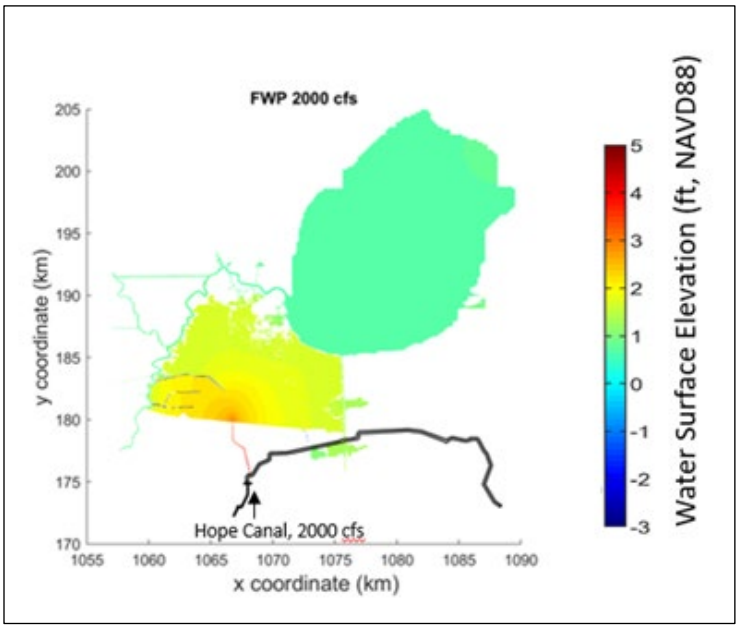

Figure 4-3: MSA-2 Water Surface Elevation

The operations of the diversion would not affect tidal levels to communities outside of the project footprint including the surrounding communities in Ascension, St. James the Baptist, St. Charles, and Livingston Parishes. Any diversion water that reaches Blind River is captured and eventually carried to Lake Maurepas where water level surface elevation changes related to the diversion running would be negligible (see Figure 4-3). Thus, the risk to public health and safety would be low.

The LDWF has concerns about the effects of water level increases on the WMA, described in section 2.8.4 areas of controversy.

Mississippi River Levee System

The MSA-2 features adjacent the MR&T levee are being designed, constructed, and maintained to HSDRRS standards and would follow all required engineering regulations and

guidelines. During construction an earthen coffer dam would be constructed to replace a section of the existing MRL. This cofferdam would be maintained to MR&T standards throughout construction; therefore, impacts are minor. Post-construction, the intake structure would be integrated into the levee and meet all MR&T standards; therefore, impacts are negligible.

West Shore Lake Pontchartrain Levee System

The MSA-2 would have a negligible increase to surge elevation and wave height leading to negligible impacts on public health and safety in reaches within the WSLP levee system.

The Delft3D hydraulic modeling study by CPRA (FTN, 2020) and the HEC-RAS modeling study by the USACE (Agnew, M., 2019) showed that during the PO-0029 project operation at 2,000 cfs, the increase in water level due to the presence of the WSLP project is less than 0.2 foot; therefore, impacts are negligible.

Additional Risk Reduction Levees

There are no anticipated risks to any other risk reduction levees in the area, nor any anticipated risks to induced flooding to communities outside the mitigation area, as any increases in water levels from the project are confined to the uninhabited portion of the Maurepas Swamp area bounded by Blind River to the west, Lake Maurepas to the north, Reserve Canal to the East, and Interstate I-10 to the south.

Indirect Impacts

There would be negative indirect impacts associated with construction of the MSA-2 diversion channel and culverts under I-10. The channel would act as a levee or spoil bank in the wetland system and alter the existing flow regime. These impacts would result in slight increases in water levels, slight decreases in tidal exchange, and reduced drainage between the Blind River, I-10, Reserve Relief Canal and Highway 61. Some of these impacts would be reduced by construction of LRVs in the channel. The magnitude and extent of these impacts is currently under investigation.

The direct beneficial impacts discussed in the section above are very likely to outweigh the negative indirect impacts to hydrology discussed in this section. More information on this would be added when the current evaluation is completed.

Cumulative Impacts

Seasonal flooding of coastal wetlands by Mississippi River water would remain unchanged for much of its corridor. However, MSA-2 in would incrementally improve this widespread hydrologic impairment. There are many other controlled freshwater diversion projects in operation (e.g., Caernarvon Freshwater Diversion, Davis Pond Freshwater Diversion, Naomi Siphon, West Pointe a la Hoche Freshwater Diversion) and being planned (e.g., Barataria Sediment Diversion, Breton Sediment Diversion) in coastal Louisiana (Appendix A, Figure 6; Appendix B, Tables 16-18) and MSA-2 would add an incremental beneficial impact to

hydrology by partially restoring the natural connectivity between the Mississippi River and coastal wetlands in the MSA-2 area and vicinity.

There are many levees, roads, spoil banks and other unnatural linear high ground areas that exist and are being constructed (e.g., WSLP) in the vicinity. The construction of the Diversion Channel would add an incremental negative impact to the already altered hydrology south of I-10, by reducing the sheet flow within wetlands, the exchange between Hope Canal and the surrounding wetlands, and the drainage potential.

There would also be a benefit to the hydrology between I-10 and Hwy. 61 associated with operation of the LDVs. These features would release Mississippi River water into the wetlands surrounding the conveyance channel in this area. Additionally, they would reduce and minimize hydrologic impacts associated with reduced sheet flow within wetlands, reduced exchange between Hope Canal and the surrounding wetlands, and reduced drainage potential by allowing for water to be exchanged between the conveyance channel and surrounding wetlands. The net hydrologic impact in this area is expected to be slightly negative because the negative impacts to sheet flow, exchange, and drainage are expected to be slightly larger than the benefits associated with implementation of the LDVs. See the WVA Project Information Sheet and hydrology appendix for more information (Appendix E and Appendix M).

Future Conditions in Pine Island and St. James

Areas associated with the No Action Alternative, Pine Island and St. James, would not be converted from their existing condition to swamp habitat. St. James would likely continue to be used as agricultural land into the future and the hydrology is not likely to significantly change in the future if it is continued to be used as such. In Pine Island, shallow open water ponds would become deeper and eventually become more hydrologically connected to Lake Pontchartrain. The rim of Lake Pontchartrain in this area could be lost in the future and the Pine Island area would become part of Lake Pontchartrain if this were to happen.

Section 5
MSA-2 BLH and Marsh Impact Mitigation

This section addresses only compensatory habitat mitigation due to construction and operation of MSA-2 and not the activities performed during project planning to avoid, minimize, rectify, or reduce habitat impacts from the alternative. A summary of those actions is included in Table 5-1. Efforts taken to avoid, minimize, rectify and or reduce habitat impacts still resulted in unavoidable impacts to fish and wildlife resources that required development of a compensatory habitat mitigation plan.

Table 5-1: Measures to Avoid and Minimize Impacts

Measure to Avoid/Minimize	Measure Component	Ways Avoided/Minimized
Intake structure	Design and operation	Reduces impacts to sturgeon
Diversion channel	Design	Reduces direct impacts to wetlands
Lateral discharge valves	Design	Reduces indirect impacts to wetlands

The intake structure for MSA-2 was designed using the recommendations from the 2008 USACE ERDC report, ERDC/EL TR-09-19, Evaluation of Potential Impacts of the Lake Maurepas Diversion Project to Gulf and Pallid Sturgeon. These recommendations were meant to reduce the chance of entrainment of adult pallid sturgeon. Additionally, the diversion would be operated so that withdrawal of water would occur from near the surface of the river (based upon river stage and season) to make entrainment less likely.

The MSA-2 diversion channel would share the right-of-way/footprint with the WSLP project levee for approximately 2.25 miles. This reduces the overall footprint of the diversion by eliminating the need for an eastern guide levee. From approximately 0.5 mile north of Hwy. 61 to the terminus of the project, the MSA-2 channel uses the existing Hope Canal as much as practically possible. This eliminates the need to excavate a new conveyance channel through the cypress swamp. The design of all guide levees, access roads, and staging areas will be optimized to minimize the overall project footprint and avoid additional environmental impacts.

Up to approximately 32 lateral discharge valves would be constructed between Airline Highway and I-10 to allow water exchange to wetlands between the conveyance channel and areas east and west of the channel.

The WRDA of 1986 and subsequent revisions require mitigation from unavoidable and irrevocable impacts due to construction of an authorized project to be mitigated for prior to, or concurrent with, construction impacts requiring compensatory mitigation. Based on the most recent designs, the WSLP project would impact approximately (~) 947 AAHUs of CZ

swamp habitat and ~293 AAHUs of CZ BLH habitat (Table 5-2). Construction and operation of MSA-2 would result in additional impacts: ~206.5 AAHUs of CZ swamp, ~35.8 AAHUs of CZ BLH, and ~19.5 AAHUs of CZ marsh (Table 5-2). Swamp impacts resulting from both WSLP and MSA-2 would be mitigated through construction and operation of MSA-2 as discussed throughout this document. BLH impacts resulting from both WSLP and MSA-2 would be mitigated per the federally approved plan discussed in EA #576 as summarized below. Marsh impacts resulting from construction and operation of MSA-2 would be mitigated through construction of one or a combination of mitigation bank credits and the Guste Island marsh creation project as discussed below.

Table 5-2: Impacts Incurred by Both WSLP and MSA-2

Habitat Type Impacted	WSLP	MSA-2
Swamp	~947 AAHUs	~206.5 AAHUs
BLH	~293 AAHUs	~35.8 AAHUs
Marsh	0	~19.5 AAHUs

In accordance with the USACE Guidance for Section 1163 of the WRDA 2016, Mitigation for Fish and Wildlife and Wetlands Losses, and Appendix C to ER 1105-2-100, compensatory mitigation for MSA-2 was formulated to occur within the same watershed as the impacts and to replace the functions and services of each habitat type with functions and services of the same habitat type. Consistent with how regulatory define the service area of mitigation banks, tidal marsh impacts would be mitigated within the deltaic plain.

Mitigation Banks

USACE approved mitigation banks with perpetual conservation servitudes within the LPB for BLH and within the Mississippi Deltaic Plain for marsh, currently in compliance with their MBI and able to service the CZ habitat types impacted by the MSA-2 are also considered as potential mitigation projects.

Mitigation banks capable of supplying the CZ credits needed to meet the BLH and marsh mitigation requirements at the time of solicitation is uncertain at this time. 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 the 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 SEIS. 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.

Since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect or cumulative impacts to any resources would be incurred from the purchase of these credits for mitigation.

BLH

EA #576 discussed approximately 1,504 AAHUs of swamp and 343 AAHUs of BLH impacts due to WSLP. Since the approval of EA #576, the impacts due to WSLP have been reduced, as shown above. Due to the reduction of BLH impacts from WSLP, there is opportunity to mitigate MSA-2 BLH impacts per the federally approved plan in EA #576. Per EA #576, the BLH impacts would be mitigated through implementation of one or a combination of the following projects (Table 5-3). Based on costs of recent purchases of BLH mitigation bank credits, mitigation banks generally rank above CEMVN's constructed projects and would be implemented first. However, this ranking would be verified at the time of implementation.

Table 5-3: BLH Mitigation Projects Approved in EA #576

Project	~AAHUs	~Acres
Mitigation Banks	TBD	TBD
St James	Up to ~36	Up to ~73.4

St. James is existing agricultural land and is within the CZ and within LPB. In EA #576, St James was inadvertently assessed as out of CZ. During public review, LDNR stated that it is in fact within the CZ. Even though St. James is a project within the approved alternative for WSLP swamp mitigation, it would not be used as swamp mitigation since the CPRAB is proposing MSA-2. Therefore, St James would be used as mitigation for WSLP BLH impacts. Additionally, St. James can fully mitigate the BLH impacts and therefore, the rest of the projects within the federally approved plan would not be needed (except for mitigation banks).

This project would require a reduction of site elevations. This would be accomplished by removing the top 6 inches to 1 foot of soil. The removed earthen material would be used to fill depressions at the site to achieve uniform target elevations throughout the site or would be hauled off by a contractor to a government-approved disposal area. Additional construction activities could consist of construction of new access roads, clearing and grubbing, backfilling of existing ponds/ditches, demolition of onsite structures, leveling/harrowing soil to receive planting, and planting of canopy and mid-story plant species required to establish BLH habitat. See Appendix G, Project Descriptions for full project description of the St. James project as discussed in EA #576.

The St. James project would require monitoring and maintenance to ensure success criteria are achieved. The general guidelines for success criteria and monitoring of BLH habitat is located in Appendix G "Monitoring Plans." An adaptive management plan was also developed for this project and is located in Appendix G "Adaptive Management Plans."

Below is a summary of the impact analysis for the St. James BLH mitigation project (Table 5-4). Only resources that would be impacted are discussed. A full impact analysis for the St. James project can be found in EA #576 Appendix G: Prior Reports.

Table 5-4: Impact Summary for St James Mitigation Project

Resource	Direct Impacts	Indirect Impacts	Cumulative Impacts
Wetlands and Other Surface Waters	None	Up to ~67 acres, ~36 AAHUs replaced	would help retard the loss of wetlands.
Wildlife	Temporary adverse due to construction activities.	Up to ~67 acres, ~36 AAHUs of wildlife habitat replaced	would help retard the loss of wetlands and overall decline of wildlife species within the basin and would be beneficial to preserving species biodiversity.
Cultural Resources Programmatic Agreement (Appendix J “Agency Coordination”	Potential adverse. CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020	CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020	CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020
Recreational Resources	None	Recreational opportunities would be created once established	would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat which promote recreation opportunities.
Aesthetic Resources	Temporary adverse due to construction activities	Beneficial once established	would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat in significant contrast to man-made land use patterns that involve stripping natural landscape features
Air Quality	Temporary adverse due to construction activities	None	Temporary and minimal contribution to cumulative impacts
Noise	Temporary adverse due to construction activities	None	Temporary and minimal contribution to cumulative impacts
Socioeconomics/Land Use, Transportation	No impacts to socio-econ, land use would be converted, temporary impacts to transportation during construction	None	Combined conversion of Up to ~67 acres farmland resulting from natural processes and development in the project parishes.
Prime and Unique Farmlands	Up to ~67 acres would be converted to forest	None	The loss of Up to ~67 acres combined with other losses of prime farmland soils resulting from natural processes and development in the project parishes.

Marsh

The marsh impacts would be mitigated through implementation of one or a combination of the following projects (Table 5-5). Based on costs of recent purchases of marsh mitigation bank credits, CEMVN's constructed project would rank above mitigation banks and would be implemented first. However, this ranking would be verified at the time of implementation.

Table 5-5: Proposed Marsh Mitigation Projects

Project	~AAHUs	~Acres
Guste Island	Up to ~19.5	Up to ~75
Mitigation Banks	TBD	TBD

Guste Island is located southwest of the town of Madisonville adjacent to the Tchefuncte River in St. Tammany Parish. Even though the Guste Island mitigation project is within the Pine Island mitigation project area, which is the approved alternative for WSLP swamp mitigation, it would not be used as swamp mitigation since the CPRAB is proposing MSA-2. Therefore, Guste Island would be used as mitigation for MSA-2 marsh impacts. Guste Island is existing shallow open water within the CZ and within the Mississippi Deltaic Plain. The Guste Island project involves creation of up to ~75 acres of marsh habitat within the area(s) depicted in Appendix G: Project Descriptions as compensatory mitigation for the marsh impacts resulting from construction and operation of MSA-2. The marsh creation area(s) would be located in shallow open water areas around Guste Island on the north shore of Lake Pontchartrain. Borrow material for construction of the marsh creation area(s) would be hydraulically dredged from Lake Pontchartrain.

This project would require such construction activities as construction of containment dikes, hydraulic dredging and placement of fill material, and gapping or degrading of containment dikes after the fill material has settled to the target elevation. See appendix G, Project Descriptions, for full project description.

The Guste Island project would require monitoring and maintenance to ensure success criteria are achieved. The success criteria and monitoring plan for this project is located in Appendix G "Monitoring Plans". An adaptive management plan was also developed for this project and is located in Appendix G "Adaptive Management Plans".

Below is a summary of the impact analysis for the Guste Island mitigation project (Table 5-6). Only resources that would be impacted are discussed. Full impact analyses can be found in Programmatic Individual Environmental Report 36 Tier 1 (PIER 36 TIER 1) and EA #576 Appendix G "Prior Reports".

Table 5-6: Impact Summary for Gust Island Mitigation Project

Resource	Direct Impacts	Indirect Impacts	Cumulative Impacts
Wetlands and Other Surface Waters	None	~75 acres ~19.5 AAHUs of marsh replaced	Would help retard the loss of wetlands.
Wildlife	Temporary adverse due to construction activities. Permanent adverse to less mobile species due to dredged material disposal.	~75 acres ~19.5 AAHUs of marsh habitat replaced	Would help retard the loss of wetlands and overall decline of wildlife species within the basin and would be beneficial to preserving species biodiversity.
T&E (NLAA: GS, manatee, & sea turtles) USFWS and NMFS concurred in letters dated Jan 28, 2020, and Nov 21, 2019, see appendix G "Agency Coordination"	None	Avoidance of area due to dredging operations, notably noise and turbidity, and the loss of foraging habitat	Minimal increase in impacts to manatees, sturgeon and sea turtles in the LPB.
Fisheries & Aquatic Resources	Benefit of ~75 acres converted to marsh increasing spawning, nursery, and forage habitat.	Temporary impacts during construction due to increase in turbidity and noise	Benefit in the form of additional spawning, nursery, and forage habitat for important aquatic species in the basin.
EFH	Estuarine water bottoms converted to estuarine intertidal herbaceous wetlands (marsh). temporary impacts to benthics in borrow site	Increased turbidity and disturbance of Lake Pontchartrain in the vicinity of the borrow area. long-term benefit to the managed species	Adequately offset by the resulting increase in habitat quality
Cultural Resources Programmatic Agreement see appendix G "Agency Coordination"	Potential adverse. CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020	CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020	CEMVN would follow its Section 106 procedures as outlined in the PA dated March 2020
Recreational Resources	Temporary adverse due to construction activities	Beneficial once established	Positive cumulative effect on recreation by improving habitat for species sought after by recreational fishermen.
Aesthetic Resources	Temporary adverse due to construction activities	Beneficial once established	Would serve to impact the region in a positive way by contributing renewed natural scenery and wildlife habitat
Air Quality	Temporary adverse due to construction activities	None	Temporary and minimal contribution to cumulative impacts
Water Quality WQC 190828-02 see appendix G "Agency Coordination"	Temporary adverse due to construction activities.	Beneficial once established	Temporary and minimal contribution to cumulative impacts. Would serve to benefit regional WQ

Resource	Direct Impacts	Indirect Impacts	Cumulative Impacts
Noise	Temporary adverse due to construction activities	None	Temporary and minimal contribution to cumulative impacts
Socioeconomics/Land Use, Transportation & Commercial Fisheries	none to socio-econ, land use or transportation. Temporary adverse to commercial fisheries during construction	None	Temporary and minimal contribution to cumulative impacts

Section 6
Adaptive Management

The purpose of adaptive management activities in the life cycle of the project is to address ecological and other uncertainties (uncertainties are described in Section 2.8.4) that could prevent successful implementation of a project. Adaptive management also establishes a framework for decision making that uses monitoring results, progress toward meeting success criteria and other information as it becomes available to update project knowledge and adjust management actions so that the project can meet its objectives. Hence, early implementation of adaptive management and monitoring allows for a project that can succeed under a wide range of conditions and can be adjusted as necessary. Furthermore, an effective monitoring program is required (WRDA 2016 section 1163 for wetland mitigation which amends Section2036(c) of WRDA 2007) to determine if the project outcomes are consistent with the identified success criteria and both reduce data gaps and uncertainties and helps adjust the project as part of an iterative learning process.

All of the construction projects proposed under the No Action BBA Alternative, and MSA-2 and the St. James and Guste Isles projects (discussed in Section 5) have adaptive management plans (contingency plans) for taking corrective adaptive management actions in cases where monitoring demonstrates that the project(s) are not achieving ecological success and objectives.

The success criteria, monitoring guidelines and adaptive management actions for the MSA-2 and the No Action BBA Alternatives considered to mitigate for WSLP impacts are included in Appendix H. Monitoring and adaptive management plans related to the mitigation for marsh and BLH impacts due to the construction of MSA-2 are included in Appendix G. A summary of the location of the various adaptive management and monitoring plans developed are summarized in Table 6-1.

Table 6-1: Summary of Developed Monitoring and Adaptive Management Plans

Mitigation Project/Alternative	Habitat Type	Monitoring Plan including Success Criteria and Adaptive Management Plan	Estimated Total Cost	Estimated Cost within First 10 years
MSA-2	Swamp-WSLP impacts	Appendix H	Monitoring-38,000,000 Adaptive Management-57,000,000	Monitoring-17,000,000 Adaptive Management-35,000,000
BBA No Action	Swamp-WSLP impacts	Appendix H	Monitoring-7,000,000 Adaptive Management-2,600,000	Monitoring-900,000 Adaptive Management
Guste Island	Marsh-MSA-2 impacts	Appendix G	Monitoring-780,000 Adaptive Management-200,000	Monitoring-109,000 Adaptive Management-breakout not available
St. James	BLH-MSA-2 impacts	Appendix G	Monitoring-482,650 Adaptive Management-500,000	Monitoring-116,672 Adaptive Management-breakout not available

A summary of the potential triggers and adaptive management action for the MSA-2 are included in Table 6-2 and the adaptive management actions are further described in this section and Appendix H. Success criteria are included in Table 6-3. A trigger indicates that the monitoring data has not met or is not expected to meet the success criteria without an adaptive management action. If the mitigation project(s) trigger a need for adaptive management, CEMVN and the NFS would consult with the other agencies through the Maurepas Interagency Team to confirm the adaptive management actions needed to achieve ecological success criteria. This decision-making process is further explained in the Adaptive Management Section of Appendix H.

Funding is an important component of the planning and potential implementation of adaptive management. Over the 50-year life, implementing adaptive management measures for MSA-2 could cost a total of approximately $57,027,925.00 (see Appendix H).

Table 6-2: MSA-2 Potential Adaptive Management Triggers and Actions

Potential Adaptive Management (AM) Trigger	Potential AM actions that could be taken to address Trigger Event	Potential Associated and/or Impacted Monitoring Success Criteria
One or more monitoring success criteria metrics are not attained	• Adjust diversion operations • Alter the original mitigation area footprint • Purchase swamp mitigation credits • Reassess need to attain success criteria metric in relation to attainment of other success criteria and overall response of the swamp • Reassess ability to attain success criteria targets in relation to current environmental conditions and revise targets as needed	• All success criteria
Hydrologic connectivity between the river and swamp is not adequately achieved	• Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures	• All success criteria
Conveyance channel is eroding or clogging	• Adjust diversion operations • Clear channel of sediment/debris • Remove/treat aquatic vegetation • Fortify channel banks	• All success criteria
Hydrology is negatively impacted in the mitigation area due to siltation, erosion, or aquatic invasive species	• Adjust diversion operations • Invasive species management • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures	• All success criteria
Mitigation area is, or is anticipated to be impacted by a severe weather event	• Adjust diversion operations • CRASH monitoring	• All success criteria
Diversion operations result in water level exceeding expectations	• Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures	• All success criteria
Adjustments to Nitrate levels in the swamp are needed	• Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures	• All success criteria
Mortality increases and/or growth is reduced for non-target woody species	• TBD-based on species and extent of impact • Consider adjustments of diversion operations or outfall management	• All success criteria
Data collection methods do not sufficiently measure parameters specified in the success criteria	• Revise the Monitoring Plan as necessary to determine success	• All success criteria
Prevalence of invasive species increases or new invasive species are introduced in the diversion area	• Attempt to identify source, determine if there is a negative impact on the mitigation area, incorporate invasive species management if feasible	• All success criteria

Potential Adaptive Management (AM) Trigger	Potential AM actions that could be taken to address Trigger Event	Potential Associated and/or Impacted Monitoring Success Criteria
River conditions change	• Adjust diversion operations	• All success criteria
Existing or future projects cause unexpected interactions with MSA-2	• TBD-based on assessments	• All success criteria
Landowner exhibits concerns	• TBD-based on concerns	• All success criteria
Negative change in habitat conditions south of 1-10	• Adjust operations of lateral relief valves	• Success criteria do not apply south of I-10 • Monitoring would be conducted to ensure there are no negative impacts associated with construction and operations
Negative impact on wildlife	• TBD-based on species and impacts	• All success criteria

Potential Adaptive Management Actions for MSA-2

- If required mitigation AAHUs are not met there is a potential to expand the original mitigation project footprint. If this action is needed it would include additional monitoring.
- Purchase of swamp mitigation credits. If this adaptive management action is needed it is expected that up to 200 AAHUs and 1,418 acres may be purchased.
- Adjustments to the diversion operations as outlined in the operations plan (Appendix N). Potential adaptive management action could influence hydrologic connectivity, water levels, water quality, salinity, nutrients, invasive species, wildlife, bald cypress, water tupelo and other woody species health, sediment accumulation and surface elevations.
- Weirs - The purpose of the weirs is to increase retention time of the diverted fresh water within the swamp. It is possible that after operation of the diversion, additional weirs may be needed to optimize diversion operations and hydrology within the swamp. Three additional weirs were included as potential AM actions. Potential AM action could influence hydrologic connectivity, water levels, salinity, water quality, bald cypress, water tupelo and other woody species health, sediment accumulation and surface elevations.
- Embankment Cuts - Embankment cuts in prominent high elevation man-made features, in particular abandoned railroad embankments and canal spoil banks, are already planned as a component of the project. It is possible that after operation of the diversion reveals where water flow through the swamp is impeded, additional embankment cuts may be needed to optimize diversion operations and improve hydrologic efficiency within the swamp. Six additional embankments cuts are included as potential adaptive management action, they are expected to have similar impacts as the cuts that were planned as part of the project and remain within the same cleared project area. Potential AM action could influence hydrologic connectivity, water levels, salinity, water quality, bald cypress,

water tupelo and other woody species health, sediment accumulation and surface elevations.

- If invasive species are impacting the ability to achieve the required AAHUs, invasive Species Management can be implemented - see Section 5.5 of the adaptive management Section of Appendix H for potential adaptive management actions based on the species and the maintenance plan (Appendix N). Potential adaptive management action could influence hydrologic connectivity, water quality, bald cypress, water tupelo and other woody species health, sediment accumulation and surface elevations.

For the projects where credits would be purchased from a mitigation bank as part of the No Action BBA Alternative, 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 CEMVN and NFS of the responsibility for monitoring and of demonstrating mitigation success and Adaptive Management.

Table 6-3: Mitigation Monitoring Success Criteria

Success Criteria	Initial Success Target	Intermediate and Long-Term Success Target
Increase Forest Integrity	Stable or increasing BA (m^2/ha) and BAI (m^2/ha/yr) growth rates relative to baseline conditions for bald cypress and water tupelo in the mitigation area.	Primary and Secondary Benefit areas: 1.9-2.55x increase in BAI relative to baseline growth rates at ≥ 75% of monitoring sites Tertiary Benefit area: Demonstrate a 1.2-1.9x increase in mean BAI (m^2/ha/yr) growth rates relative to mean baseline (pre-MSA-2) growth rates at ≥ 75% of monitoring sites in the mitigation area.
Water Quality Improvement	**Nitrate (mg/L)**: 2x increase relative to baseline conditions at ≥ 75% of monitoring sites during MSA-2 operation. *If baseline concentrations are ≤ 0.1 mg/L nitrate, then target is ≥ 0.2 mg/L nitrate	All benefit areas: Attain ≥ 0.45 mg/L at ≥ 75% of monitoring sites during MSA-2 operation
	Dissolved Oxygen (mg/L): ≥ 2 mg/L at ≥ 75% of monitoring sites during MSA-2 operation	All benefit areas: Attain ≥ 4 mg/L at ≥ 75% of monitoring sites during MSA-2 operation
Increase Sediment Accumulation and Soil Surface Elevation	**Sediment Delivery and Retention**: **1)** Increased sediment retention within the mitigation area. **2)** Increased inorganic sediment content relative to baseline conditions and those observed in sites outside of the mitigation area.	None for intermediate or long-term success
	Wetland Soil Surface Elevation Change: None for initial success	Primary and Secondary Benefit areas: An additional 5.0 ± 1 mm/yr increase at ≥ 75% of monitoring sites. Tertiary Benefit area: None for intermediate or long-term success
Salinity Maintenance	All benefit areas: ≤0.8 ppt at ≥ 75% of monitoring sites	

Section 7
Coordination and Consultation

7.1 PUBLIC INVOLVEMENT

Public involvement is an important part of planning and decision-making. Agencies, non-governmental organizations, and citizens provided valuable input for the final recommendation. NEPA provides people, organizations, and governments an opportunity to review and comment on proposed major federal actions. Engaging with and receiving input from the public, interested parties, stakeholders, government agencies, and nongovernmental organizations regarding the content of the Final SEIS in all stages is critical to achieving the USACE objective of enhancing trust and understanding with customers, stakeholders, teammates, and the public through strategic engagement and communication.

7.1.1 Scoping

NEPA affords all persons, organizations, and government agencies the right to review and comment on proposed major federal actions that are evaluated by a NEPA document. This is known as the scoping process. The scoping process is the initial step in the preparation of the SEIS. The scoping process is an early and open process to help determine the scope of issues to address and identify the significant issues related to the proposed action. Therefore, the scoping process would help identify (1) the range of actions (project, procedural changes), (2) alternatives—both those to be rigorously explored and evaluated and those that may be eliminated, and (3) the environmental resources considered in the evaluation of potential environmental impacts.

A project kick-off meeting and two public scoping meetings were organized and hosted in accordance with NEPA to gather input from interested parties, agencies, and the public to consider an alternative proposed by the NFS to compensate for unavoidable impacts to swamp habitat associated with the construction of the WSLP project.

Public scoping meetings were held virtually on October 5 and 6, 2021 at the CEMVN District Office, to obtain potential compensatory mitigation measures from the general public.

The public was notified of the scoping meetings via the NOI published in the Federal Register on August 13, 2021. A public notice was mailed and/or e-mailed to the NEPA mailing list, which was comprised of the WSLP mailing and stakeholder list. A meeting notice was placed on CEMVN websites and CEMVN social media sites (Twitter, Facebook, Instagram). A media advisory was provided to local Louisiana and regional media outlets.

The public was able to provide written comments during the scoping meeting and written comments after each meeting in person, by mail, and district email (Appendix O). Additional, public comments are accepted anytime during the SEIS process via the same district email.

A scoping report was prepared that outlines the project background and scoping process to date, and summarizes the key issues identified by members of the public during the initial scoping period, which began on August 13, 2021. Comments received after October 31, 2021, are not included in the report; however, they are considered in the development of alternatives to address swamp impacts and analysis of the SEIS. An analysis of the comments identified 20 themes that are detailed in Section IV of the scoping report. The top six themes represent 53 percent of the comments received:

1. Critical line of defense
2. Mitigation in-kind & in-basin
3. Restore health and biodiversity of ecosystem
4. Mitigation bank credits
5. Mitigation needs
6. Delays to WSLP levee construction

Seventy Facebook/e-mail letters were received. Within the 70 email/letters received, there were 60 distinct comments from individuals and non-government organizations. One respondent submitted a comment via both Facebook and e-mail. One non-government entity (Spanish Lake Restoration; mitigation bank) submitted an email letter on the NOI and the scoping presentation. In total, three emails/letters were submitted from Spanish Lake Restoration. Two different form letters were submitted by e-mail 56 times by different respondents totaling 10 distinct comments. Since the form e-mails contained the same comments, they were counted as a single e-mail/letter.

7.1.2 Draft SEIS Comment Period

The release of the draft SEIS for a 45-day public comment period was published in the Federal Register (87 FR 15420; EIS No. 2022-0034) on March 18, 2022. A public notice was shared through announcements on Facebook, Instagram, and through media outlets.

The draft SEIS was subsequently retracted from public review on April 1, 2022, to correct outdated information integral to the study. An Addendum was prepared explaining the changes made to the draft document and the Draft SEIS was re-released for a second 45-day public review period. The second 45-day public review period was announced in the Federal Register on April 15, 2022 (87 FR 22531; EIS No. 20220051). The public comment period ended May 31, 2022.

A Public information meeting was held virtually on May 11 and May 12, 2022, at the CEMVN District Office to provide a summary of the study and answer any questions the public might have regarding the study.

The public was notified of the public information meeting via a public notice mailed and/or e-mailed to the CEMVN NEPA mailing list, which was comprised of non-government agencies, government agencies, stakeholders in the study as well as individuals who stated they were interested in the study. A meeting notice was placed on CEMVN websites and social media sites (Twitter, Facebook, Instagram). A media advisory was provided to local Louisiana and regional media outlets.

The public was informed at the meeting on the methods by which comments should be submitted and that all comments must be received by May 31, 2022.

Table 7-1 reflects the number of comments received on the draft SEIS and the mode in which those comments were received.

Table 7-1: Number of Comment by Mode

Comment Mode	Number of Respondents	Number of Comments
e-mail submitted Letter	21	102
e-mail submitted Form letters	31	1
Total:	***52***	***103***

Comments were evaluated for recurring themes in order to gain an understanding of the key issues to address in the final SEIS. The theme categories are broad and encompassing in order to summarize the comments that were identified. Twenty recurring themes were identified. The top recurring theme was monitoring with 19 comments received. Sixteen comments received were in support of the project. Nine comments were in regard to water quality seeking clarification of statements made or statement of inconsistency and seven comments were in regard to seeking the cost used for other mitigation projects, estimates utilized for mitigation banks or the date in which the costs were determined.

A full discussion of the public review period, public information meeting, comments received and CEMVN responses are included in the Public Review Report located in Appendix O.

7.2 AGENCY COORDINATION

Preparation of the Final SEIS was coordinated with appropriate, federal, tribal, state, and local interests, as well as environmental groups and other interested parties. The following agencies agreed to be cooperating agencies, and participate in the NEPA process:

- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Environmental Protection Agency, Region VI
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Natural Resources Conservation Service, State Conservationist
- Coastal Protection and Restoration Authority Board of Louisiana
- Advisory Council on Historic Preservation
- Governor's Executive Assistant for Coastal Activities
- Louisiana Department of Wildlife and Fisheries
- Louisiana Department of Natural Resources,
- Louisiana State Historic Preservation Officer
- Louisiana Departments of Transportation and Development
- Choctaw Nation of Oklahoma
- Mississippi Band of Choctaw Indians

Section 8
Compliance with Environmental Laws and Regulations

8.1 CLEAN AIR ACT OF 1972

The CAA sets goals and standards for the quality and purity of air. It requires the EPA to set NAAQS for pollutants considered harmful to public health and the environment. The project is within, or near, St. John The Baptist Parish, Ascension Parish, St. James Parish, and Livingston Parish, which all are currently in attainment of NAAQS. The BBA Alternatives occur within three parishes: Tangipahoa Parish, St. Tammany Parish and St. Mary Parish, which all are currently in attainment of NAAQS. The LDEQ is not required by the CAA and Louisiana Administrative Code, Title 33 to grant a general conformity determination.

8.2 CLEAN WATER ACT OF 1972 – SECTION 401 AND SECTION 404

The CWA sets and maintains goals and standards for water quality and purity. Section 401 requires a WQC from the LDEQ that a proposed project does not violate established effluent limitations and water quality standards. State WQC 210426-02 was received on May 3, 2021, for the WSLP Environmental Mitigation Project. CEMVN coordination letters and responses from LDEQ are found in Appendix J. Public and agency comments on water quality can be found in Appendix O. As required by Section 404(b)(1) of the CWA, an evaluation to assess the short- and long-term impacts associated with the discharge of dredged and fill materials into waters of the United States resulting from this project has been completed. The Section 404(b)(1) evaluation was released for public review March 18, 2022. An updated 404(b)1 was released on May 1, 2022, for public review for a 30-day period ending on May 31, 2022. The Final Section 404(b)(1) evaluation is available in Appendix L.

8.3 COASTAL ZONE MANAGEMENT OF 1972

The Coastal Zone Management Act requires that "each federal agency conducting or supporting activities directly affecting the CZ shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." In accordance with Section 307, a consistency determination was prepared for the proposed project and submitted on February 22, 2022, to LDNR for the proposed action. On April 29, 2022, LDNR issued a letter stating the TSA is consistent with the Louisiana Coastal Resources Program (see LDNR Coastal Zone Consistency, C20190208 Mod 01, in Appendix J).

8.4 ENDANGERED SPECIES ACT OF 1973

The ESA is designed to protect and recover T&E species of fish, wildlife, and plants. CEMVN identified in an IPaC search (November 2021), three T&E species under USFWS

jurisdiction: the pallid sturgeon, Gulf sturgeon, and West Indian manatee. These species are known to occur or believed to occur within the vicinity of the proposed construction area. No threatened or endangered plants or critical habitat were identified in the proposed construction area. CEMVN has determined that the proposed MSA-2 would have no effect on the red-cockaded woodpecker and Gulf sturgeon; may affect and is likely to adversely affect the pallid sturgeon; may affect but is not likely to adversely affect the West Indian manatee, and other protected species. CEMVN initiated coordination with the USFWS on December 22, 2021. ESA consultation was finalized on June 23, 2022, with the receipt of the USFWS BO. The BA, BO, and CEMVN coordination letters and responses from USFWS are found in Appendix J.

Final RPMs and the associated terms and conditions (T&C) that were included in the Final BO are listed below.

RPM 1. Gate operation that would significantly increase or decrease the velocity through the structure should be implemented over several hours to allow fish sufficient time to migrate back to the river or swim away from the structure.

T&C 1. RPM 1. The Service's Louisiana Ecological Services Office (337-291-3126) should be notified of any proposed changes to the proposed action described in the Biological Opinion, so that re-initiation of consultation under Section 7 of the ESA can proceed as quickly and efficiently as possible.

RPM 2. The USACE will coordinate with the Service to develop a Fish Monitoring and Removal Plan for pallid sturgeon. This plan will need to be completed and approved by the Service prior to the construction of the cofferdam.

T&C 2. RPM 2. Develop a plan to be implemented for the proposed MSA Project that identifies potential avoidance and minimization measures for pallid sturgeon. Live sturgeon captured in the structure or the cofferdam area should be tagged and returned to the river.

RPM 3. A local study should be conducted over several fall and winter periods to determine acceptable levels of entrainment using estimates of abundance, mortality, and recruitment in age-structure population models.

T&C 3. RPM 3. A local study in the vicinity of the MSA Project to determine acceptable levels of entrainment would be conducted by qualified individuals. To the extent practicable, study data would be collected in coordination with other ongoing USACE pallid sturgeon studies in the LMR below the ORCC in order to understand pallid sturgeon populations in the vicinity of MSA Project, including impacts of migration/movement and/or entrainment in other structures between MSA Project and the ORCC on pallid sturgeon populations in the vicinity of MSA Project. The findings of this study will be used to inform operations of the MSA Project to minimize take of pallid sturgeon and may improve knowledge of impacts of diversion entrainment on pallid sturgeon populations in the LMR generally. A final report of the findings from the study would be submitted to the Louisiana Ecological Services Office once it has been completed.

RPM 4: Ensure that the terms and conditions are accomplished and completed as detailed in this incidental take statement including the completion of reporting requirements.

T&C 4. RPM 4. Upon locating a dead, injured, or sick individual of an endangered or threatened species, the USACE must notify the Louisiana Ecological Services Office at Lafayette, Louisiana at (337) 291-3100 within 48 hours. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

T&C 5. RPM 4. A report describing the actions taken to implement the terms and conditions of this ITS shall be submitted to the Field Supervisor, U.S. Fish and Wildlife Service, 200 Dulles Drive, Lafayette, LA 70506, within 60 days of the completion of project construction. This report shall include the dates of work, assessment, and actions taken to address impacts to the pallid sturgeon, if they occurred.

8.5 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act is intended to minimize the impact of federal programs on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Projects are subject to requirements if they may irreversibly convert farmland to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. In its review of the proposed project, the NRCS assessed the number of prime farmland acres impacted by the proposed project and it did not indicate that the project would impact NRCS work in the vicinity. No actions will be taken to avoid impacts to farmland. USACE coordination letters and responses from NRCS are found in Appendix J.

8.6 FLOODPLAIN MANAGEMENT

EO 11988 (Floodplain Management) requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. EO 11988 further directs federal agencies to reduce flood loss risk; minimize flood impacts on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains. The objectives of EO 11988 were considered; however, CEMVN has determined that floodplain impacts, if any, from the proposed work would be mainly beneficial. Additionally, there is no practicable alternative for the proposed work outside the 100-year floodplain. As stated previously, the purpose of this SEIS was not to evaluate suite of measures and alternatives to address the WSLP swamp impacts, only the MSP was examined as requested by the NFS. The full analysis of measures and alternatives took place in approved EA 576. CEMVN solicited comments from FEMA and the community of floodplain administrators for St. Charles, St. James, and St. John the Baptist Parishes during the scoping and draft SEIS public review periods. No public or agency comments were received regarding floodplain management.

8.7 FISH AND WILDLIFE COORDINATION ACT OF 1934

The Fish and Wildlife Coordination Act (FWCA) provides authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. The FWCA requires that fish and wildlife resources receive equal consideration to other project features. The FWCA also requires federal agencies that construct, license or permit water resource development projects to first consult with the USFWS, NMFS and state resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. Section 2(b) requires the USFWS to produce a CAR that details existing fish and wildlife resources in a project area, potential impacts due to a proposed project and recommendations for a project.

The USFWS provided a planning aid letter to CEMVN on June 3, 2021, which stated the proposed Maurepas diversion "would likely help restore some degree of sustainability to the degrading Maurepas Swamp" (Appendix J). Additionally, the letter provided comments that would help CEMVN assess the MSP as a mitigation alternative. A Final CAR was received on June 8, 2022, and provided 12 recommendations to ensure that the envisioned swamp benefits are achieved, unnecessary impacts are avoided and/or minimized, and that unavoidable impacts to fish and wildlife resources are mitigated (Appendix J). These 12 recommendations and CEMVN's responses are provided below.

8.7.1 USFWS Final CAR Recommendations and CEMVN Responses

The hydrologic reconnection would enhance swamp habitat in the Maurepas Swamp by strategically delivering nutrient-laden river water to improve 104,746 acres of Cypress-Tupelo swamp. The planned re-introduction of those Mississippi River water inputs would also serve to improve the sustainability of the Maurepas swamp ecosystem. Given these anticipated system level benefits, the USFWS does not object to the selection of MSA-2 to mitigate WSLP project swamp impacts, provided that the following recommendations are enacted to ensure that the envisioned swamp benefits are achieved, unnecessary impacts are avoided and/or minimized, and that unavoidable impacts to fish and wildlife resources are mitigated.

1. CEMVN should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the planning, engineering and design of project features to ensure that those features are located and designed to avoid and minimize wetland impacts and associated fish and wildlife resources.

   CEMVN Response: Concur. CEMVN will continue to coordinate with the USFWS throughout the planning, engineering and design of the proposed project. All efforts will be made to first avoid and minimize wetland impacts to the extent practicable.

2. Project impacts to BLH and marsh should be minimized to the greatest degree possible, and unavoidable impacts should be mitigated in a manner approved by the Service and other natural resource agencies.

CEMVN Response: Concur. CEMVN will continue to take efforts to avoid and minimize impacts to the extent practicable. Unavoidable impacts will be mitigated and are addressed in the mitigation plan in Appendix G in the SEIS. This mitigation plan has been coordinated with the Service and other natural resource agencies to ensure the compensatory mitigation can be achieved. This coordination will continue throughout the project life.

3. Surplus MSP swamp compensation should not be considered available as potential compensation for swamp impacts resulting from projects other than WSLP.

   CEMVN Response: Concur. All public areas suitable for producing wetland benefits and providing compensatory mitigation have been identified and are being used for this project.

4. CEMVN should coordinate with the LDWF regarding work conducted on the Maurepas Swamp WMA and should make monitoring results and operations information available to LDFW Point of Contact Kyle Balkum, Phone # 225-765-2819.

   CEMVN Response: Concur. CEMVN will continue to coordinate with the LDWF concerning project development, monitoring and operations plans. All monitoring results and operations information will be made available to LDWF, especially those results that pertain to LDWF owned land.

5. Monitoring of the Davis Pond and Caernarvon Diversions indicated that some contaminants were being introduced into the receiving areas from the Mississippi River. To address potential impacts of future contaminants on fish and wildlife resources, the Service recommends that pre- and post-operation sampling of wildlife, fish, and/or shellfish, from the outfall area and the Mississippi River be undertaken. Preferably, sampled species from the outfall area should forage exclusively within the diversion outfall area. The Service recommends that CEMVN, in coordination with the Service, develop a list of contaminants to be analyzed. The list of contaminants to be analyzed would be taken from the most recent EPA Priority Pollutants and Contaminants of Concern (COC) list. Periodic post-operational sampling should start after sufficient time for potential contaminants to accumulate (i.e., 3 to 5 years) and the frequency of subsequent periodic sampling (e.g., 3 to 5 years) would be predicated upon levels of contaminants detected. Expansion of sampling to local nesting bald eagles, (e.g., fecal and blood samples analyzed for the same contaminants) would also be predicated upon the type and level of contaminants detected. If high levels of contaminants are found, the Service and other resource agencies should be consulted. This adaptive sampling plan should be developed in cooperation with the Service and other natural resource agencies and implemented prior to operation.

   CEMVN Response: Concur. WQ, pollutant and containment monitoring is included in the AM Plan (Appendix H). CEMVN will work closely with the Service in developing

an adaptive pre- and post-operational plan to evaluate any potential for contaminates and potential for impacts to fish and wildlife resources.

6. The Service recommends that consideration be given to operating the diversion in a manner that would prevent or minimize adverse impacts to wetlands due to prolonged inundation and focus on the overall enhancement of the entire project area to the greatest extent possible.

   CEMVN Response: Concur. CEMVN, in conjunction with the NFS, will make every effort to maximize the environmental benefits and avoid any negative effects from operation of the diversion to ensure the project satisfies its compensatory requirement. Additional monitoring south of I-10 has been added to ensure impacts are avoided to the maximum extent or identified and mitigated as appropriate.

7. The Service recommends development of a detailed Monitoring and Adaptive Management (MAM) Plan to inform operational decisions in order to minimize adverse impacts where possible. The MAM plan should be developed through coordination with the Service, NMFS, and other resource agencies. At a minimum, the MAM Plan should conduct the monitoring described in ERDC's "Success Criteria for Mississippi River Reintroduction into Maurepas Swamp: Ten Year Targets."

   CEMVN Response: Concur. As outlined in the Monitoring and Adaptive Management Plans in Appendix H, coordination with the resource agencies and the NFS is a critical component to ensuring full satisfaction of the project's mitigation requirements. These Monitoring and Adaptive Management Plans will be adhered to by CEMVN and its NFS or modified in coordination with the resource agencies as necessary.

8. A report documenting the status of implementation, operation, maintenance and adaptive management measures should be prepared every three years by the managing agency and provided to CEMVN, the Service, NMFS, EPA, LDNR, CPRA, and the LDWF. That report should also describe future management activities and identify any proposed changes to the existing management plan.

   CEMVN Response: Concur. Reporting requirements specified in the Monitoring and Adaptive Management Plans will be followed or modified in coordination with the resource agencies as necessary.

9. Further detailed planning of project features and any adaptive management and monitoring plans should be developed in coordination with the Service and other state and federal natural resource agencies so that those agencies have an opportunity to review and submit recommendations on work addressed in those reports and plans.

CEMVN Response: Concur. CEMVN will continue to closely coordinate development of project features, adaptive management and monitoring plans with the Service and the resource agencies.

10. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. During project construction a qualified biologist should inspect the proposed construction site for the presence of documented and undocumented wading bird nesting colonies and bald eagles.

    a. All construction activity during the wading bird nesting season (February through October 31 for wading bird nesting colonies, exact dates may vary) should be restricted within 1,000 feet of a wading bird colony. If restricting construction activity within 1,000 feet of a wading bird colony is not feasible, CEMVN should coordinate with FWS to identify and implement alternative BMPs to protect wading bird nesting colonies.

    b. During construction activities, if a bald eagle nest is within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary, and those results should be forwarded to this office.

CEMVN Response: Concur. CEMVN will conduct necessary monitoring prior to any construction activity and establish no work areas within 1,000 feet of identified wading bird colonies. If it becomes infeasible to establish the no work zone, CEMVN will coordinate closely with the Service. During construction, CEMVN will identify/evaluate any bald eagle nests in the vicinity or adjacent to the project area in accordance with the FWS guidelines. We will consult as necessary with the Service.

11. The Service provided a BO to CEMVN regarding project-related impacts to federally listed species and recommends that CEMVN contact the Service and the LDWF for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat, 3) the action is modified in a manner that causes effects to listed species or designated critical habitat, or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made or finalized.

CEMVN Response: Concur. CEMVN will continue to coordinate closely with the Service and natural resource agencies as the project goes through planning, engineering and design. We will keep the resource agencies apprised of any new project development, changes to the proposed plan and unanticipated impacts. CEMVN will coordinate closely with the Service if there are designations of new listed species or critical habitat.

12. The Service recommends that to the extent feasible, all dredged material removed from the settling basin should be used beneficially to enhance nearby coastal habitats that are in decline or to augment coastal restoration projects/features.

CEMVN Response: Understood. Modification of the current disposal plan for this maintenance material should be addressed by CPRA. Any additional cost for such modifications would be solely the responsibility of CPRA.

8.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

Pursuant to USACE policy, potential HTRW concerns are to be identified early and construction in HTRW-contaminated areas is to be avoided to the extent practicable. After an initial HTRW assessment, in the absence of a known HTRW concern, the proposed mitigation site would not require an HTRW investigation.

ER 1165-2-132 provides that in the planning, engineering and design (PED) phase that, for proposed project in which the potential for HTRW problems has not been considered, an HTRW initial assessment, as appropriate for a reconnaissance study, should be conducted as a first priority. If the initial assessment indicates the potential for HTRW, then testing, as warranted, and analysis similar to a feasibility study should be conducted prior to proceeding with the project design.

The areas for the proposed Maurepas Diversion project features were surveyed via site visits, aerial photography, topographic maps, and data base searches. An ASTM 1527-13 Phase I Environmental Site Assessment (ESA), HTRW 21-06 dated September 2, 2021, has been completed (Appendix P). The probability of encountering HTRW for the proposed action was determined to be low based on the initial assessment. An update to the September 2, 2021, Phase I ESA was completed on November 8, 2022 (Appendix P). No recognized environmental conditions (REC) were identified during the updated ESA and the probability of encountering HTRW for the proposed action remains low. If a recognized environmental condition is identified in relation to the proposed construction area, CEMVN would take the necessary measures to avoid the recognized environmental condition so that the probability of encountering or disturbing HTRW would continue to be low.

8.9 MAGNUSON-STEVENS FISHERIES CONSERVATION AND MANAGEMENT ACT

The MSFCMA, as amended, Public Law 104-208, addresses the authorized responsibilities for the protection of EFH by NMFS in association with regional fishery management councils. MVN began coordination with NFMS regarding MSFCMA and EFH on April 23, 2021. The NMFS has a “findings” with CEMVN on the fulfillment of coordination

requirements under provisions of the MSFCMA. In those findings, CEMVN and NMFS have agreed to complete EFH coordination requirements for federal civil works projects through the review and comment on NEPA documents prepared for those projects. The Draft SEIS was provided to the NMFS for review and comment during the public review period. The NMFS Habitat Conservation Division stated they had no objections related to the draft SEIS via email correspondence dated June 1, 2022 (see Appendix J).

8.10 MIGRATORY BIRD TREATY ACT

The bald eagle was removed from the List of Endangered and Threatened Species in August 2007 but continues to be protected under the BGEPA and the MBTA. Colonial nesting wading bird, neotropical migratory birds, and other birds are protected under the MBTA (50 CFR 10.13). During nesting season, construction and other related activities must take place outside of USFWS/LDWF buffer zones. A CEMVN Biologist and USFWS Biologist have surveyed for nesting birds prior to associated work described in SEA #570 that is ongoing. No nesting birds were found during the survey. Surveys for bald eagle nests and colonial nesting waterbirds would be conducted prior to construction. In addition, CEMVN recommends that onsite contract personnel be trained to identify colonial nesting birds and their nests and avoid affecting them during the nesting season. Coordination with the USFWS and the LDWF would continue throughout the project planning and implementation phase.

8.11 NATIONAL HISTORIC PRESERVATION ACT OF 1966 – NEPA COORDINATION/SECTION 106 CONSULTATION

The consideration of impacts to historic and cultural resources is mandated under Section 101(b)4 of NEPA as implemented by 40 CFR, Parts 1501-1508. Section 106 of the NHPA requires federal agencies to take into account their effects on historic properties (i.e., historic and cultural resources) and allow the ACHP an opportunity to comment. Historic properties are identified by qualified agency representatives in consultation with interested parties. CEMVN would fulfill its Section 106 of the NHPA procedures through an existing PA executed March 4, 2020, and titled Programmatic Agreement Among the U.S. Army Corps of Engineers, New Orleans District; Amite River Basin Commission; East Baton Rouge Parish; Louisiana Coastal Protection and Restoration Authority; Louisiana Department of Transportation and Development; Pontchartrain Levee District; Louisiana State Historic Preservation Officer of the Department of Culture, Recreation & Tourism; and Choctaw Nation of Oklahoma; Regarding the Bipartisan Budget Act of 2018 Compensatory Habitat Mitigation Program for the Comite River Diversion, East Baton Rouge Parish Watershed Flood Risk Management, and West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Projects In Louisiana (2018 BBA Mitigation PA).

The existing PA establishes an alternative process for CEMVN to fulfill its obligations under Section 106 of the NRHP for Undertakings associated with the Compensatory Mitigation Program (BBA Mitigation Program). The Programmatic Agreement (PA) provides Standard Treatment Measures agreed upon by SHPO, federally recognized Tribes, and NFS. For the Maurepas Project, CEMVN would use the NHPA stipulations and conditions detailed within

the PA to protect cultural and historic resources and ensure the Undertakings are in compliance with Section 106 of the NRHP. On October 19, 2021, CEMVN submitted a consultation letter to LA SHPO, NFS, and appropriate federally recognized Tribes that described the proposed Maurepas Project (Undertaking) and its intent to use the existing PA to govern its NHPA compliance efforts.

Additional cultural resources surveys, under the existing PA, will likely be required due to low survey coverage and presence of known significant archaeological sites. At the present time, the impacts associated from the moderate rise in water surface elevation (roughly 1 foot, see Figure 4-3) in the vicinity of the known sites indicates that impacts may not be adverse, however, implementing the process in the 2018 BBA Mitigation PA may locate significant sites in other locations or may otherwise necessitate archaeological data recover. In the case this were to occur, consideration will need to be given to seeking a waiver under Section 208 of the NHPA Amendments of 1980 consistent with guidance in ER 1105-2-100; Appendix C-4 (h)(3); however, given the distance of the currently known resources from the diversion's planned outflow and the minimal change in water surface elevation, and the general objective to revitalize the existing swamp environment, thereby enhancing the stabilizing vegetation in the vicinity of the known sites, the likelihood of adversely affecting sites is considered to be low.

8.11.1 Archaeological Resources Protection Act of 1979

A federal permit under the ARPA (16 U.S.C 470aa-470mm; 32 CFR Part 229; 43 CFR Part 7; 36 CFR Part 296) would be obtained from the appropriate federal land manager prior to the commencement of field work for any excavation, removal, alteration or destruction of archaeological resources occurring within federal and Indian lands, including disposition of archaeological resources from such sites.

8.12 SCENIC RIVERS ACT

8.12.1 Louisiana Scenic Rivers Act of 1988

The LDWF is the lead state agency in the State Scenic River Program. Archaeological resources within scenic river corridors are protected by law under the Louisiana Scenic Rivers Act of 1988. While multiple rivers are located in the planning area, only Blind River has the potential for being impacted by the project. In addition to the extra protections afforded to cultural resources under the Louisiana Scenic Rivers Act, Bayou St. John its point of origin to its entrance into Lake Pontchartrain is designated as a "Historic and Scenic River," which requires that "full consideration shall be given to the detrimental effect of any proposed action upon the historic and scenic character thereof, as well as the benefits of the prosed use."

On August 25, 2021, LDWF determined that there would be no anticipated impacts to Blind River from the proposed project under adherence to service recommendations (See Appendix J for personal coordination with Chris Davis, LA Scenic River Coordinator).

8.13 EXECUTIVE ORDER 12898: ENVIRONMENTAL JUSTICE

EO 12898 of 1994 and the Department of Defense's Strategy on Environmental Justice of 1995 direct federal agencies to identify and address any disproportionately high and adverse human health or environmental effects of federal actions to minority and/or low-income populations.

Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or some other race or a combination of two or more races. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

Low-income populations are those whose income is below the Census Bureau's statistical poverty threshold for a family of four. The Census Bureau defines a "poverty area" as a census tract or block numbering area with 20 percent or more of its residents below the poverty threshold level and an "extreme poverty area" as one with 40 percent or more below the poverty threshold level.

Impacts to areas of EJ concern from construction of the BBA Alternative, MSA-1, and MSA-2 are expected to be minimal and short-term occurring during construction activities. Overall, there are no permanent disproportionately high and adverse human health or environmental effects from the proposed activities.

Public outreach was conducted in the area of EJ concern, Garyville, Louisiana, to gain insight from residents about potential positive and adverse impacts associated with the construction of the MSP. A total of eight entities were contacted, four local churches, two non-profits that serve residents of the area, the local public library, and Councilmember Warren Torres' office. Of those contacted, two churches, one non-profit, the local library, and Councilmember Torres agreed to notify residents of the public meeting. Additionally, the library agreed to broadcast our virtual public meeting in the lobby for incoming patrons.

8.14 EXECUTIVE ORDER 13175: CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

It is the policy of the federal government to consult with federally recognized Tribal governments on a government-to-government basis as required in EO 13175 ("Consultation and Coordination with Indian Tribal Governments;" U.S. President 2000). The requirement to conduct coordination and consultation with federally recognized Tribes on and off Tribal lands for "any activity that has the potential to significantly affect protected tribal resources, tribal rights (including treaty rights), and Indian lands" finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws. The USACE Tribal Consultation Policy, November 1, 2012, specifically implemented this EO and later Presidential guidance. The 2012 USACE Tribal Consultation Policy and Related Documents provide definitions for key terms, such as tribal resources, tribal rights, Indian lands, consultation, as well as guidance on the specific trigger for consultation (Table 8-1).

Table 8-1: 2012 USACE Consultation Policy Definitions

Category	Definition
Tribal rights:	Those rights legally accruing to a federally recognized Tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaties, statutes, judicial decisions, executive orders, or agreement and that give rise to legally enforceable remedies.
Tribal lands:	Any lands title to which is: either held in trust by the United States for the benefit of any federally recognized Indian tribe or individual or held by any federally recognized Indian tribe or individual subject to restrictions by the United States against alienation.
Protected tribal resources:	Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Tribal lands, retained by, or reserved by or for, federally recognized Tribes through treaties, statutes, judicial decisions, or executive orders.

While St. John the Baptist, St. James, Ascension, and Livingston Parishes have a long history of occupation by Native American communities, prior to their establishment and throughout their history, there are currently no trial rights or Indian lands that have the potential to be significantly affected by the proposed actions within in the planning area. There are, however, protected Tribal resources within the diversion influence area. In accordance with CEMVN's responsibilities under the NHPA Section 106 process and EO 13175, CEMVN has offered the following nine federally recognized Tribes the opportunity to review and comment on the proposed action: 1) the Alabama Coushatta Tribe of Texas, 2) the Chitimacha Tribe of Louisiana, 3) the Choctaw Nation of Oklahoma, 4) the Coushatta Tribe of Louisiana, 5) the Jena Band of Choctaw Indians, 6) the Mississippi Band of Choctaw Indians, 7) the Muscogee (Creek) Nation, 8) the Seminole Nation of Oklahoma, and 9) the Tunica-Biloxi Tribe of Louisiana. See Appendix J for consultation letter date and responses received from the Seminole Nation (October 19, 2021), the Jena Band of Choctaw Indians (November 10, 2021), and the Choctaw Nation (November 18, 2021).

8.15 EXECUTIVE ORDER 14008 (SECTION 213)

It is the policy of the federal government to ensure that federal infrastructure investment reduces climate pollution, and to require that federal permitting decisions consider the effects of greenhouse gas emissions and climate change. There would be no adverse indirect impacts to air quality in the parishes associated with construction of the proposed action. As a mitigation project, after the construction is completed, there is no mechanical emission source of greenhouse gases.

Section 9
Conclusion

9.1 RECOMMENDED DECISION

CEMVN prepared a SEIS to evaluate, at the request of the NFS, an alternative project to compensate for unavoidable impacts to swamp habitat associated with the construction of the WSLP project. Compensatory mitigation for impacts due to construction of the WSLP project was described previously in the 2014 WSLP EIS and in EA #576. Public comments on EA #576 included requests by the CPRAB and others that MSP, a proposed ecological restoration project that shares construction features with the WSLP project, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of the WSLP project. The MSP was assessed and it was determined it could meet the mitigation needs for the WSLP project. The MSP was then converted to mitigation alternatives MSA-1 (benefits captured on private and public lands), MSA-2 (benefits captured on public lands only) and evaluated and compared to the previously identified mitigation plan in EA #576.

The evaluation and comparison confirmed the BBA Alternative as the federally selected plan to meet the mitigation needs of WSLP. Through a letter dated August 23, 2021 (Appendix J), the NFS acknowledged the BBA Alternative (No Action) as the federally selected plan but requested MSA-2 be pursued because it could be integrated with the implementation of the WSLP project, saves the NFS time and money, provides mitigation immediately adjacent to the impacts, and would restore the ecosystem around the WSLP project, which would increase its resiliency. The NFS acknowledged that implementing MSA-2 would be more costly than the BBA Alternative and has agreed to be responsible for the increased cost over and above the BBA Alternative.

In consideration of the results of the alternative analysis, the significance of the Maurepas Swamp in the watershed and the NFS request, on November 4, 2021, the New Orleans District Engineer and Commander supported the NFS preferred alternative (MSA-2) as the TSA with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative. Since the NFS is responsible for the additional costs above the plan selected in EA #576, the federal investment does not change but additional watershed and NFS benefits would be achieved. The MSA-2 would be classified as Non-traditional Cost Sharing for the NFS. The Non-traditional Cost Sharing PPA Amendment would account for the additional costs, solely and completely a NFS cost and construction for BLH and Marsh AAHUs, required for the mitigation of any additional environmental impacts resulting from the construction of MSA-2, whether through NFS-purchase of mitigation bank credits or NFS-constructed mitigation projects, to include any increased monitoring costs. As the NFS would be responsible for the construction of MSA-2, the total combined lands, easements, rights-of-way, and disposal (LERRD) and Work-in-Kind Credits which the NFS would be able

to receive from the Government for any reason in connection therewith, including but not limited to NFS costs for its construction of mitigation for additional environmental impacts from the construction of MSA-2, for any required planting or additional mitigation should MSA-2 not perform or provide the required mitigation benefits, additional monitoring costs, etc., is strictly limited to the combined LERRD, initial construction, and monitoring costs currently estimated for the BBA Alternative (No Action Alternative).

Thus based upon the above, the NFS-preferred alternative, MSA-2, was recommended as the TSA with the understanding that the NFS would be solely and completely responsible for the construction of MSA-2 and any and all increased costs over and above the current estimated BBA Alternative.

While the CEMVN District Engineer and Commander recommended MSA-2 as the TSA, the ultimate decision on which mitigation plan to implement as the recommended plan is forthcoming and will be made by the MVD Commander.

In a letter dated June 21, 2022, the NFS outlined the use of various funding sources to meet the required share for the construction of MSA-2 (see Appendix J). A cost-share record for each source of funding would be created to track obligations and expenditures accordingly.

9.2 UNAVOIDABLE ADVERSE EFFECTS

Wetland impacts were avoided and minimized to the extent possible in the preliminary design of the MSA-2 (TSA). With avoidance and minimization of wetland impacts, construction and operation of TSA would result in ~206.5 AAHUs of CZ swamp, ~35.8 AAHUs of CZ BLH, and ~19.5 AAHUs of CZ marsh. The enhancement of approximately 1,469 acres of swamp habitat, creation/restoration of up to approximately 74 acres of BLH habitat, and creation/restoration of approximately 75 acres of marsh habitat will mitigate for the wetland impacts resulting from construction and operation of the TSA. Additionally, there would be unavoidable adverse effects to pallid sturgeon due to operation of the TSA. In coordination with USFWS, reasonable and prudent measures identified in the BO would be implemented to reduce these impacts (see Section 8.4 and Appendix J).

9.3 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA Section 102(2)(c)(iv) and 40 CFR 1502.16 requires that an EIS include a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This section describes how the proposed action would affect the short-term use and the long-term productivity of the environment.

In reference to the MSA-2, “short term” refers to the temporary phase of construction of the proposed project, while “long term” refers to the operational life of the proposed project and beyond. Section 4 of this document evaluates the direct, indirect and cumulative effects that could result from the MSA-2.

Construction of the TSA would result in short-term construction-related impacts and would include, to some extent, interference with local traffic, minor limited air emissions, increases in ambient noise levels, dust generation, disturbance of wildlife and listed and protected

species, and disturbance of recreational and other public facilities. These impacts would be temporary and would occur only during construction and are not expected to alter the long-term productivity of the natural environment.

Operation of the TSA would result in long-term impacts and would include, to some extent disturbance of wildlife and listed and protected species. Coordination with USFWS has resulted in various measures to reduce these impacts.

The TSA would assist in the long-term productivity of the Maurepas Swamp by improving the water quality, and nutrients delivered to forested wetlands. This, in turn, would enhance the growth and productivity of swamp habitat potentially providing increased resistance to SLR and climate change. These long-term beneficial effects of the TSA would outweigh the minimal and mitigable short-term impacts to the environment resulting primarily from project construction.

9.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires that environmental analysis include identification of “any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.” Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

The TSA would result in few direct and indirect commitments of resources; these would be related mainly to construction components. Most resource commitments are neither irreversible nor irretrievable. Most impacts are short-term and temporary. Others that may have a longer effect can be reduced through appropriate measures such as mitigation and operational modifications.

Section 10
List of Preparers

Name	Office	Discipline/Role
Tim Axtman	Chief, Plan Formulation	Sr. Plan Formulator
Terry Baldridge	Economics Division	Economist; District Quality Control (Economics)
Craig Baldwin	Geotech	Geotechnical Engineer; Engineering Design
Elizabeth Behrens	Ch. Coastal Env. Planning Section	Supervisory Biologist; Environmental Lead
Jason Binet	Engineering Division	Supervisory Civil Engineer; Engineering Design
Charles Brannon	Project Management Division	Project Manager
Michael Brown	Ch, Coastal Environmental Compliance Section	Supervisory Biologist
Alyssa Conti	Office of Counsel	Attorney
Jacob Stephens	Office of Counsel	Attorney
Kristen Butcher	Coastal Environmental Planning	Wetlands Assessment; Water Quality 404(b)(1)
Troy Constance	Chief, RPEDS	Planning Report
Travis Creel	Section Chief Plan Formulation	
Mike Danielson	Cost Engineering	Cost Engineer
Brandon Davis	Quality Control Section	Economist; District Quality Control Manager
Jason Emery	Natural and Cultural Resources Section	Archaeologist; Tribal/RTS Cultural Resources
Jill Enersen	Natural and Cultural Resources Section	Architectural Historian
Ashley Fedoroff	Natural and Cultural Resources Section	Archaeologist; Cultural Resources
Tammy Gilmore	Coastal Environmental Planning	Sr. Biologist; T&E Species
Eric Glisch	Engineering Division	Environmental Engineer; Water Quality Analysis
Whitney Hickerson	Engineering Division	Hydraulic Engineer; Engineering Design
Denis Hoerner	Engineering Division	Structural Engineer; Engineering Design
Jeremiah Kaplan	Natural and Cultural Resources Section	Archaeologist; Environmental Support
Diane Karnish	Economics Division	Supervisory Economist; Socioeconomics; Land Use and Commercial Fisheries
Elizabeth Manuel	Plan Formulation Section	District Quality Control (Plan Formulation)

Name	Office	Discipline/Role
Dan Meden	Coastal Environmental Compliance	Biologist; Wildlife; WQ Sec 401 evaluation
Michelle Meyers	Plan Formulation Section	Plan Formulation; Adaptive Management
Jack Milazzo	Natural and Cultural Resources Section	Landscape Architect; GIS and Environmental support
Joe Musso	Coastal Environmental Compliance	Biologist; Noise Assessment; HTRW
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References and Resources

Project References:

Balinsky, J. B. 1981. Adaptation of nitrogen metabolism to hyperosmotic environment in amphibia. Journal of Experimental Zoology 215:335–50.

Chambers, J.L.; Conner,W.H.; Day, J.W., Jr.; Faulkner, S.P.; Gardiner, E.S.; Hughes, M.S.; Keim, R.F.; King, S.L.; Miller, C.A.; Nyman, J.A.; et al. Conservation, Protection, and Utilization of Louisiana's Coastal Wetland Forests; Final report to the Governor of Louisiana from the Coast Wetland Forest Conservation and Use Science Working Group: Baton Rouge, LA, USA, 2005; p. 121.

Conner, W.H.; Day, J.W. 1976. Productivity and composition of a bald cypress-water tupelo site and a bottomland hardwood site in a Louisiana swamp. Am. J. Bot. 63, 1354–1364.

Cropley, Peter, et al. Phase I Cultural Resources Survey and Archeological Inventory of the Mt. Airy Pipeline, Options 1 and 2, Project Area in St. John the Baptist Parish, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-6238.

Duellman, W. E. and L. Trueb. 1986. Biology of Amphibians. John Hopkins University Press, Baltimore, MD, USA.

Durio, Lori, et al. Cultural Resources Inventory Report, Bengal Pipeline Route in the Mississippi River Valley, Louisiana (Volume 2). Report on file with the Louisiana Division of Archaeology. LDOA Report #22-2683.

Effler, R.S., Goyer, R.A., and Lenhard, G.J. (2006). Bald cypress and water tupelo responses to insect defoliation and nutrient augmentation in Maurepas Swamp, Louisiana, USA. Forest Ecology Management. 236:295–304.

Foreman, Jacob, et al. Phase I Cultural Resources Survey of the Proposed Ascension Pipeline Project, Ascension, St. James, and St. John the Baptist Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-5158

Girard, Jeff, Chip McGimsey, Dennis Jones. *Louisiana's Comprehensive Archaeological Plan.* 2018. State of Louisiana Department of Culture, Recreation and Tourism, Office of Cultural Development, Division of Archaeology, Baton Rouge.

Glass, William J., et al. A Phase I Cultural-Resource Survey within the Former Angelina Plantation. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4288.

Hale, Ashley, et al. Phase I Cultural Resources Survey Of The 23.16 Km (14.4 Mi) Proposed Convent Dry Gas Pipeline Project, Ascension, St. James, St. John The Baptist And St. Charles Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-3793.

Huebchen, Karl R. A Phase I Cultural Resources Survey for the Proposed 16-inch Marathon Garyville Pipeline Connection. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4531.

Hunter, R., R. Lane, John Day, J. Lindsey, Jason Day, M. Hunter. 2009. *Nutrient Removal and Loading Rate Analysis of Louisiana Forested Wetlands Assimilating Treated Municipal Effluent*. Environmental Management 44:865-873.

Jackson, Paul. Phase II Archaeological Testing and Evaluation of Locus A Within the Angelina Plantation (16SJB68) in Mt. Airy, St. John the Baptist Parish, Louisiana. Report on file with Louisiana Division of Archaeology. LDOA Report #22-4690.

Keim, R.F., Braud, D.H., Shaffer, G.P., Chambers, J.L. (2010). Mapping coastal wetland forests in coastal Louisiana: Baton Rouge, Louisiana Department of Environmental Quality, 21p.

Kelley, David. Phase I Cultural Resources Survey of the Proposed Praxair South Louisiana Hydrogen Pipeline Expansion Project, Ascension, St. James, St. John the Baptist, and St. Charles Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-3879

Kirk, James P., K. Jack Killgore, and Jan J. Hoover. 2008. Evaluation of Potential Impacts of the Lake Maurepas Diversion Project to Gulf and Pallid Sturgeon

Kniffen, Fred B, Hiram F. Gregroy, and George Stokes. 1987. *The Historic Indian Tribes of Louisiana: From 1542 to the Present*. Louisiana State University Press, Baton Rouge, LA.

Kryter, K. D. (1994). The handbook of hearing and the effects of noise: Physiology, psychology, and public health. Academic Press.

LaCour-Conant, K., K. Ramsey, K. Bollfrass. 2019. River Reintroduction into Maurepas Swamp Wetland Value Assessment. Coastal Protection and Restoration Authority. Baton Rouge, LA. 171 pp with appendices.

Lane, R.R., H.S. Mashriqui, G.P. Kemp, J.W. Day, J.N. Day, and A. Hamilton. 2003. Potential Nitrate Removal from a River Diversion Into a Mississippi Delta Forested Wetland. Ecological Engineering 20:237-249.

LCWCRTF and WCRA. 1999. Coast 2050: Towards a Sustainable Coastal Louisiana, The Appendices. Appendix D – Region 2 Supplemental Information. Louisiana Department of Natural Resources. Baton Rouge, Louisiana. 260 pp.

Lee Wilson and Associates, Inc. 2001. Diversion into the Maurepas Swamps. A complex project under the Coastal Wetlands Planning, Protection, and Restoration Act. Prepared for: the U.S. Environmental Protection Agency, Region 6, Dallas, Texas. Contract No. 68-06-0067 WA#5-02. 59 pp.

Louisiana Department of Wildlife and Fisheries (LDWF). 2021. Wildlife Management Areas, Refuges, and Conservation Areas. https://www.wlf.louisiana.gov/page/maurepas-swamp. Accessed September 17, 2021.

Meselhe, E., Richardson, J., Lagumbay, R., Allison, M., Jung, H. (2015). Simulation of Flow near Proposed Dock Facility and Freshwater Diversion Reserve, Louisiana at River Mile 144.2. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.

Mitsch, W. and J. Gosselink. 2000. Wetlands, John Wiley & Sons 3rd edition. New York, New York. 722 pp.

National Park Service. *How to Apply the National Register Criteria for Evaluation. National Register Bulletin No. 15*. 1995. U.S. Dept. of the Interior, National Park Service, Cultural Resources, Washington, D.C. Electronic resource: https://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf.

Paille, R. and Breaux, C. (2021). Maurepas Swamp Project Draft Wetland Value Assessment Project Information Sheet.

Rees, Mark A. *Archaeology of Louisiana*. 2010. Louisiana State University, Baton Rouge

Rothrock III, Oscar A., et al. Phase I Cultural Resources Survey of the Proposed Maurepas Pipelines Project, Ascension, St. James, St, John the Baptist, and St. Charles Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4868.

Ryan, Joanne, et al. Revised Management Summary: Phase I Cultural Resources Survey and Reconnaissance of Rerouted Portion of Alternate C, Access Roads, and Stockpile Areas, West Shore Lake Pontchartrain Levees Project, St. John the Baptist and St. Charles Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4571-1.

Ryan, Joanne, et al. Management Summary: Phase I Cultural Resources Survey and Reconnaissance of Rerouted Portions of Alternate C, Access Roads and Stockpile Areas, West Shore Lake Pontchartrain Levees Project, St. John the Baptist and St. Charles Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4571-2.

Saltus, C.L. and Suir, G.M. (2019). Remotely Sensed Habitat Assessment of Swamp and Bottomland Hardwood Habitat: West Shore Lake Pontchartrain Hurricane Damage Risk Reduction System Potential Impact Area. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Saltus, A. R., Jr. Submerged Cultural Resources Investigation of the Maurepas Basin with Intensive Surveys at Warsaw Landing, Blood River, and Springfield Area, Natalbany River, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-1086.

Semlitsch, R.D., Scott D.E., Pechmann, J.H.K. & Gibbons J.W. 1996. Structure and Dynamics of an Amphibian Community: Evidence from a 16-Year Study of a Natural Pond. *Long-Term Studies of Vertebrate Communities.* Chapter 9. Pp. 217-248.

Shaffer, G.P., J.W. Day, D. Kandalepas, W.B. Wood, R.G. Hunter, R.R. Lane, and E.R. Hillmann. 2016. Decline of the Maurepas Swamp, Pontchartrain Basin, Louisiana, and Approaches to Restoration. Water 8(3):101; doc10.3390/w8030101.

Shaffer, G.P., Wood, W.B., Hoeppner, S.S., Perkins, T.E., Zoller, J., and Kandalepas, D., (2009). Degradation of bald cypress-water tupelo swamps to marsh and open water in southeastern Louisiana, U.S.A. An irreversible trajectory. Journal of Coastal Research. 54:152–165.

Skinner, S. Alan, et al. Cultural Resources Survey of the Bengal Pipeline Route in the Mississippi River Valley, Louisiana (Volume 1). Report on file with the Louisiana Division of Archaeology. LDOA Report #22-2683.

Stanton, Travis, et al. Intensive Cultural Resources Survey of the Proposed Port of South Louisiana Connector, St. James and St. John the Baptist Parishes, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-2628.

Swanton, John R. 1984[1952]. Smithsonian Institution Bureau of American Ethnology, Bulletin 145, *The Indian Tribes of North America*. Smithsonian Institution Press, City of Washington.

Smardon, R.C., Palmer, J.F., Knopf, Alfred, Grinde, Kate, Henderson, J.E., and Peyton-Dove, L. 1988. “Visual Resources Assessment Procedure for U.S. Army Corps of Engineers,” Instruction Report EL-88-1, prepared by State University of New York, Syracuse, for U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers (USACE), 2004. Louisiana Coastal Area (LCA) Final Study Report: Volumes 1-4. New Orleans, Louisiana: U.S. Army Corps of Engineers.

United States Army Corps of Engineers (USACE) and Coastal Protection and Restoration Authority (CPRA). 2010. Louisiana Coastal Area (LCA), Louisiana Ecosystem Restoration Study Volume IV of VI: Final Integrated Feasibility Study and Supplemental Environmental Impact Statement for the Small Diversion at Convent/Blind River St. James Parish, Louisiana.

United States Army Corps of Engineers. 2010. Louisiana Coastal Area (LCA) Ecosystem Restoration Study: Final Integrated Feasibility Study and Supplemental Environmental Impact Statement for the Amite River Diversion Canal Modification, Ascension and Livingston Parishes, Louisiana. (Vol. 2): Sections 4.2.1.2, 4.2.8.1, and 5.8.2.

United States Department of Agriculture, Natural Resources Conservation Service. [personal communication State Soil Scientist, Mike Lindsey]. October 18, 2021.

United States Department of Transportation. Federal Highway Administration (FHWA). 2006. CONSTRUCTION NOISE HANDBOOK. Final Report. August 2006.

United States Environmental Protection Agency. EPA 2011b U.S. EPA. Exposure Factors Handbook 2011 Edition (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/052F.

United States Environmental Protection Agency (EPA). 2011b. River Re-Introduction to Maurepas Swamp (PO-29) Draft Environmental Information Document (EID). U. S. Environmental Protection Agency, Region 6, Dallas, TX.

United States Environmental Protection Agency (EPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Document ID: usepa-1974.

Vliet, K.A. 2020. Alligators: The Illustrated Guide to Their Biology, Behavior, and Conservation. John Hopkins University Press: Baltimore.

Wakeley, J.S., T.H. Roberts. Bird distributions and forest zonation in a bottomland hardwood wetland Wetlands, 16 (1996), pp. 296-308

Wang, H., Piazza, S., Sharp, L., Stagg, C., Couvillion, B., Steyer, G., and McGinnis, T. (2016). Determining the Spatial Variability of Wetland Soil Bulk Density, Organic Matter, and the Conversion Factor between Organic Matter and Organic Carbon across Coastal Louisiana, U.S.A. Journal of Coastal Research. 33:10.2112/JCOASTRES-D-16-00014.1.

Wells, Douglas C. Phase I Cultural Resources Survey of the River Reintroduction Corridor, Maurepas Swamp (PO-29), St. John the Baptist Parish, Louisiana. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-3023.

Wells, Douglas C., et al. Management Summary: Phase I Cultural Resources Survey and Reconnaissance of Alternate C, West Shore Lake Pontchartrain Levees Project. Report on file with the Louisiana Division of Archaeology. LDOA Report #22-4571.

Zoller, J.A., 2004. Seasonal differences in bird communities of a Louisiana swamp and manipulation of the breeding density of Prothonotary Warblers. M.S. Thesis, Southeastern Louisiana University, Hammond.

Websites:

Audubon (n.d.) Important Bird Areas: West Pontchartrain-Maurepas Swamp. https://www.audubon.org/important-bird-areas/west-pontchartrain-maurepas-swamp

Bipartisan Budget Act of 2018, Public Law 115-123. February 2018. https://uscode.house.gov/statutes/pl/115/123.pdf

Coastal Protection and Restoration Authority (CPRA). 2017. Coastal Master Plan. https://coastal.la.gov/our-plan/2017-coastal-master-plan/

Coastal Protection and Restoration Authority (CPRA). 2012. Coastal Master Plan. https://coastal.la.gov/2012-coastal-master-plan/

Cohen E.B., et al. 2021. A place to land: spatiotemporal drivers of stopover habitat use by migrating birds. https://onlinelibrary.wiley.com/doi/pdf/10.1111/ele.13618

d'Anville. 1752. Carte de la Louisiane par le Sr. d'Anville. Dressée en mai 1732. [Gravée par] Guille. de la Haye. Library of Congress. Accessed on 4/1/2021 at: https://lccn.loc.gov/75692506

Day Jr., J., Hunter R., Lane, R., Shaffer, G., Day, J. *Long-term assimilation wetlands in coastal Louisiana: Review of monitoring data and management.* https://doi.org/10.1016/j.ecoleng. 2019.10.01

Demaringy. 1743. Map - *Carte particulière d'une partie de la Louisianne ou les fleuve et rivierres [i.e. rivières] onts etés relevé a l'estime & les routtes [i.e. routes] par terre relevé & mesurées aux pas, par les Srs. Broutin, de Vergés, ingénieurs & Saucier dessinateur.* Library of Congress. Accessed on 4/1/2021 at: https://lccn.loc.gov/2003623370

Gauld, George. 1778. Map - *A Plan of the coast of part of west Florida & Louisiana : including the River Yazous / Surveyed by George Gauld M.A. for the Right Honourable the Board of Admiralty.* Library of Congress. Accessed on 4/1/2021 at: https://lccn.loc.gov/2002623325

iNaturalist 2021. Maurepas Swamp Wildlife Management Area Check List. https://www.inaturalist.org/check_lists/593749-Maurepas-Swamp-Wildlife-Management-Area-Check-List

Jones, P.D., Strickland, B.K., Demarais, S., McKinley, W.T., Ernst, J.R., and J. Klassen. 2019. Seasonal Flooding Effects on Deer in the Mississippi River Batture. https://www.researchgate.net/publication/333515885_Seasonal_Flooding_Effects on_Deer_in_the_Mississippi_River_Batture

Journal of Fish and Wildlife. A Trapping Survey Targeting Head-Started Alligator Snapping Turtles in Southwest Louisiana. Vol 11, Issue 2. Dec. 2020: https://meridian.allenpress.com/jfwm/article/11/2/572/442590/A-Trapping-Survey-Targeting-Head-Started-Alligator

Krauss, K.W., Shaffer, G.P., Keim, R.F., Chambers, J.L., Wood, W.B., and Hartley, S.B., (2017). Performance measures for a Mississippi River reintroduction into the forested wetlands of Maurepas Swamp: U.S. Geological Survey Scientific Investigations Report 2017–5036, 56 p., https://doi.org/10.3133/sir20175036.

Lance, V.A., Elsey, R.M., Butterstein, G., et al. 2010. The effects of Hurricane Rita and subsequent drought on alligators in southwest Louisiana. Journal of Experimental Zoology 313a, 2 (pg 106-113). https://doi.org/10.1002/jez.577

LCPRA 2020. Coastwide Reference Monitoring System. https://www.lacoast.gov/crms_viewer/Map/CRMSViewer

Louisiana Department of Environmental Quality. Final 2020 Integrated Report of Water Quality in Louisiana. https://deq.louisiana.gov/assets/docs/Water/Integrated_Report/2018_Integrated_Report/18_IR1_A_Master_Text_FINAL-CORRECTIONS_For_Website_04-17-19.pdf

Louisiana Department of Wildlife and Fisheries. 2021. Deer Research, Management, and Reports. Accessed on 8/27/2021 from https://www.wlf.louisiana.gov/page/deer-research-and-management.

Louisiana Department of Wildlife and Fisheries. Louisiana Alligator Management Program. 2019 – 2020 Annual Report. https://www.wlf.louisiana.gov/assets/Resources/Publications/Alligator/2019-2020_Alligator_Annual_Report.pdf.

Louisiana Department of Wildlife and Fisheries. 2018. Waterbody Management Plan Series: Blind River. https://www.wlf.louisiana.gov/assets/Resources/Publications/Freshwater_Inland_Fish/Inland-Waterbody-Management-Plans/Blind_River_MP-A_2018.pdf .

Mississippi State University (MSU), Deer Ecology and Management Lab. 2021. Population Dynamics of Deer. https://www.msudeer.msstate.edu/population-dynamics-of-deer.php.

National Environmental Policy Act, 40 Code of Federal Regulations [CFR] Parts1500-1508). https://ceq.doe.gov/laws-regulations/regulations.html.

National Oceanic Atmospheric Administration. Essential Fish Habitat. 2021 https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat

National Oceanic Atmospheric Administration. National Centers for Coastal Ocean Science. 2021. Cyanobacteria Algal Bloom from Satellite in Lake Pontchartrain, LA. https://coastalscience.noaa.gov/research/stressor-impacts-mitigation/hab-monitoring-system/cyanobacteria-algal-bloom-from-satellite-in-lake-pontchartrain-la/

National Oceanic Atmospheric Administration. Office for Coastal Management. Coastal Zone Management Act. 2021. https://coast.noaa.gov/czm/act/

National Wildlife Federation. 2021. *American Alligator.* https://www.nwf.org/Educational-Resources/Wildlife-Guide/Reptiles/American-Alligator. Accessed September 28, 2021.

Natural Resource Conservation Service. Farmland Protection Policy Act. 2021. https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/

NETR Online [NETR]. Historic aerials, USGS maps. https://www.historicaerials.com/viewer.

Pasko, S. NOAA and Eich, Ann, USFWS. 2011. ANS Taskforce Dedicated to the Prevention and Control of Aquatic Nuisance Species.

https://www.fws.gov/anstaskforce/spoc/nutria.php#:~:text=Nutria%20dig%20into%20soils%20to,sedimentation%2C%20and%20reduced%20water%20quality.

Pine Oaks Terminal. 2019. https://www.pinoakterminals.com/

Port of South Louisiana. 2020. https://portsl.com/overview/

Shaffer, G.P.; Day, J.W.; Kandalepas, D.; Wood, W.B.; Hunter, R.G.; Lane, R.R.; Hillmann, E.R. (2016). Decline of the Maurepas Swamp, Pontchartrain Basin, Louisiana, and Approaches to Restoration. Water. 8: 101. https://doi.org/10.3390/w8030101

Shaffer, G.P. et al. 2016. Decline of the Maurepas Swamp, Pontchartrain Basin, Louisiana, and Approaches to Restoration. https://www.mdpi.com/2073-4441/8/3/101/htm

Strickland, B.A., Gastrich, K., Mazzotti, F.J. et al. 2020. *Variation in movement behavior of alligators after a major hurricane*. Anim Biotelemetry 8, 7. https://doi.org/10.1186/s40317-020-00193-0

United States Army Corps of Engineers. Engineering Regulation 200-2-2 (33 CFR Part 230). https://www.gsa.gov/cdnstatic/Department_of_Army_Procedures_for_Implementing_NEPA.pdf.

United States Army Corps of Engineers. 2020. Bipartisan Budget Act (BBA) Construction Projects; West Shore Lake Pontchartrain (WSLP), Comite River Diversion, and East Baton Rouge (EBR) Flood Risk Management, BBA Construction Mitigation EA #576. https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Bipartisan-Budget-Act-2018-BBA-18/West-Shore-Lake-Pontchartrain/

United States Army Corps of Engineers. 2020. Supplemental Environmental Assessment (571) West shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Levee System. St. Charles and St. John the Baptist Parishes, Louisiana. https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Bipartisan-Budget-Act-2018-BBA-18/West-Shore-Lake-Pontchartrain/

United States Army Corps of Engineers. 2019. Supplemental Environmental Assessment (570) West shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Structural Alignment Surveys and Borings Investigations. St. Charles and St. John the Baptist Parishes, Louisiana. https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Bipartisan-Budget-Act-2018-BBA-18/West-Shore-Lake-Pontchartrain/

United States Army Corps of Engineers. 2014. Westshore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study. https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Bipartisan-Budget-Act-2018-BBA-18/West-Shore-Lake-Pontchartrain/

United States Environmental Protection Agency. Clean Air Act. 2021. https://www.epa.gov/laws-regulations/summary-clean-air-act

United States Environmental Protection Agency. Clean Water Act. 2021. https://www.epa.gov/laws-regulations/summary-clean-water-act

United States Environmental Protection Agency. 2019. Environmental Justice 2020 Glossary. https://www.epa.gov/environmentaljustice/ej-2020-glossary. Accessed January 2020.

United States Environmental Protection Agency. 2021. National Ambient Air Quality Standards. https://www3.epa.gov/airquality/greenbook/anayo_la.html,updated April 2021.

United States Environmental Protection Agency. 2021. Louisiana Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Data Updated 31 August 2021. https://www3.epa.gov/airquality/greenbook/anayo_la.html, visited September 28, 2021.

United States Environmental Protection Agency. Summary of Executive Order 12898. Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations. 2021. https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice

United States Fish and Wildlife Service. Publication date (2021). National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

United States Fish and Wildlife Bald and Golden Eagle Protection Act. 2021 https://www.fws.gov/birds/policies-and-regulations/laws-legislations/bald-and-golden-eagle-protection-act.php

United States Fish and Wildlife Agency. Fish and Wildlife Coordination Act. 2021. https://www.usbr.gov/power/legislation/fwca.pdf

Water Infrastructure Improvement for the Nation Act. Public Law 114-322. https://www.usbr.gov/mp/wiin-act/docs/wiin-act-public-law-114-322.pdf