



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



Draft Mitigation Plan Update

April 2022



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVENUE
NEW ORLEANS, LOUISIANA 70118

April 15, 2022

CEMVN-PD

ADDENDUM

This Addendum reflects changes to the “Draft Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study” (hereinafter “WSLP Draft SEIS”).

The WSLP Draft SEIS was retracted from public review on April 1, 2022. It was initially published by the United States Army Corps of Engineers, Mississippi Valley Division, New Orleans District (CEMVN) in the Federal Register (87 FR 15420, page 15420; EIS No. 20220034) on March 18, 2022. It contained the following statement in section 1.2 (page 4):

Although CPRAB has an active permit for the Mississippi River Reintroduction into Maurepas Swamp project PO-29 (MVN-2013-01561-CQ), CPRAB has not pursued completing the permitting process since 2019 and has requested the permit be placed on hold. As such, this permit was not considered as a project that would occur in the FWOP conditions.

The construction items contained within the WSLP Draft SEIS Mitigation Plan, collectively known as the “Maurepas Diversion,” were originally proposed as a Coastal Protection and Restoration Authority Board (CPRAB) construction project under the aforementioned permit. The Project Development Team for the CEMVN Maurepas Diversion, a proposed mitigation component of the WSLP project, which includes Executive staffs of both the CEMVN and the CPRAB, mutually understood and agreed on the path for CEMVN’s evaluation of the Maurepas Diversion as compensatory mitigation for the West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Project (hereafter WSLP project) making the CPRAB permit moot. However, the procedural step to formally withdraw CPRAB’s permit application via written communicate was not completed at the time of the initial agreement to halt the permit or upon initial publication of this WSLP Draft SEIS. By email dated March 28, 2022, CEMVN Regulatory Division informed CPRAB that due to prolonged inactivity, the permit application has been withdrawn from active review status and should CPRAB wish to pursue this permit in the future, they must submit a new permit application.

Section 1.2 (page 4) of the Draft SEIS has been updated to reflect the following:

CPRAB’s permit application for the Mississippi River Reintroduction into Maurepas Swamp project 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 FWOP conditions.

To address this Addendum, the following changes have been made to the WSLP Draft SEIS since it was published in the Federal Register on March 18, 2022: the updated text on page 4 (as stated above), the addition of the email documenting the withdrawal of the permit application in Appendix D (Plan Formulation), and updates to Appendix B Table 17.

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Cover Page

Draft 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, Choctaw Nation of Oklahoma, Mississippi Band of Choctaw Indians, and Louisiana's Coastal Protection and Restoration Authority.

Abstract: The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), prepared a Supplemental Environmental Impact Statement (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 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 (EIS) and in Environmental Assessment (EA)# 576. Public comments on EA# 576 included requests by the Louisiana's Coastal Protection Restoration Authority Board of Louisiana (CPRAB) and others that the Coastal Wetlands Planning and Restoration Act (CWPR) project 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 evaluated and converted into Maurepas Swamp Alternative-2, which was selected for the federally identified plan in EA# 576 and as the Tentatively Selected Alternative (TSA).

All comments on the Draft SEIS Mitigation Plan update must be received by May 31, 2022.

For further Information please contact:

New Orleans District, U.S. Army Corps of Engineers

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Estimated Cost of Preparing Draft: \$1,673,665

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Executive Summary

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), prepared this draft Supplemental Environmental Impact Statement (SEIS) to evaluate, at the request of the Nonfederal Sponsor (NFS), 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 (EIS) and revised in Environmental Assessment (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 Parish Watershed Flood Risk Management Project) since all these projects occurred in the same watershed and impacted similar habitats. The Record of Decision 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 Restoration Authority Board of Louisiana (CPRAB) and others that the Coastal Wetlands Planning and Restoration Act (CWPR) project 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 Tentatively Selected Alternative (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 Bipartisan Budget Act of 2018 (BBA 2018, Public Law 115-123).

Compensatory mitigation is required by the Water Resources Development Act (WRDA) of 1986, Section 906, as amended and by the Clean Water Act Section 404(b)(1) Guidelines and is required to be consistent with the policies set forth in 33 CFR 320.4(r), 325 and 332 (REGS), the Council for Environmental Quality's (CEQ) implementing regulations for the National Environmental Policy Act (NEPA), the February 6, 1990, Memorandum of

Agreement between the USACE and the Environmental Protection Agency (MOA) and WRDA 2007 §2036(a) .

Purpose, Need and Scope

The purpose of this evaluation is to determine whether the CWPRRA 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.

Construction of the WSLP project would impact as much as 10,892 acres of swamp in the Louisiana (LA) coastal zone (CZ). This equates to a mitigation need of approximately 947 (AAHUs) of CZ swamp. The proposed mitigation plan would replace the lost functions and services of impacted swamp habitat through restoration, establishment, enhancement, or preservation 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 via wetland value assessments (WVA) that the MSP could be revised from an ecosystem restoration project to a federal mitigation project that aligns with 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 MSA-1 and MSA-2, in addition to the No-Action Alternative (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 consisting of the St James and Pine Island projects within the BBA Alternative (EA #576) have the potential to generate approximately 1,286 AAHUs for swamp (Table 2-2). Additional AAHUs could be generated by the purchase of mitigation bank credits. However, the number of available in-kind mitigation bank credits cannot be determined until such time as implementation of this project is attempted. Review of historic records of availability of in-kind credits over the last 10 years indicate around 55 AAHUs might be available.

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) (see Table 2-3 and 2-4). 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% of AAHUs may be achieved in 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 2-3). 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 during the Alternatives Evaluation and Comparison (AEC) process based on six criteria. The criterion included Risk and Reliability, Environmental, Time Cost Effectiveness, Other Cost Considerations and Watershed and Ecological Site Considerations. Based on the AEC evaluation, the BBA18 alternative (No Action alternative) remains the federally selected project to meet the WSLP mitigation needs. However, following the AEC, the NFS requested that the MSA-2 alternative 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 agreed to be responsible for the increased cost over and above the BBA alternative.

Thus, the NFS preferred alternative MSA-2 was selected as the Tentatively Selected Alternative (TSA) with the understanding that the NFS would be responsible for the increased cost over and above the BBA Alternative. The TSA would satisfy the swamp mitigation needs by compensating for unavoidable impacts to approximately 947 AAHUs of coastal zone (CZ) swamp.

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 during the public scoping period expressed support for the 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 for the NFS to pay the additional costs required to utilize the MSA-2 as mitigation for WSLP. Alternatively, there were a few comments in opposition to the MSA-2: some comments indicated that the purchase of mitigation bank credits was the only option given the MSA-2 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 MSA-2 as mitigation for the WSLP construction impacts; concern was

expressed that construction of the WSLP levee was taking too long. A detailed discussion of the coordination and consultation is in Section 6.

Cooperating Agencies - 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

Date 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. Reference Section 2.7.4 for further discussion.

Significant Resources and Environmental Considerations

Section 4 describes the direct, indirect, and cumulative impacts of 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 relevant 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 2.7.4 "Unresolved Areas of Controversy" of the main report.

Unresolved Areas of Controversy

There are several unresolved areas of controversy discussed in Section 2.7.4 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 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 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 Department of Wildlife and Fisheries (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, some which 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 are 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. Management recommendations would be followed to reduce or mitigate a chance of entrainment.

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 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 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 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 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 Louisiana Department of Environmental Quality is not required by the CAA and Louisiana Administrative Code, Title 33 to grant a general conformity determination.

Clean Water Act 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 March 18, 2022. An updated 404(b)(1) will be released for public review for a 30-day period ending no later than May 31, 2022. The Section 404(b)(1) evaluation will be available in Appendix L in the final SEIS.

Coastal Zone Management of 1972: In accordance with Section 307, a Consistency Determination was prepared for the proposed project and submitted on February 22, 2022, to Louisiana Department of Natural Resources (LDNR) for the Proposed Action, and LDNR will provide their response, which will be included in the final SEIS.

Endangered Species Act of 1973: 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 coordination is ongoing, and the Record of Decision (ROD) would not be signed until coordination is complete. CEMVN coordination letters and responses from USFWS are found in Appendix J.

Farmland Protection Policy Act: The TSA would impact lands classified as prime farmland. CEMVN welcomes comments from NRCS. CEMVN coordination letters and responses from NRCS will be included in Appendix J.

Floodplain Management: CEMVN would comply with FEMA Region VI to ensure the Recommended Plan would be in compliance with EO 11988 and welcomes comments from the community floodplain administrators for St. Charles, St. James, and St. John the Baptist Parishes. Reference Appendix J.

Fish and Wildlife Coordination Act: 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.” Additionally, the letter provided comments that would help CEMVN assess the MSP as a mitigation alternative. A Draft Coordination Act Report (CAR) was received on February 4, 2022. The USFWS provided several recommendations. Those recommendations and CEMVN responses are located in Section 8.

Hazardous, Toxic, and Radioactive Waste: 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 T). The probability of encountering HTRW for the proposed action is low based on the initial assessment. 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.

Magnuson-Stevens Fisheries Conservation and Management Act: CEMVN has determined that the TSA would have no impacts to EFH. In a letter dated October 1, 2013, the National Marine Fisheries Service stated the WSLP project, as described in the 2016 WSLP Draft EIS, would not adversely impact EFH and that an EFH assessment is unnecessary (Appendix VII, Annex F).

Migratory Bird Treaty Act: CEMVN recommends that on-site contract personnel be trained to identify colonial nesting birds and their nests and avoid affecting them during the breeding season. Coordination with the USFWS pursuant to the BGEPA and MBTA has been initiated and is ongoing. Surveys for bald eagle nests and colonial nesting waterbird nests would continue. BMPs, included the development of a NPP, would be used. Coordination with the USFWS and the LDWF is ongoing for MBTA and BGEPA trust species.

National Historic Preservation Act of 1966 – NEPA Coordination/Section 106 Consultation: CEMVN would fulfill its Section 106 of the NHPA procedures through an existing PA executed March 4, 2020 and entitled Programmatic Agreement Among the CEMVN; 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.

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 PA provides Standard Treatment Measures agreed upon by SHPO, federally recognized Tribes, and NFS. For the Maurepas Project, CEMVN would utilize the NHPA stipulations and conditions detailed within the PA in order 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.

Archaeological Resources Protection Act of 1979: A federal permit under the Archaeological Resources Protection Act (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 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. In addition to the extra protections afforded to cultural resources under the LSRA, 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 proposed 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 I for personal coordination with Chris Davis, LA Scenic River Coordinator).

Executive Order 12898: Environmental Justice: Impacts to EJ communities 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.

Executive Order 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 E.O. 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).

Mitigation

Based on the most recent designs, WSLP would impact approximately (~) 947 AAHUs of CZ swamp habitat and ~293 AAHUs of CZ BLH habitat. Construction and operation of MSA-2 would result in ~206.5 AAHUs of CZ swamp, ~35.8 AAHUs of CZ BLH, and ~19.5 AAHUs of CZ marsh (Table 1 below). 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 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.

Conclusion

The BBA Alternative was confirmed in the AEC as the federally selected plan. The AEC process compared projects to each other in relation to six main criteria. The primary criteria that resulted in the higher AEC score were Cost Effectiveness, Other Cost Considerations and Risk and Reliability. In consideration of the results of the AEC, and the NFS request, it has been determined that the NFS preferred alternative MSA-2 would satisfy the Swamp mitigation need generated by the WSLP project. The sponsor preferred alternative is selected for implementation, and the NFS has the full understanding that they would be responsible for the increased cost over and above implementation of the BBA alternative.

This SEIS and mitigation plan provides sufficient information on the potential adverse and beneficial environmental effects to allow the CEMVN Commander to make an informed decision on the appropriateness of the Supplemental Environmental Impact Statement (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 Supplemental Environmental Impact Statement (SEIS) to reevaluate mitigation alternatives to compensate for unavoidable impacts to significant resources associated with the construction of the West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Project (hereafter WSLP project).

Mitigation for impacts due to construction of the WSLP project was described previously in Environmental Assessment (EA) #576 (USACE 2020), which addressed mitigation for habitat impacts associated with each of the BBA 18 construction projects (WSLP, Comite, and East Baton Rouge). The Finding of No Significant Impact (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 Louisiana Coastal Protection Restoration Authority Board of Louisiana (CPRAB) and others that the PO-0029 River Reintroduction into Maurepas Swamp Project (MSP), a proposed ecological restoration project that shares construction features with WSLP, be considered as a mitigation alternative for impacts to swamp habitat associated with the construction of WSLP. Section 2 explains the process that transpired following the receipt of this comment. At that time, because the MSP could not meet some of the screening criteria in EA #576 for potential projects, EA #576 was finalized and the FONSI was signed by the CEMVN District Commander on April 13, 2020. Implementation of the approved plan would satisfy all WSLP mitigation requirements as well as the mitigation requirements of the other BBA projects, the Comite River Diversion and East Baton Rouge Flood Risk Management projects.

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

This SEIS is prepared in accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality's (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), 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 Bipartisan Budget Act of 2018 (BBA 2018, Public Law 115-123).

When unavoidable impacts occur, the CEMVN is required to offset those impacts through compensatory mitigation by replacing the lost habitat's functions and services equally and in-kind. Compensatory mitigation is required by the Water Resources Development Act (WRDA) of 1986, Section 906, as amended and by the Clean Water Act Section 404(b)(1) Guidelines and is required to be consistent with the policies set forth in 33 CFR 320.4(r), 325 and 332 (REGS), the Council for Environmental Quality's (CEQ) implementing regulations for the National Environmental Policy Act (NEPA), the February 6, 1990, Memorandum of Agreement between the USACE and the Environmental Protection Agency (MOA) and WRDA 2007 §2036(a)).

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, one 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 2016 WSLP EIS was signed by the Assistant Secretary of the Army on September 14, 2016.

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 (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. The FONSI associated with SEA #570 was signed by the CEMVN District Commander on May 13, 2019.

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 (SEA #571) 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 Finding of No Significant Impact (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 wetland bottomland hardwoods (BLH-Wet) in the Louisiana (LA) Coastal Zone (CZ). This equates to a mitigation need of approximately 947 average annual habitat units (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.

Environmental Assessment #576, BBA Construction Projects; WSLP, Comite River Diversion, and EBR Flood Risk Management, BBA Construction Mitigation (EA #576) identified mitigation for BLH, and swamp habitat impacts associated with the WSLP, Comite, and East Baton Rouge 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 Tentatively Selected Alternative 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 Bipartisan Budget Act of 2018 (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 utilized 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 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 an MFR 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 recommended 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.

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
2001	River Reintroduction at Maurepas Swamp (P0-29)	Engineering and Design Report
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
2012	West Maurepas Diversion-Louisiana’s Comprehensive Master Plan for a Sustainable Coast, Coastal Protection and Restoration Authority	Master Plan
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)
2017	East Maurepas Diversion, Coastal Protection and Restoration Authority Coastal Protection and Restoration Authority	Master Plan
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)
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)
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)

CPRAB’s permit application for the Mississippi River Reintroduction into Maurepas Swamp project 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 FWOP conditions (see Appendix D).

The Small River Diversion at Hope Canal was one of the 5 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 supplemental EIS 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 SCOPE

The fundamental objective of compensatory mitigation is to offset unavoidable impacts to significant resources. The purpose of this evaluation is to determine whether the CWPRA 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.

Construction of the WSLP project would impact as much as 10,892 acres of swamp in the LA CZ. This equates to a mitigation need of approximately 947 (AAHUs) of CZ swamp. The proposed mitigation plan will replace the lost functions and services of impacted swamp habitat through restoration, establishment, enhancement, or preservation 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 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 intent 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).

1.4 PLANNING AREA

The planning area is in southeast Louisiana between the Mississippi River, and Lakes Maurepas and Pontchartrain. 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 Lake Pontchartrain Basin (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 general 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 (SLR; mitigation bank)) submitted an email letter on the NOI and the scoping presentation. In total, 3 email/letters were submitted from SLR. 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 utilizing mitigation bank credits for the WSLP swamp impacts would utilize all the available credits and there would be no mitigation bank credits remaining for others to utilize.

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.

Section 2

Alternative Formulation

Compensatory mitigation utilizes 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.

The BBA (No Action Alternative) utilizes restoration and establishment to meet the swamp habitat mitigation needs for the WSLP project. MSP would utilize enhancement to meet these same needs. MSP is compared to the BBA swamp feature of recommended mitigation plan in EA #576. A summary of the alternative development, evaluation, comparison, and selection are included in this section.

The planning goals and objectives of the evaluation under this SEIS were to:

- Evaluate the MSP as an 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 would 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 Coastal Protection and Restoration Authority Board of Louisiana (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 Coastal Protection and Restoration Authority (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 plan formulation and impact analysis.
- Alternative Development-Conversion of MSP from an ecosystem restoration project into mitigation project alternatives (MSA-1 and MSA-2).
- Alternatives Evaluation and Comparison (AEC) meeting to evaluate and compare the alternatives and complete the NEPA scoping process.

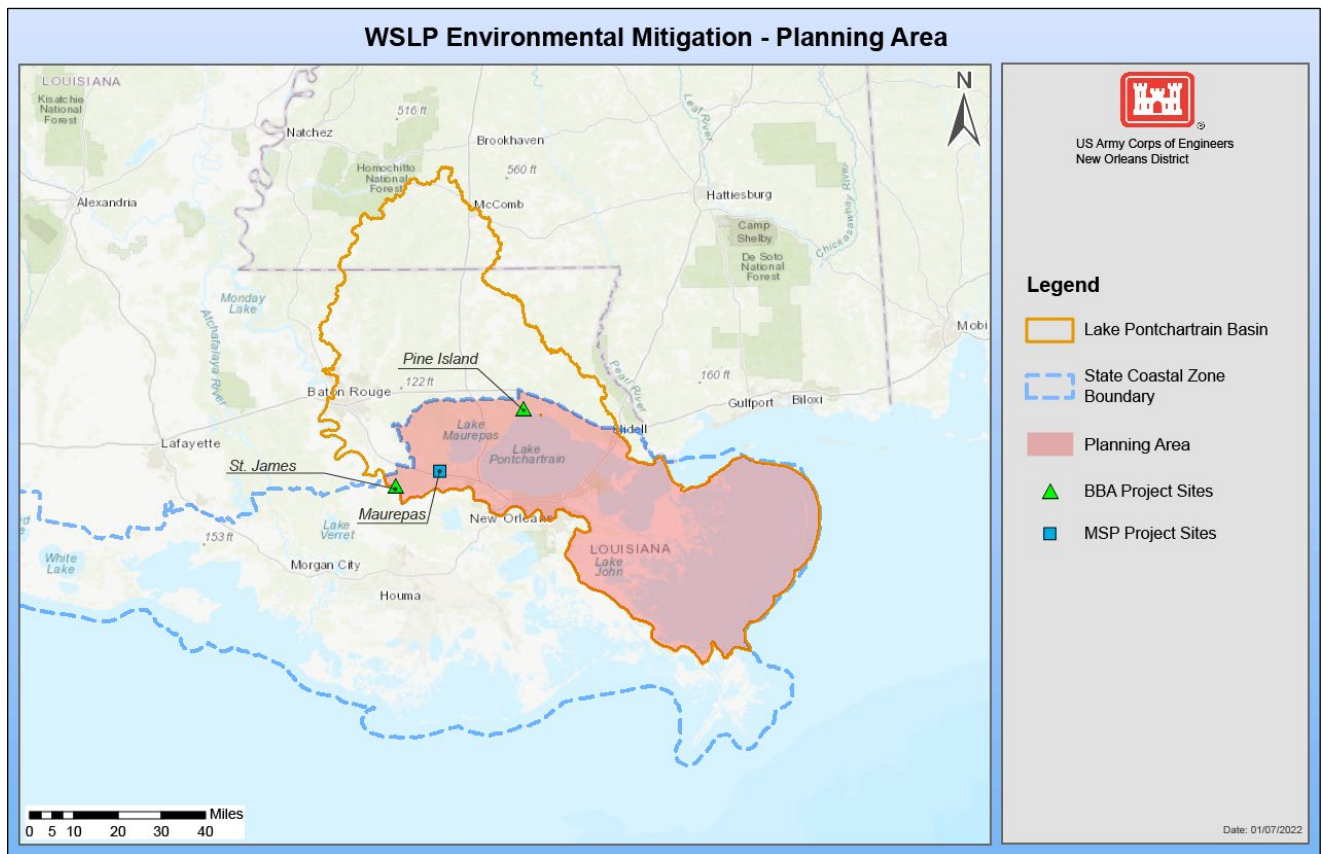


Figure 2-1. WSLP Environmental Mitigation Planning Area

2.1.1 Evaluation of the MSP to Determine if it is a Viable Mitigation Alternative

In accordance with the 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 (see section 2.1.2) would replace the lost functions and values of the Louisiana Coastal Zone (CZ) Swamp impacts incurred by the WSLP project in-kind and within the same watershed as the impacts, the LPB. In accordance with 33 U.S. Code § 2283 (a) the alternatives must be undertaken (at the latest) concurrent with the authorized parent project that incurred the impacts. Construction schedules in EA #576 for the No Action Alternative (BBA project) and those provided by the NFS for MSP verify this could be done.

Additionally, 33 USC 2317 (a)(1) states: "There is established, as part of the Corps of Engineers water resources development program, an interim goal of no overall net loss of the Nation's remaining wetlands base, as defined by acreage and function, and a long-term goal to increase the quality and quantity of the Nation's wetlands, as defined by acreage and function." In compliance with 33 USC 2317 (a)(1), mitigation measures, as assessed in EA #576, were required either to restore or to establish the same habitat types that were impacted, which resulted in mitigation projects that replaced lost functions and lost acreage in-kind. However, the proposed MSP mitigation project was classified as enhancement of

the existing CZ swamp habitat which would prevent the loss of and increase the function of the swamp. The MSP was not expected to be able to increase the acres of CZ swamp.

33 U.S. Code § 2283 (d)(3)(A) states “To mitigate losses to flood damage reduction capabilities and fish and wildlife resulting from a water resources project, the Secretary shall ensure that the mitigation plan for each water resources project complies with, at a minimum, the mitigation standards and policies established pursuant to the regulatory programs administered by the Secretary.”

The PDT’s next efforts were to utilize the 12 components needed for a mitigation plan as found in 33 CFR 332.4(c)/40 CFR 230.92.4(c) to determine if the MSP contained the necessary elements required for a mitigation project and to determine whether the MSP could produce the necessary benefits to offset the WSLP swamp mitigation requirement. These evaluations determined that MSP could potentially produce sufficient credits and was a viable alternative that could be considered to compensate for the loss of swamp habitat associated with the WSLP project. A summary of the evaluations for MSP includes:

Comparison of the MSP alternative against required mitigation components as per 33 CFR 332.4(c)/40 CFR 230.92.4(c)

As per 33 U.S. Code § 2283 (d)(3)(A), the final mitigation plan for a project should at a minimum, include the items described in 33 CFR 332.4(c)(2) through (c)(14) and outlined below. The MSP alternative was evaluated to determine if these elements were available or could be developed to be consistent with (33 CFR 332.4(c)/40 CFR 230.92.4(c).

1. Objectives. A description of the resource type(s) and amount(s) that would be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project would address watershed needs.

Evaluation: Feasible. The original project objectives for the MSP ecosystem restoration project were converted to a mitigation objective.

Original MSP Restoration Project Objective:

The specific objectives of the original River Reintroduction into Maurepas Swamp 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 ([PO-0029 River Reintroduction into Maurepas Swamp Fact Sheet](#))

Mitigation Objective: The objective of the MSP as a compensatory mitigation project is to enhance important Maurepas Swamp habitat to provide compensatory mitigation for adverse impacts to swamp habitat from the construction of the WSLP project.

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.

2. Site selection. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

Evaluation: Feasible. 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.

3. Site protection instrument. A description of the legal arrangements and instrument including site ownership, that would be used to ensure the long-term protection of the mitigation project site.

Evaluation: Feasible. This item will be developed and included in the Real Estate Plan included with the Final SEIS.

4. Baseline information. A description of the ecological characteristics of the proposed mitigation project site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

Evaluation: Feasible. Due to the ongoing work by CPRA and the numerous previous reports and studies that have been done on variation of the MSP project, there is a lot of background and baseline information that was used to inform the mitigation plan. The historic and existing conditions of the mitigation site are described in Section 3 Affected Environment.

5. Determination of credits. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.

Evaluation: Feasible. In a letter dated July 2, 2020, the USFWS stated that rough-draft WVAs utilizing the intermediate sea level rise (SLR) scenario for a 2,000 cubic feet per second (cfs) diversion indicated that the MSP could provide sufficient benefits to compensate for WSLP project swamp impacts. Once MSP

was further developed into alternatives additional WVAs were conducted. See Section 2.4 Benefit Estimation for Alternatives.

6. Mitigation work plan. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and area plantings.

Evaluation: Feasible. Numerous reports and studies have been completed on variations of the MSP project by CPRA and others. As such, there is a lot of background and baseline information that was used in the mitigation plan. This SEIS serves as the mitigation work plan. The Engineering Plans for Construction are included in Appendix M.

7. Maintenance plan. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

Evaluation: Feasible. The Operations and Maintenance Plan is included as Appendix N.

8. Performance standards. Ecologically based standards that would be used to determine whether the mitigation project is achieving its objectives.

Evaluation: Feasible. Success Criteria were developed and included in Appendix H.

9. Monitoring requirements. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

Evaluation: Feasible. A draft monitoring plan to determine if compensatory mitigation requirements are met is included in Appendix H: Monitoring Plan. Monitoring to mitigation for known impacts of diversion construction are included in Appendix G. Monitoring to inform if additional impacts occur as a result of construction are included in Appendix H: Adaptive Management.

10. Long-term management plan. A description of how the mitigation project would be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

Evaluation: Feasible: This information is included in Appendix H, Adaptive Management.

11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

Evaluation: Feasible. This information is included in Appendix H, Adaptive Management.

12. Financial assurances. A description of financial assurances that would be provided and how they are sufficient to ensure a high level of confidence that the mitigation project would be successfully completed, in accordance with its performance standards.

Evaluation: Not necessary for a project sponsored by the State of Louisiana.

Wetlands Value Assessment

The Wetland Value Assessment (WVA) Swamp Community Model for Civil Works Version 2.0 was first utilized 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 West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Project (WSLP). 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 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 2.3. Draft operational assumptions are included in the Operations Plan (Appendix N).

2.1.2 Project Management Plan (PMP)/Work Breakdown Structure (WBS) Development Phase (July 2020-November 2020)

Once it was determined the MSP could be a viable alternative, it needed to be converted from an ecosystem restoration project into a mitigation project. A PMP and a WBS were created to capture the data and activities needed to convert the MSP from an ecosystem restoration project into a mitigation alternative. This included information needed for documentation of the 12 required elements of a mitigation project, information needed for a refined WVA for benefit calculation and the data needed to inform alternative development and AEC process. The documented information needs (work packages) are:

Documentation for 12 required elements of a mitigation plan (section 2.1.1)

- Information needed for the Wetland Value Assessment

- **Data to inform AEP Evaluation**
 - 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 (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%, 65%, 95%, 100%) 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 (ROE) 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 and policies 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 in addition to the No-Action Alternative (alternatives are further described in Section 2.2).

2.1.3.1 Alternative Formulation Criteria

USACE projects, including mitigation, must be formulated to reasonably maximize benefits to the national economy, to the environment, or to the sum of both. Each alternative plan shall be formulated in consideration of four criteria described in USACE 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, EA #576 further identified additional criteria for the proposed mitigation alternatives. The new alternatives (MSA-1 and MSA-2) proposed as swamp mitigation for WSLP impacts were

subsequently evaluated against the same EA #576 criteria. The evaluations for both the P&G criteria and those used previously in EA #576 were jointly considered during formulation to ensure the MSP alternatives included the necessary elements.

As explained in EA #576, large land tracts were identified for the purposes of obtaining greater ecological output within the watershed and to produce cost efficiencies that would be experienced during construction and Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) in order to reduce risk.

After evaluation, it was determined that MSA-1 and MSA-2 did not meet the criteria related to restoration and creation (these are the preferred mitigation methods). It was also recognized that Civil Works planning projects including mitigation projects must be formulated to reasonably maximize benefits to the national economy, to the environment or the sum of both. Therefore, failure to meet these criteria, although considered in EA #576, did not preclude consideration of the MSA-1 and MSA-2 since the alternatives met the other requirements necessary for a mitigation project and met the P&G criteria.

Planning efforts should identify and prioritize aquatic resource restoration, or establishment activities. Although it is not a first line method typically used by the CEMVN for mitigation, enhancement is an allowed method in accordance with mitigation laws in certain circumstances when enhancement has been identified as important for maintaining or improving ecological functions of the watershed. It was determined that the MSA-1 and MSA-2 fit within those certain circumstances. 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.

USACE Principles and Guidelines

MSA-1 and MSA-2 were formulated and evaluated in consideration of four criteria described in the USACE Principles and Guidelines (P&G) promulgated in 1983: completeness, efficiency, effectiveness, and acceptability.

- **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 restoration objective. Real estate, O&M, 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.

Given that the results of the WVA MSA-1 and MSA-2 are capable of completely fulfilling the mitigation needs for the WSLP project for swamp, it was deemed complete.

- **Efficiency:** A selected project plan must represent a cost-effective means of addressing the problem or opportunity. The MSA-1 and MSA-2 as a mitigation alternative for WSLP integrates the implementation of two key projects (WSLP

and the Maurepas Diversion) saving time and money for the overall implementation of both projects. The MSA-2, by reestablishing a natural hydrologic regime, would provide significant long term beneficial impacts beyond the MSP mitigation area that would not be included in the calculated benefits.

- **Effectiveness:** The mitigation alternatives must be capable of delivering the required mitigation outputs. The MSP meets 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 1.2) 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. However, this does not mean that the recommended plan must be the locally preferred plan.
- **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 Maurepas Swamp Project. This project is being designed to discharge up to 2,000 cubic feet per second of water from the Mississippi River approximately 5.5 miles to the north into the Maurepas Swamp through Hope Canal. The specific objectives of the 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.
 - 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.
 - Louisiana Coastal Area Program (LCA) - (Authorized WRDA 2007)-The LCA Program was developed and implemented in partnership with 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.

2.2 ALTERNATIVES CONSIDERED

During the transformation of the MSP into an actual alternative, the PDT initially established the new Maurepas Swamp Alternative (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 was a concern of the NFS. As such, two options were developed for the Action Alternative in preparation for the AEC. The MSA-1 (CEMVN's Alternative) with a project area that included both privately and publicly owned land and MSA-2 (NFS Alternative) which was situated to occur only on publicly owned land (Maurepas Wildlife Management Area). As such, the following alternatives were carried forward into the alternatives analysis phase:

1. No Action Alternative (BBA Alternative) -See 2.2.1 for additional details on this alternative.
2. Action Alternative
 - Maurepas Swamp Alternative - 1 (MSA-1) CEMVN's Alternative, Public and Private Lands utilized - See Section 2.2.2 for additional details on this alternative
 - Maurepas Swamp Alternative - 2 (MSA-2) NFS Alternative, Public Land Only utilized - See Section 2.2.2 for additional details on this alternative

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 only difference between the two alternatives would be in where the mitigation benefits are calculated whether benefits would be calculated on both private and public lands or only calculated on public lands.

2.2.1 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).

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.

2.2.2 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. Both alternatives would have the same construction footprint and structural features; and both would have the same hydrological regime/hydrologic footprint. The only difference between the two alternatives would be in how the mitigation benefits are calculated, whether benefits would be calculated from both private and public lands or just calculated from public lands. The delineation of the benefit areas for the two alternatives are discussed in Section 2.3 and the MSA alternatives are further described under Section 2.4 and 2.5.

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 Average Annual Habitat Units (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 2-3). The same model also defined the Mitigation Areas (primary, secondary, and tertiary benefit areas, Figure 2-3), 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 utilized 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. See WVA Models and Assumptions Appendix E 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 2-2). The hydrologic improvement benefits attributed to MSA-1 include 8,634 acres within the primary and secondary areas, of which 3,375 acres are in the secondary benefit area. The purpose of having a public land only option (MSA-2, illustrated at the right in Figure 2-2) 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. The hydrologic improvement benefits attributed to MSA-2 includes 9,943 acres within the primary, secondary, and tertiary areas, of which 2,324 acres are in the tertiary benefit area (farther away from outfall). With the avoidance of private land, the MSA-2 takes 25% 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%) to satisfy the WSLP mitigation need. For more details on benefit calculations see section 2.4.

Table 2-1. 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	3,375	808	2,028	3,191
Tertiary Benefit Area				781	1,543	2,324
Subtotals	3,599	4,235	8,634	3,487	5,324	9,943
Swamp Acre Totals		7,834			8,811	

Acres have been rounded to nearest whole unit. No tertiary benefits are calculated for MSA-1 since all required benefits could be achieved in the primary and secondary areas.

2.4 BENEFIT ESTIMATION FOR ALTERNATIVES

The WVAs were first utilized 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 Bottomland Hardwood 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.

2.4.1 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.

2.4.2 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 2-2). Additional AAHUs could be generated by the purchase of mitigation bank credits. However, the number of available in-kind mitigation bank credits cannot be determined until such time as implementation of this project is attempted. Review of historic records of availability of in-kind credits over the last 10 years indicate around 55 AAHUs might be available.

Table 2-2. 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

2.4.3 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 2-3).

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). Results suggest that implementation of MSA-1 would have adverse effects on mitigation area marshes. Although the marsh WVA indicates negative AAHUs it also shows more marsh acres for the Future with Project condition. Under the currently certified marsh model, negative AAHUs are being assessed due to more intact marshes under Future with Project conditions versus more fragmented marshes under Future Without Project conditions. The WVAs score marshes with some interspersion or fragmentation higher than completely intact marshes. It is the opinion of the Habitat Evaluation Team (HET) that the negative AAHUs are misleading, and these results should not be used to assess marsh mitigation benefits/impacts associated with MSA-1. Therefore, no mitigation would be needed for impacts to marsh.

In summary, MSA-1 would yield a net benefit of approximately 1,048 AAHUs to CZ swamp habitats (see Table 2-3). The benefits attributed to existing swamp through hydrologic improvement includes 7,564 acres closest to the outfall (primary and secondary areas) (see Table 2-3 and 2-4). 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% of AAHUs may be achieved in 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.

2.4.4 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 (see Table 2-3). 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 2-3. 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	N/A	N/A	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

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 2-1. 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	1,239	7,876
MSA-2 Public Lands Only	Swamp	1,215	8,811
AAHU values have been rounded to second decimal place			

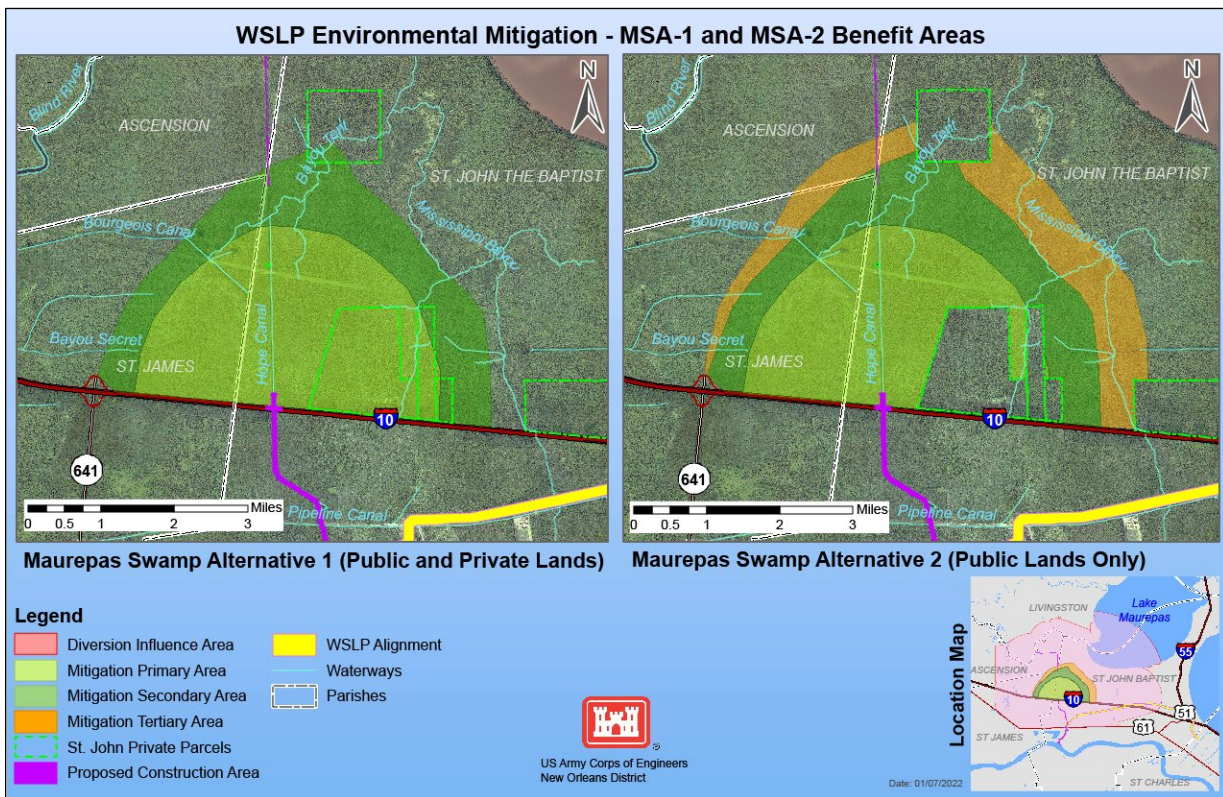


Figure 2-2. Primary, Secondary, and Tertiary Benefit Areas

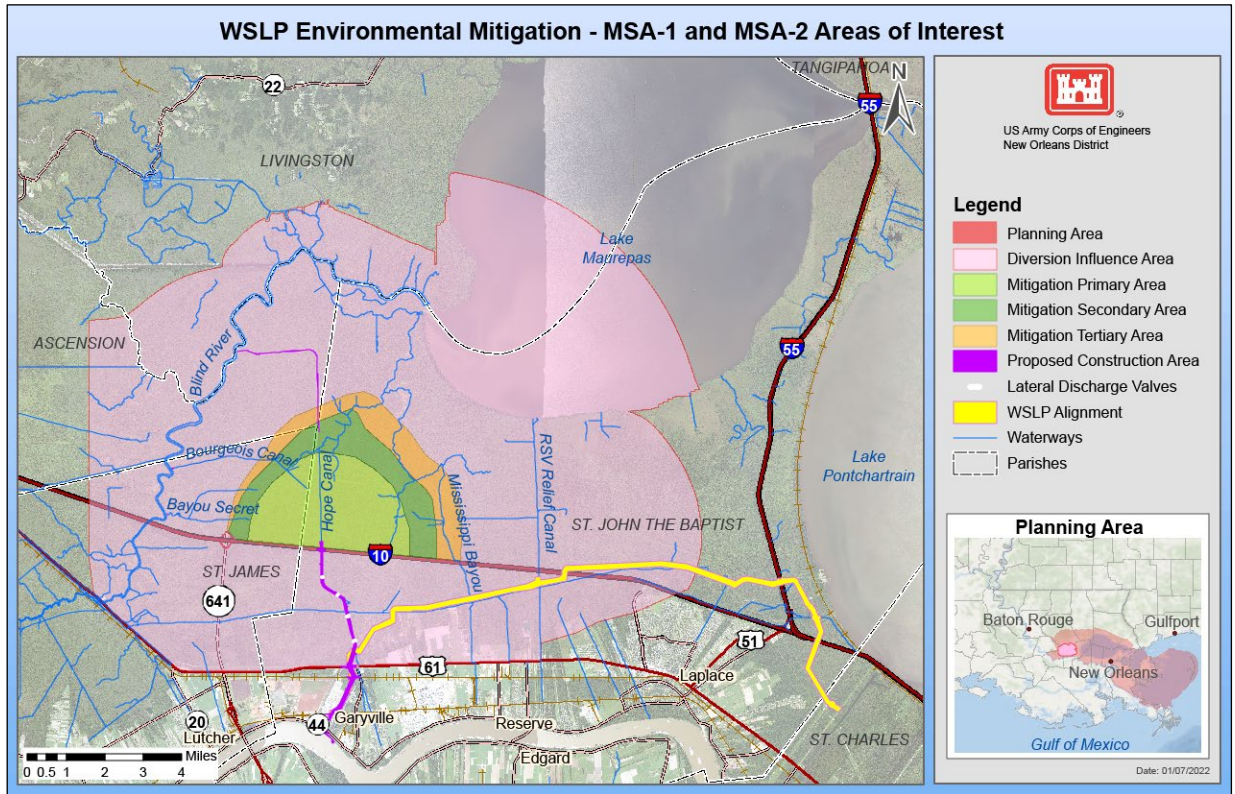


Figure 2-3. Maurepas Areas of Interest

As mentioned previously, prior to the compensatory mitigation areas being defined as shown in Figure 2-2, 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 restoration project. Flowage easements will be purchased on any privately owned properties within the mitigation area. For privately owned properties within the diversion influence area (see Figure 2-3), further modeling will be required to determine the effect of any potential inundation, and the necessity of purchasing flowage easements in this area will be evaluated at that time.

2.5 PROPOSED ACTION

The proposed alternatives MSA-1 and MSA-2 involve the construction a freshwater diversion that would reconnect the Mississippi River to the Maurepas Swamp, strategically delivering nutrient-laden river water to improve 104,746 acres of Cypress-Tupelo swamp (Figure 2-2). A description of the construction and structural features for the MSA alternatives and the difference in benefit areas between MSA-1 and MSA-2 is described below. The MSA-1 is depicted on the left in Figure 2-2. The MSA-2 is depicted on the right in Figure 2-2.

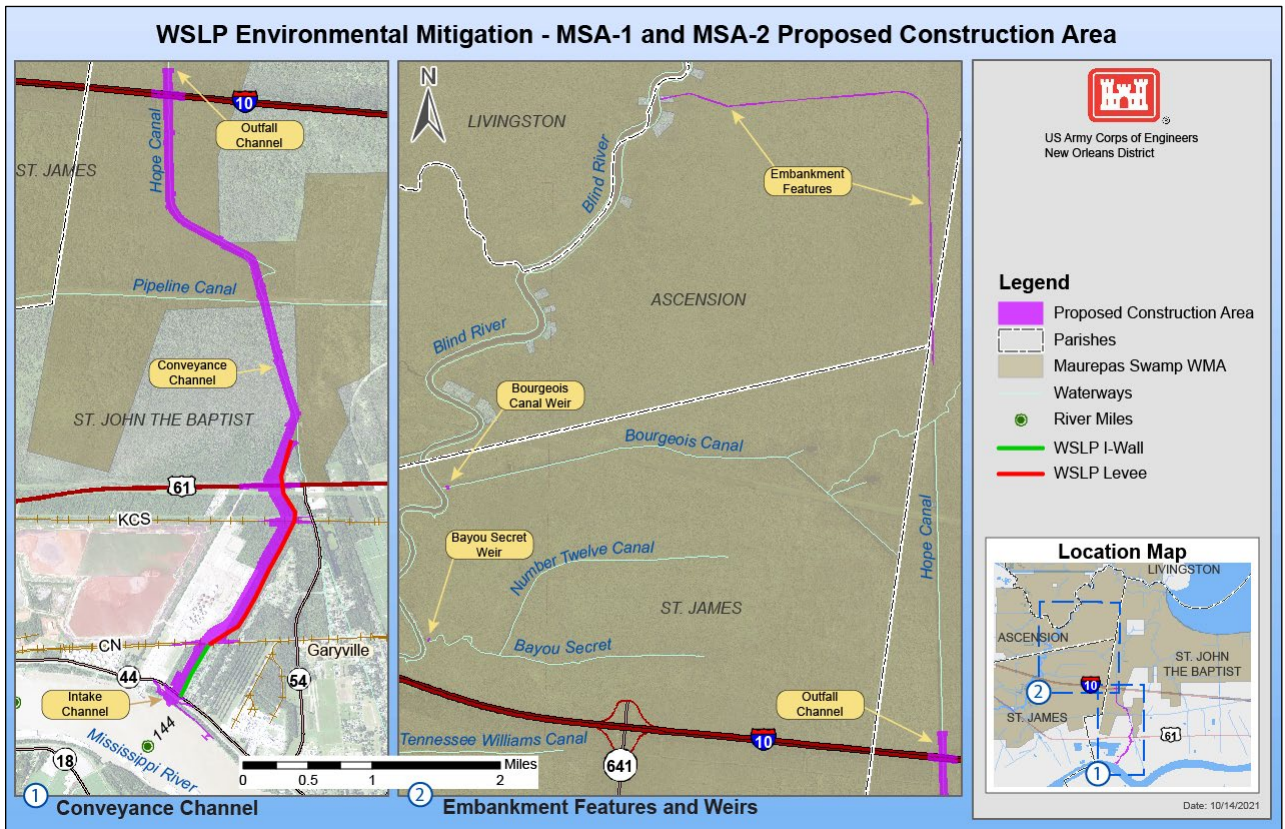


Figure 2-4. Maurepas Diversion Proposed Construction Area (Overall proposed construction area is 288.30 acres. Temporary Impacts are 26.48 acres and Permanent Impacts are 261.82 acres).

MSA-1 and MSA-2 would be a 2,000 cubic foot per second (cfs) freshwater diversion that would be operated to optimize benefits to swamp habitats within the mitigation area (Operations Appendix N). Construction would include three groups of features, the conveyance channel, embankment features, and weirs (Figure 2-4). 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) northwards. It extends northward for 5½ miles, terminating approximately 1,000 ft north of Interstate 10 (I-10). The majority of the open conveyance channel, excluding vehicular and railroad crossings, is a 40' to 60' excavated channel bottom tightly positioned between a guide levee on the west and the West Shore Lake Pontchartrain 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 2-5 illustrates typical construction corridor sections of the conveyance channel and the WSLP alignment from the sedimentation basin to the outfall north of I-10.

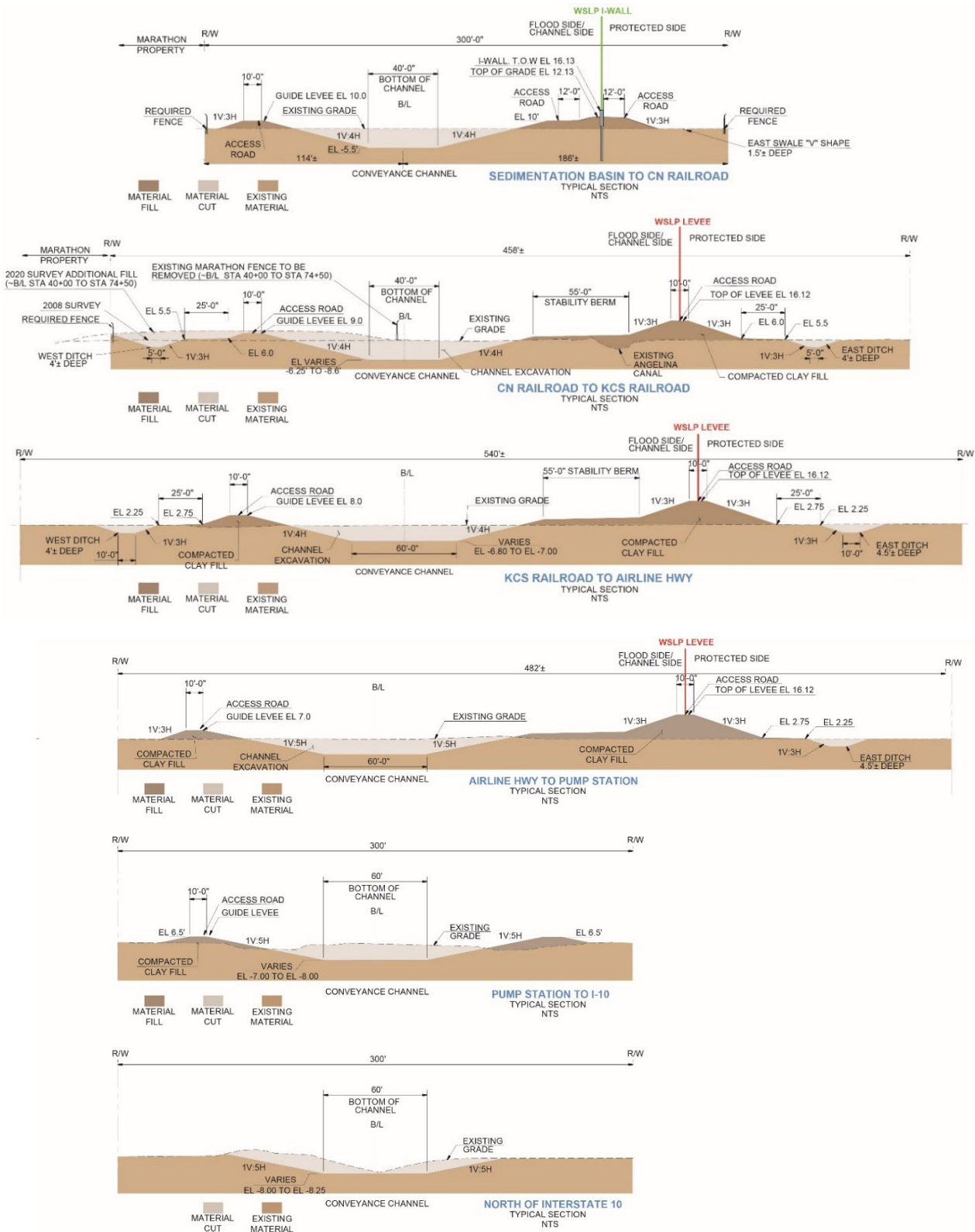


Figure 2-5. Typical Construction Corridor Sections of the Conveyance Channel and the WSLP Alignment from the Sedimentation Basin to the Outfall North of I-10

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 2-5, Figure 2-4, Figure 2-6*)
- an automated gate structure in the Mississippi River Levee (MRL); (*Table 2-5, Figure 2-6*)
- a sedimentation basin; (within the conveyance channel)
- a 5.5-mile-long open conveyance channel; (*Figure 2-4*)
- box culverts under River Road, Canadian National Railroad (CN), and Airline Highway; (*Figure 2-4*)
- a bridge over the channel at Kansas City Southern Railroad (KCS); (*Table 2-5, Figure 2-4*)
- 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;
- 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 2-5, Figure 2-4*) and
- submerged rock rip-rap weirs in Bayou Secret and Bourgeois Canal located in St. James Parish; (*Table 2-5, Figure 2-4*)

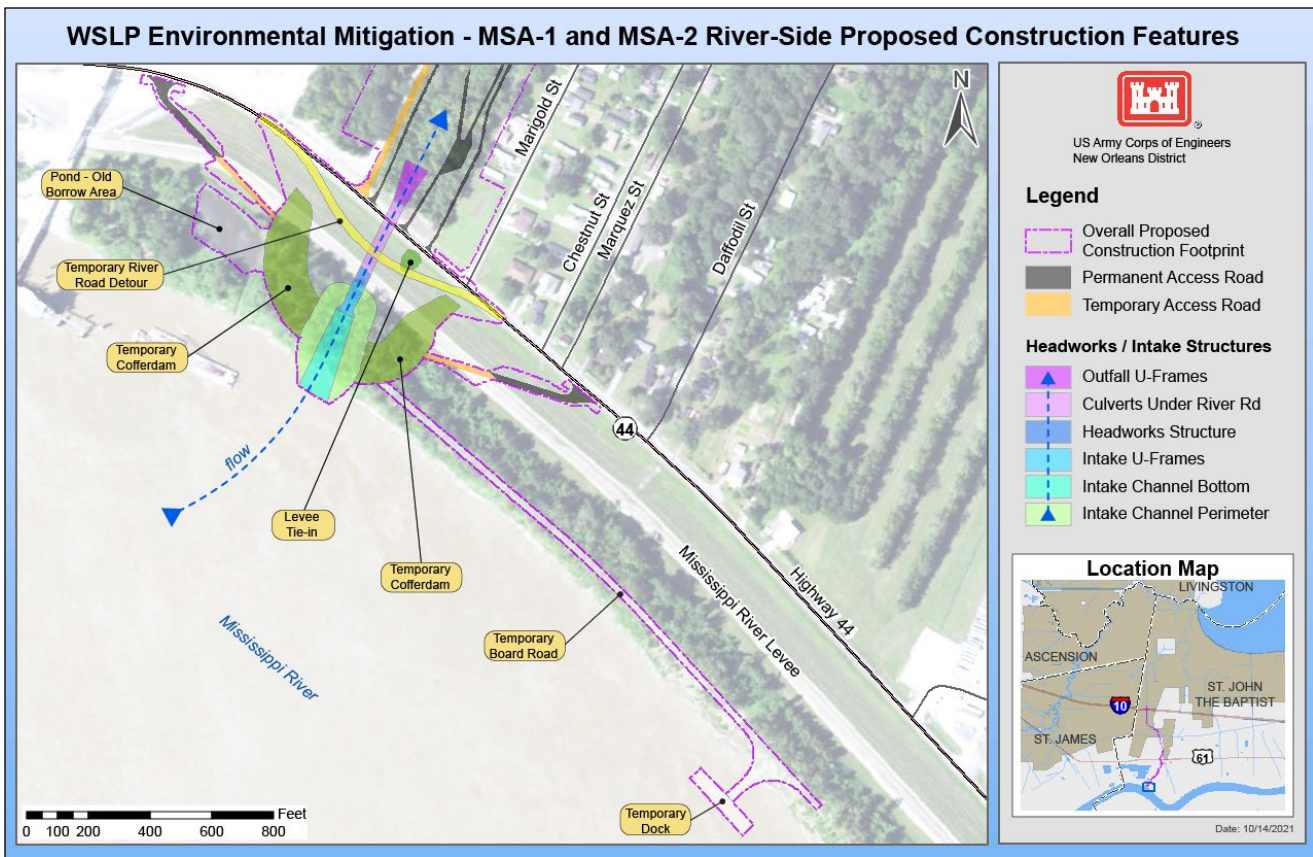


Figure 2-6. MSA-1 and MSA-2 Features from the Mississippi River to LA-44

The intake channel would be roughly 400 ft long by 200 ft wide, with a bottom depth at EL (-) 4 ft 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 2-5. 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 Degradation	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 in reinforced concrete pipes approximately 80 ft 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 HWY 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 Delft3D 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 2-3, Figure 2-7).

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.

2.6 ALTERNATIVE EVALUATION AND COMPARISON PROCESS (AUGUST 2021 – NOVEMBER 2021)

On September 23, 2021, an Alternatives Evaluation and Comparison (AEC) meeting was conducted to evaluate the three formulated alternatives. The three alternatives evaluated include: Maurepas Swamp Alternative 1 – MSA-1 (private and public lands), Maurepas Swamp Alternative 2 – MSA-2 (public lands only), and the No Action alternative (BBA selected plan in EA #576).

During the AEC, mitigation projects were evaluated individually and then compared to one another using the following selection criteria:

- **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 (NCC).
- **Cost Effectiveness** – This criterion evaluates the average annual cost per average annual habitat unit.

- **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 are established based on importance determined by the PDT with Risk and Reliability ranked highest at 30%, Environmental weighted 20%, Watershed and Ecological Site Considerations weighted 15%, Time weighted 15%, and Cost Effectiveness and Other Cost Considerations both weighted 10%.

The PDT evaluated these projects using the design data documented during the alternatives development phase as well as input provided by the NFS and the interagency team during an August 2021 inter-agency workshop.

The BBA Alternative (no action) received the highest scores in the AEC and was confirmed as the federally selected plan. The primary criteria that resulted in the higher AEC score for the BBA alternative were Cost Effectiveness, Other Cost Considerations and Risk and Reliability. The MSA-1 and MSA-2 projects scored lower in Cost Effectiveness, Other Cost Considerations, Risk and Reliability and Environmental and higher in Watershed/Ecological and equal in Time.

Once the initial evaluation was complete, a sensitivity analysis was determined to be unnecessary because increasing the importance of Risk and Reliability, Time and Schedule, Cost Effectiveness and Other Cost Considerations would not result in a change in the selected alternative to mitigate WSLP swamp impacts.

2.7 TENTATIVELY SELECTED ALTERNATIVE (TSA)

2.7.1 Selection Rationale

The WSLP project is expected to impact approximately 10,892 acres of swamp and 4,877 acres of BLH-Wet in the Louisiana 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 AEC confirmed the BBA18 alternative as the federally selected plan to meet the mitigation needs of WSLP.

Subsequent to the AEC through a letter dated August 23, 2021 (Appendix J) the NFS acknowledged the BBA alternative (no action) as the federally selected alternative 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. MSA-1 was removed from further consideration since it was not the federally selected plan identified in AEC or being requested by the NFS.

In accordance with 33 CFR 332.3 (a)(1), the fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to waters of the United States. The district engineer determines the compensatory mitigation plan based on what is practicable and capable of compensating for the aquatic resource functions that would be lost as a result of the WSLP project. When evaluating compensatory mitigation options, the district engineer would consider what would be environmentally preferable. In making this determination, the district engineer must assess the likelihood for ecological success and sustainability, the location of the compensation site relative to the impact site and the significance within the watershed, and the costs of the compensatory mitigation project.

In consideration of the results of the AEC, the significance of the Maurepas Swamp in the watershed and the NFS request, on November 4, 2021 the New Orleans District Engineer and Commander selected the NFS preferred alternative (MSA-2) for implementation as the TSA with the understanding that the NFS would be responsible for the increased cost over and above the BBA Alternative (Appendix D).

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).”

2.7.2 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 cost of operating the diversion based on this plan is about \$105,000 per year. This amount is based on a full-time CPRA staff annual salary, including indirect cost. Because the diversion structure is expected to operate for only six months out of the year, the \$105,000 annual salary is a conservative estimate that includes all other incidental, and relatively insignificant, associated costs such as electricity, back-up generator, overhead costs, etc. The 50-year cost, including 2.5% inflation, is \$5,381,250.

The Habitat Evaluation Team (HET) with assistance from the Maurepas Technical Advisory Group (TAG) 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, with an average annual maintenance cost of \$6,889,012. 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 estimated cost for maintenance of these features over the 50-year project is \$9,225,000. The total maintenance cost over the 50-year project life is \$353,675,591, with an average annual maintenance cost of \$7,073,512. 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. After the District Engineer provides notice of construction completion for the project, or functional portion of the project, the CPRAB would commence OMRR&R responsibilities associated with the project.

2.7.3 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.

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

There are many uncertainties associated with coastal systems. The project delivery team identified the following environmental factors which inherently carry uncertainty and could impact the accrual of benefits within the 50-year period of analysis:

- Potential climate change issues, such as sea level rise, in addition to regional subsidence rates are significant scientific uncertainties. These issues have been incorporated in the plan formulation process and would be monitored by gathering data on water levels, salinities, and land elevation.
- 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, 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 Adaptive management identify the numerous adaptive management (AM) activities in the life cycle of the project that could address some of these ecological and the other 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 Coastal Wetlands Planning, Protection, and Restoration Act 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% of the primary benefit area and the tertiary benefit area was assumed to be 45% 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

The timing for implementation is an uncertainty that must be considered. If the plan 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. In addition to these uncertainties, there is also the requirement that the mitigation be implemented concurrent with construction of the WSLP project.

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 18 alternative to ensure full satisfaction of the mitigation requirement.

Unresolved 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.

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 Department of Wildlife and Fisheries (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, some which 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 are 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. Management recommendations would be followed to reduce or mitigate a chance of entrainment.

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 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).

2.7.4.1 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 habitats 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

Sea Level Rise (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 (MR) River Mile (RM) 144.

The MR flows generally southwest into the Gulf of Mexico (GOM) 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 GOM. The Maurepas Swamp to GOM 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 MR 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 ft elevation change over 50 years (up to 2075) following shortly after the expected completion of the project. Due to the flow rates of the MR 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 ft 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 ft 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.

2.7.4.2 Engineering Factors

Uncertainty in Engineering Factors

The MSA-2 features integrated into the Mississippi River Levee System are being designed, constructed, and maintained to MR&T Standards and would follow all required engineering regulations and guidelines. As such, the risk and uncertainty as related to uncertainty in engineering factors is low.

Levee/Structure Failure

The MSA-2 features adjacent to the MR&T Levee are being designed, constructed, and maintained to HSDRRS Standards and would follow all required engineering regulations and guidelines. As such, the risk and uncertainty as related to levee/structure failure is low.

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. All associated drainage ditches and culverts are being designed and would be constructed to facilitate runoff for rain events. Thus, the risk and uncertainty as related to hydrologic flows is low.

Section 3

Affected Environment

This chapter describes the existing conditions of the affected environment and a forecast of the “future without-project” 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 coastal zone (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 coastal zone (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 Mississippi River levee. The area north of I-10 is undeveloped wetlands in the Maurepas Swamp WMA. Appendix A, Figure 10 present various habitat classifications from the most recent land cover database. Land loss is a key environmental factor in coastal Louisiana.

3.2 RELEVANT RESOURCES

This section contains a list of the relevant 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 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 2-3. According to Delft3D 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 (104,746 acres) is reached (Figure 2-3). 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, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Further detail on the 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 nine feet and two feet respectively. Historically, the shorelines of the lake were bordered by cypress/tupelo gum swamps, fresh to intermediate marshes, and bands of bottomland hardwood forests bordering natural drainages and the lake rim in some areas. 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 bottomland hardwood 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 2-3) 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*, others are observed throughout open water areas within the diversion influence area.

Prior to leveeing of the Mississippi River (1700's-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% 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.*, hairy pod 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. Bottomland hardwood 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 bottomland hardwood 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 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 utilized by: seabirds, wading birds, shore birds, dabbling and diving ducks, rails, coots, and gallinules, other saline marsh residents and migrants, nutria, muskrat, mink, river otter, and raccoon, rabbits, deer, and American alligator (LCWCRTF & WCRA, 1999).

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% (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 and 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 Louisiana Department of Wildlife and Fisheries has records of a wading bird nesting colony within one 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 threaten 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 1930's 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 Threatened and Endangered 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 crocodylian 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% 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 crocodylian (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 3-1) 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 t been de-listed because population levels have improved are the bald eagle and the brown pelican. Currently, American alligators and shovelnose sturgeon are listed as threatened under the Similarity of Appearance clause in the Endangered Species Act (ESA) of 1973, as amended but are not subject to ESA Section 7 consultation. Appendix B, Table 4 contains a list of Louisiana State Listed species that could potentially occur.

Table 3-1. Species that May Occur in the Planning Area

Species	Parish	Critical Habitat	Status	Jurisdiction	
				USFWS	NMFS
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 3 listed threatened and endangered 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 ft) and extremely limited access. All of 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). In order to minimize the potential for construction activities to cause adverse impacts to manatees, the following standard manatee protection measures 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 Information for Planning and Consultation (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 5 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. 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 Migratory Bird Treaty Act, and the bald eagle is additionally protected by the Bald and Golden Eagle Protection Act (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 MS 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 one mile from proposed excavation in Hope Canal. The nearest nest to proposed pile driving activities is approximately two miles from the US 61 crossing. There is one active nest within the secondary mitigation area. Baldcypress 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 5 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, Chandelier Sound, Lake Salvador, Lake Cataouatche, Atchafalaya Bay, West Cote Blanche Bay, and Vermillion Bay. NMFS has indicated that these water bodies and adjacent wetlands provide nursery, foraging, and other important habitats which support varieties of economically important marine fishery species, including striped mullet, Atlantic croaker, Gulf menhaden, spotted and sand sea trout, southern flounder, black drum, and blue crab. Some of these species also serve as prey for other fish species managed under the MSFCMA by the Gulf of Mexico Fishery Management Council (e.g., 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 Essential Fish Habitat (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 which support varieties of economically important marine fishery species, including striped mullet, Atlantic croaker, Gulf menhaden, spotted and sand sea trout, southern flounder, black drum, and blue crab. Some of these species also serve as prey for other fish species managed under the MSFCMA by the Gulf of Mexico Fishery Management Council (e.g., 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 3-2 shows the EFH for the managed species in southeastern Louisiana.

Table 3-2. 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 essential fish habitat for postlarval/juvenile brown shrimp; postlarval/juvenile white shrimp; and postlarval/juvenile and adult red drum. The 2005 generic amendment of the FMP for the Gulf of Mexico, prepared by the Gulf of Mexico FMC, identifies EFH in the project area to be estuarine 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 essential fish habitat for larval, post larval, early and late juvenile, and adult red drum, early juvenile white shrimp, and neonate and juvenile bull shark (Table 3-3).

Table 3-3. 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 (TCPs). Historic properties have a narrower meaning and are defined in 36 CFR 800.16(l) of the National Historic Preservation Act (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 National Historic Preservation Act (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 state Historic Preservation Officer/s (SHPO), Tribal Historic Preservation Officer/s (THPO) and/or tribal officials, state and local officials, non-federal sponsors/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. E.O. 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 (5) 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 (1) of these cultural/temporal periods. Moreover, many of these sites possess more than one (1) 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 Environmental Protection Agency (<https://www.epa.gov/eco-research/ecoregion-download-files-state-region-6#pane-16>). There are six (6) regions at Level III, of which four (4) 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 in order 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 contexts 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 its 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. National Register (NR)-listed properties typically fall into one (1) of five (5) categories: building, structure, object, site, and district.

The National Park Service (NPS) uses the following definitions to differentiate NR 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 (5) common types of NR properties mentioned above, the planning area also has the potential to contain National Historic Landmarks (NHLs) and archaeological sites not presently listed on the NR:

- **National Historic Landmark:** 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 (SOI) 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 which 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 Advisory Council on Historic Preservation 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 NR 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 NR 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 NR-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 (6) 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 3-4.

Table 3-4. 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 Louisiana Division of Archaeology (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 (3) 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 (2) 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 (7) sites are listed as unknown eligibility (16AN8, 16LV24, 16LV73, 16LV74, 16LV103, 16SJ72, and 16SJB4). These sites include four (4) prehistoric shell middens (16AN8, 16LV73, 16LV24, 16SJB4), 2 possible watercrafts/shipwrecks (16LV74, 16SJ72), one (1) railroad bridge (16SJ72), and the Amite River Diversion Canal (16LV103). Two (2) cemeteries are present within the APE (16SJ58, 16SJ61), both dating back to the Civil War (Table 3-4).

Fifteen (15) 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 (9) 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 Interstate-10 to the Mississippi River (Wells 2008; 22-3023). No eligible archaeological sites were recorded as a result of this survey (Table 3-4).

Architectural

The proposed construction area located approximately one (1) mile from the Garyville Historic District, a National Register Historic District (NRHD) 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 3-4).

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 3-5).

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 3-5. 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	22-1086	Partial	Little survey coverage of proposed mitigation area.
	16LV24	22-2628		
	16LV72	22-2683		
	16LV73	22-3023		
	16LV74	22-3793		
	16LV103	22-3879		
	16SJ58	22-3879		
	16SJ61	22-4288		
	16SJ73	22-4571		
	16SJB4	22-4571-1		
	16SJB68	22-4571-2		
	48-01071	22-4690		
	48-01073	22-4868		
	48-01089	22-4868		
	22-5158			
	22-5431			
	22-6238			

Tribal

A total of nine (9) 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, entitled, *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 18 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 7 National Wildlife Refuges (NWRs), more than 15 LA Wildlife Management Areas, 7 LA State Parks, and 1 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% of the State's resident fishing licenses and boat registrations according to the Louisiana Department of Wildlife and Fisheries (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 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 utilized 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. Interstate 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 Wildlife Management Areas, 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 Mississippi River Levee, 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 Wildlife Management area (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 Tepagnier) 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 2-1, Figure 2-4).

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 which 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 3-6) are minimally influenced by logging trends and urban development and are more influenced by industrial emissions.

Table 3-6. 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 (NO₂)	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 (O₃)	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
	PM ₁₀	primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
		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 (SO₂)	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 utilizing 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 Clean Air Act of 1970. The Clean Air Act Amendments of 1990 mandated a program by which air quality must be improved and maintained to meet the National Ambient Air Quality Standards (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.”

Effective March 30, 2021; Two of the four Parishes, Ascension and Livingston, were redesignated to Maintenance March 21, 2017.

No Action Alternative (BBA Alternative)

Depending on which project(s) are implemented and classified as Marginal for Ozone (O₃) 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 Clean Water Act requires each state to monitor and report on surface and groundwater quality, which the Environmental Protection Agency (EPA) synthesizes into a report to Congress. The Louisiana Department of Environmental Quality (LDEQ) produces a Section 305(b) Water Quality Report that provides monitoring data and water quality summaries for hydrologic units (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 its 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 USEPA 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 (TMDL) is most often the next step in the process. A TMDL 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 (MSR) to the south, Lake Maurepas to the north, and Blind River to the west. Between MSR 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 Coastwide Reference Monitoring System (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 ft 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 ft 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 Total Nitrogen (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 ARDC (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 NOAA, 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 (USEPA 1974). A DNL of 65 weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. 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 (USEPA 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 one quarter mile to the southeast and one mile to the west of the project area. The industrial facilities are within one 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 am to 10:00 pm 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, wildlife management areas, 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. During a database search, several issues were noted within one mile of the proposed site but no RECs were identified on site. There is a low probability of encountering HTRW on the site.

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 one 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 one 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 T. 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 eleven parishes, the names of the individual parishes are given in the Table 3-7.

Table 3-7. 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 3-7 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 3-8 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 3-8. 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 3-9 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 3-9. 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 US and worldwide (EPA, 2011b). MSA-2 include an intake structure 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. Project features at the river include an intake channel in the batture and an automated gate structure in the Mississippi River levee. 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 utilize 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% from 1990 census to 2010 census. According to the 2019 American Community Survey (ACS), population in St. James Parish declined by 8.6% from 2019 to 2010. 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% 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 3-10 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 3-10. 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 3-11 shows the recent population trends in the communities within the diversion influence area. Population in the following table are based on the Census Bureau’s American Community Survey five-year estimates. Laplace is the largest population center of all the communities in the diversion influence area. According to the ACS, the population in all three CDPs 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 3-11. 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 3-12 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 3-12. 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 3-13 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 labor force and employment numbers are expected to return to normal.

Table 3-13. 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 3-14 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 3-14. 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 Interstate 10, Highway 44 and Airline Highway. Table 3-15 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 3-15. 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 3-16 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 3-16. 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

Executive Order 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 environmental justice policy is to ensure that minority and low-income populations are fully and equitably considered during the project development process.

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% population identifying as a minority.

MSA-2 Alternative Area

Minority Status

According to the United States 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 significantly greater than in the general population (USACE and CPRA 2010). Tables 3-17 and 3-18 show the minority populations of areas within the larger planning area including St. John the Baptist and the town of

Garyville. Approximately 62% of St. John the Baptist population identifies as a minority, according to U.S. Census Bureau data for 2019, well above the State of Louisiana minority rate of 38 percent. The majority of residents in the town of Garyville, LA, located along the Mississippi River in the area of the proposed action, also identify as a minority.

Low-Income Status

Low-income populations are those that fall below the poverty threshold determined by the US Census Bureau. Poverty populations according to US Census Bureau data for 2019 in St. John the Baptist Parish and other Louisiana parishes are shown in Table 3-17. 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 20 percent or is significantly greater than in the general population.

Table 3-17. Minority Populations in St. John the Baptist Parish

Race	Minority population
Black	24,433
White	16,501
Asian	482
Two or More Races	663
Other	1,163
Native American (Alaskan Native)	0
Pacific Islander	0
TOTAL POPULATION	43,242
PERCENTAGE Minority	61.8%
Percent Hispanic	6.1%
State of Louisiana Percentage Minority	38.0%

Source: U.S. Census Bureau, American Community Survey 2015-2019

Minority populations according to United States Census Bureau data for 2019 for each race in Garyville are shown in Table 3-18.

*Table 3-18. Minority Populations in Garyville CDP**

Race	Minority population
Black	1,170
White	985
Asian	0
Two or More Races	0
Other	0
Native American (Alaskan Native)	0
Pacific Islander	0
SUM	692
TOTAL POPULATION	2,155
PERCENTAGE MINORITY	54.3%
Hispanic Percentage	0.8%

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

Source: U.S. Census Bureau, American Community Survey 2015-2019

Low-Income Status

Low-income populations are those that fall below the poverty threshold determined by the US Census Bureau. Poverty populations according to US Census Bureau data for 2019 in St. John the Baptist Parish and other Louisiana parishes are shown in Table 3-19. 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 20 percent or is significantly greater than in the general population.

Poverty Rates in Garyville and St. John the Baptist Parish as compared to the region, metropolitan area, and US are shown in Table 3-19. The percent of residents living below poverty in St. John the Baptist is comparable to the rate in the State of Louisiana, 17.4% and 19.2% respectively while the percent living below poverty in Garyville is lower at 13.4%.

Table 3-19. Poverty Populations in St. John the Baptist Parish Compared to the Region, Metropolitan Area, and US

Location	Percent living in poverty
Garyville	13.4%
Ascension Parish	10.6%
St. John the Baptist Parish	17.4%
Orleans Parish	23.7%
Plaquemines Parish	18.2%
Jefferson Parish	15.5%
St. Bernard Parish	21.1%
St. Charles Parish	11.2%
St. James Parish	17.0%
State of Louisiana	19.2%
United States	13.4%

Source: U.S. Census Bureau, American Community Survey 2015-2019

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, Natural Resource Conservation Service (NRCS). Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. 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% 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 relative sea level rise 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 ft (3 m) along the highest portions of the old natural levee of the Mississippi River to as low as 3 ft (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 invert elevations of the drainage channels range from +5 to -1 ft (+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 utilized 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 utilized is unknown at this time. Since 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 Lake Pontchartrain Basin (LPB) cut by the Coastal Zone (CZ) (Figure 2-1).
2. Diversion Influence Area - Diverted Mississippi River water is modeled representing the extent of nutrients, velocities, and water levels (Figure 2-3).
3. Mitigation Area - Primary, secondary, and tertiary benefit areas (Figure 2-3).
4. Proposed Construction Area – delineates the extent of construction activity (Figure 2-3).

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.

Indirect Impacts

Implementation of the St. James and Pine Island projects would prevent an overall loss of CZ swamp habitat from the planning area.

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, however, would not reverse the current overall trend of wetland loss that is occurring or prevent it from accelerating in the future.

Future Conditions in Maurepas Swamp

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. 20016).

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 4-1 for impacts to wetlands by construction feature and habitat type. See Table 4-2 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 4-1. 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 4-2. 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

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 4-3 indicating acres and AAHUs of indirect positive impacts to CZ swamp that would result from MSA-2.

Table 4-3. 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 models result 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 Habitat Evaluation Team (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 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.

Cumulative Impacts

This project, 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 & 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.

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, sea level rise, 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 and 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. Wildlife present at the time of construction would be temporarily displaced to adjacent habitats due to noise, movement, turbidity and vibration. 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.

Indirect Impacts

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 habitat 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.

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. 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 river-side 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 slight and would not have a long-term negative impact on any wildlife that may be present in the construction area. Any wildlife that may be present in the construction area would be highly mobile and would simply utilize adjacent, undisturbed habitat during construction activities. Disturbance and noise from the construction equipment would temporarily disperse wildlife species from the construction area. However, once the work is completed, wildlife species would be expected to return to the construction area. The temporary disturbance would not adversely impact the general populations of wildlife species within the region, as extensive forested areas and suitable habitat is readily available within the vicinity of the construction area.

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 the 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 3.0 msl feet and reopens when water levels recede to 2.5 msl feet following a closure (Figure 4-1).

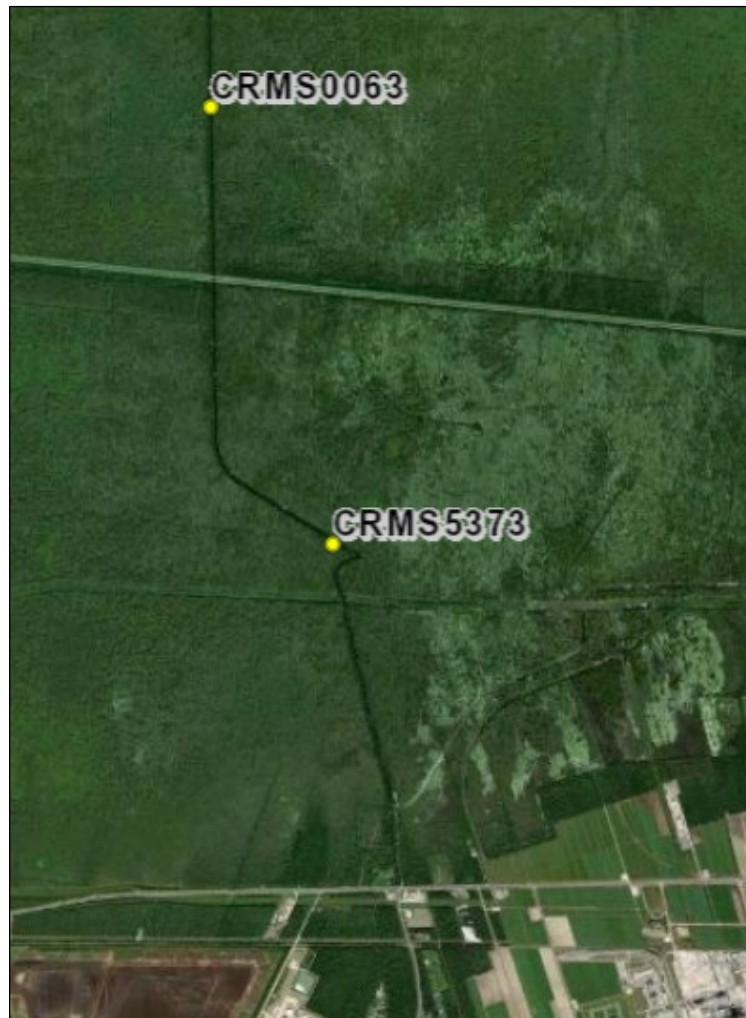


Figure 4-1. CRMS Station 5373

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 to 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.

Indirect Impacts

Construction Area

Indirect impacts would occur 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 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 Sections 4.2.12 Noise). Mobile terrestrial wildlife species that utilize swamp habitat near the constructible features would be displaced from disturbance. However, these species would have the opportunity to utilize adjacent swamp habitat.

Once benefits are gained from improved habitat quality, many terrestrial species utilizing existing swamp habitat would thrive with the additional foraging, cover, and resting habitat the alternative would create. 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.

Operation and Maintenance

There is potential for increased herbivory outside of diversion influence area which in turn would have an impact on the forested wetland ecosystems in close proximity to Maurepas swamp (See Section 4.2.1). 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, runoff from urban and agricultural areas that would enter 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.

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 & 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.

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 above.

4.1.3 Threatened and Endangered 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 utilization of the shallow water depths in the site (typically less than two feet) is unlikely and access is extremely limited. The borrow area could potentially be utilized 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.

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.

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.

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 utilize 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 MS 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.

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.

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% 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 GS. 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.

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, GS, bald eagles, and colonial nesting birds in the LPB. The cumulative effects to pallid sturgeon would be the combined entrainment of individuals due to the operation of the Bonnet Carre and the Maurepas diversion.

Determination

CEMVN has determined that the proposed MSA-2 would have no effect on the Red-cockaded woodpecker and GS; 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 is ongoing.

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 ft. 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 three 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). 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 conditions 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 Carre 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.

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. 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 essential fish habitat 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 essential fish habitat 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 essential fish habitat through implementation of St. James, because there is no essential fish habitat 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 essential fish habitat through implementation of St. James, because there is no essential fish habitat 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 essential fish habitat through implementation of St. James, because there is no essential fish habitat 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 essential fish habitat within the direct construction area and within the benefit areas for this alternative. Lake Maurepas does contain essential fish habitat. 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 essential fish habitat 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 essential fish habitat 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 essential fish habitat associated with eutrophication. These would be similar to those discussed in the Aquatic Resources and Fisheries Section. Please see that section for details.

Cumulative Impacts

There could be slight incremental impacts to essential fish habitat associated with eutrophication. These would be similar to those discussed in the Aquatic Resources and Fisheries Section. Please see that section for details.

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 Advisory Council on Historic Preservation, federally-recognized Tribes, and other interested parties, entitled, *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 PA 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 (on-line), existing cultural resources survey reports, and other available documentation identified eleven (11) previously recorded archaeological resources and three (3) 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 PA (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 PA.

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. In order to reduce impacts to cultural resources resulting from the implementation of MSA-2, CEMVN would follow the steps as outlined in the PA (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 PA.

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

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 would 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.

Cumulative Impacts

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.

Operation of the diversion may cause adverse Impacts to alligator and deer populations and therefore to hunting.

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.

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, some which are more the effect of prey availability in lower salinity areas.

Minor, adverse direct impacts to recreational fishing due to operation of the diversion are not expected. The expected benefits include increased swamp health. Tourism and recreational uses of the swamp are dependent on the abundance of wildlife and marine and estuarine fauna. Increased species abundance and diversity would be anticipated to benefit activities in the swamp such as wildlife viewing, hiking, birding, boating, fishing, and hunting.

Indirect Impacts

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 long term adverse impacts and benefits to recreational fishing. Indirect long-term adverse impacts to recreational fishing could occur due to operations and permanent features such as decreased water quality due

to introduction of turbid and nutrient rich water, increased competition due to introduction of non-native species, and permanent conversion of prey habitat where features are located. 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

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 DO, 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 undertaken 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 for the River Reintroduction into Maurepas Swamp).

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.

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.

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.

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 Wildlife Management 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.

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 utilizing 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 Best Management Practices (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.

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 (4) 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 6 NAAQS standards. Ascension Parish and Livingston Parish are in attainment of 5 of 6 NAAQS

standards 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.

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.

Best management practices would be implemented to prevent or minimize any material due to construction activities from entering the river.

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 water body's designated uses as defined under the standards of Louisiana Administrative Code, Title 33, Part IX, Chapter 11. Water quality impacts in the fill area of Pine Island would temporarily add to the water quality impairment of this sub-segment, but these impacts would be minimized through best management practices and would diminish to background levels after construction.

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. 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. 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 2-3). No impacts are anticipated on water quality in the Mississippi River.

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 assimilation and nutrient loading. Lane et al. (2003) found that the Maurepas swamps are 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 Interstate 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.

See Figures 1 and 2 (Appendix A) for modeled total nitrogen (TN) and total phosphorus (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.

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).

Cumulative Impacts

Cumulatively, impacts with adjacent state-sponsored restoration projects and the Amite River Diversion Canal (ARDC) 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 assimilation and nutrient loading 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 Mississippi River and tributaries 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.

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).

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.

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.

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.

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.

Cumulative Impacts

No 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 utilized 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 Hazardous, Toxic, and Radioactive Waste (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. Some residences exist within one quarter to one mile of the project site. Industrial facilities are located within one mile of the project site. Several petroleum pipelines and abandoned oil/gas wells exist within and near the project 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. An HTRW investigation would be conducted prior to final design and any RECs would be avoided.

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 either the proposed mitigation sites or the borrow site. No indirect impacts from HTRW are anticipated 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 T). No HTRW and no RECs were identified; therefore, no direct, indirect, or cumulative impacts from HTRW were identified.

Future Conditions in Pine Island and St. James

In 50 years, some of the agricultural land may be developed into residential areas, however, the probability of encountering HTRW at the project site would remain low. In 50 years, Pine Island would likely continue to be open water areas and the probability of encountering HTRW at the project site would remain low.

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 swap 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

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 West Shore Lake Pontchartrain 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 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.

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.

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 utilizing tugboats and/or barges would occur approximately 400 ft (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 bature. 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.

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 Louisiana Department of Wildlife and Fisheries 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.

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 River Mile 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)

Environmental Justice (EJ) is institutionally significant because of Executive Order 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, best management practices would be utilized 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).

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 impacts from construction of MSA-2 to low-income and minority communities. MSA-2 is located to the west of the WSLP storm damage risk reduction system (floodwall). The community located just east of the WSLP structural alternative, (currently under construction), is a minority community based upon 2019 U. S. Census Bureau data. The human environmental impacts of constructing the WSLP structural alternative were identified in the WSLP EIS. The WSLP structural alignment 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 footprint is just to the west of the WSLP structural alignment. The WSLP structural levee would provide protection to those communities to the east of the Diversion.

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 impacts of constructing MSA-2 would 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 in nature. Best Management Practices would be used to avoid/reduce or minimize construction-related activities.

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.

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.

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.

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.

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.

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.

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.

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 essential fish habitat 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 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 Operations Manual 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 Interstate I-10 to the south (see Figure 4-2 below). Also, the diversion would not be operated when there is a weather event that could adversely affect tidal flooding.

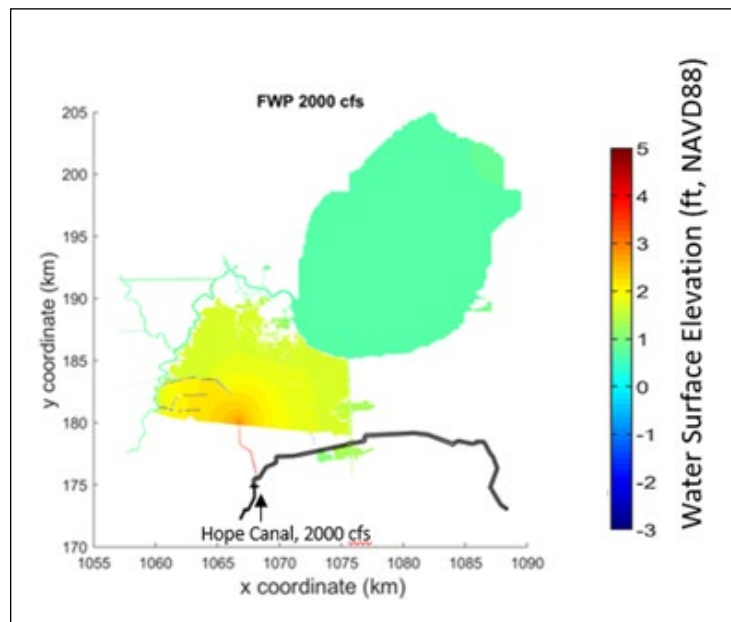


Figure 4-2. MSA-2 Water Surface Elevation

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 2-7). Thus, the risk to public health and safety would be low.

The Louisiana Department of Wildlife and Fisheries has concerns about the effects of water level increases on the Wildlife Management Area, described in section 2.7.4 unresolved 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 West Shore Lake Pontchartrain (WSLP) project is less than 0.2 ft, 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 PIS and hydrology appendix for more information.

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 Mitigation

Based on the most recent designs, WSLP would impact approximately (~) 947 AAHUs of CZ swamp habitat and ~293 AAHUs of CZ BLH habitat. Construction and operation of MSA-2 would result in an additional ~206.5 AAHUs of CZ swamp, ~35.8 AAHUs of CZ BLH, and ~19.5 AAHUs of CZ marsh. Swamp impacts resulting from both WS8***LP 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 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 5-1. 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

In accordance with the USACE Implementation Guidance for Section 2036(a) of the WRDA 2007, Mitigation for Fish and Wildlife and Wetlands Losses, and Appendix C to Engineer Regulation 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 mitigation banking instrument (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 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. 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 5-2. 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 Coastal Zone (CZ) and within LPB. In EA #576, St James was inadvertently assessed as out of CZ. During public review, Louisiana Department of Natural Resources 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 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. 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 5-3. 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 bio-diversity.
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. 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 5-4 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 figure 5.2 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. 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 5-5. 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 bio-diversity.
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	Temporary adverse due to construction activities.	Beneficial once established	Temporary and minimal contribution to cumulative impacts. Would serve to

Resource	Direct Impacts	Indirect Impacts	Cumulative Impacts
Coordination"			benefit regional WQ
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 (AM) activities in the life cycle of the project is to address ecological and other uncertainties (uncertainties are described in Section 2.6.3) that could prevent successful implementation of a project. AM also establishes a framework for decision making that utilizes monitoring results, progress towards 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 AM 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 2007, Section 2036) 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.

Both CEMVN-constructed projects proposed under the No Action BBA Alternative and Maurepas Swamp Alternatives have an AM Plan (contingency plan) for taking corrective AM actions in cases where monitoring demonstrates that the mitigation project(s) is/are not achieving ecological success and objectives. The plan for the Maurepas Swamp Alternatives further includes AM triggers to specify when AM maybe needed; a trigger indicates that the monitoring data has not met or is not expected to meet the success criteria without an AM action. If the mitigation project(s) trigger a need for AM, CEMVN and the NFS would consult with the other agencies through the Maurepas Interagency Team (MIT) to confirm the AM actions needed to achieve ecological success criteria. This decision-making process is further explained in the Adaptive Management Section of Appendix H.

General success criteria, monitoring guidelines and AM Actions for the mitigation projects can be found in Appendix H for the Maurepas Swamp Alternatives and EA #576 Appendix H for the No Action BBA Alternative. The AM actions and triggers for the Maurepas Swamp Alternatives are summarized below. Evaluation of potential AM actions for the No Action BBA projects are discussed in EA #576.

A summary of the potential triggers and AM Action for the MSA-2 are included in Table 6-1 and the AM actions are further described in this Section and Appendix H. Success criteria are included in Table 6-2.

Table 6-1. 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • All success criteria
Hydrologic connectivity between the river and swamp is not adequately achieved	<ul style="list-style-type: none"> • Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures 	<ul style="list-style-type: none"> • All success criteria
Conveyance channel is eroding or clogging	<ul style="list-style-type: none"> • Adjust diversion operations • Clear channel of sediment/debris • Remove/treat aquatic vegetation • Fortify channel banks 	<ul style="list-style-type: none"> • All success criteria
Hydrology is negatively impacted in the mitigation area due to siltation, erosion, or aquatic invasive species	<ul style="list-style-type: none"> • Adjust diversion operations • Invasive species management • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures 	<ul style="list-style-type: none"> • All success criteria
Mitigation area is, or is anticipated to be impacted by a severe weather event	<ul style="list-style-type: none"> • Adjust diversion operations • CRASH monitoring 	<ul style="list-style-type: none"> • All success criteria
Diversion operations result in water level exceeding expectations	<ul style="list-style-type: none"> • Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures 	<ul style="list-style-type: none"> • All success criteria
Adjustments to Nitrate levels in the swamp are needed	<ul style="list-style-type: none"> • Adjust diversion operations • Add embankment cuts to improve hydrologic connectivity • Install weirs or other outfall management structures 	<ul style="list-style-type: none"> • All success criteria
Mortality increases and/or growth is reduced for non-target woody species	<ul style="list-style-type: none"> • TBD-based on species and extent of impact • Consider adjustments of diversion operations or outfall management 	<ul style="list-style-type: none"> • All success criteria
Data collection methods do not sufficiently measure parameters specified in the success criteria	<ul style="list-style-type: none"> • Revise the Monitoring Plan as necessary to determine success 	<ul style="list-style-type: none"> • All success criteria
Prevalence of invasive species increases or new invasive species are introduced in the diversion area	<ul style="list-style-type: none"> • Attempt to identify source, determine if there is a negative impact on the mitigation area, incorporate invasive species management if feasible 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> Adjust diversion operations 	<ul style="list-style-type: none"> All success criteria
Existing or future projects cause unexpected interactions with MSA-2	<ul style="list-style-type: none"> TBD-based on assessments 	<ul style="list-style-type: none"> All success criteria
Landowner exhibits concerns	<ul style="list-style-type: none"> TBD-based on concerns 	<ul style="list-style-type: none"> All success criteria
Negative change in habitat conditions south of I-10	<ul style="list-style-type: none"> Adjust operations of lateral relief valves 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> TBD-based on species and impacts 	<ul style="list-style-type: none"> 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 AM 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 AM 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 AM 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 AM Section of Appendix H for potential AM actions based on the species and the Maintenance Plan (Appendix N). Potential AM 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 6-2. 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 baldcypress 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 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 draft 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.

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 reevaluate alternatives 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 Notice of Intent 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 Web sites and CEMVN social media sites (Twitter, Facebook, Instagram). A media advisory was provided to local Louisiana and regional media outlets.

Public notices for the meeting were published on the District's website, Facebook and Instagram page. An announcement of the beginning of scoping was provided to the local media for announcement. 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-mails 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 (SLR; mitigation bank)) submitted an email letter on the Notice of Intent and the Scoping presentation. In total 3 email/letters were submitted from SLR. 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.

Draft SEIS Comment Period

A Public Notice for the draft SEIS was shared through PR announcements on Facebook, Instagram, and through media outlets for the 45-day comment period beginning March 4, 2022 and ending April 18, 2022.

7.2 AGENCY COORDINATION

Preparation of the draft SEIS has been coordinated with appropriate, federal, Tribal, state, and local interests, as well as environmental groups and other interested parties. The following agencies all 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 Clean Air Act (CAA) sets goals and standards for the quality and purity of air. It requires the Environmental Protection Agency to set National Ambient Air Quality Standards (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 Louisiana Department of Environmental Quality 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 Clean Water Act (CWA) sets and maintains goals and standards for water quality and purity. Section 401 requires a Water Quality Certification from the Louisiana Department of Environmental Quality (LDEQ) that a proposed project does not violate established effluent limitations and water quality standards. State Water Quality Certification 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. 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) will be released for public review for a 30-day period ending no later than May 31, 2022. The Section 404(b)(1) evaluation will be available in Appendix L in the final SEIS.

8.3 COASTAL ZONE MANAGEMENT OF 1972

The Coastal Zone Management Act (CZMA) requires that "each federal agency conducting or supporting activities directly affecting the coastal zone 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 Louisiana Department of Natural Resources (LDNR) for the Proposed Action, and in response LDNR will provide their determination for the Proposed Action, which will be included in the final SEIS.

8.4 ENDANGERED SPECIES ACT OF 1973

The Endangered Species Act (ESA) is designed to protect and recover threatened and endangered (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 GS; 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. CEMVN coordination letters and responses from USFWS are found in Appendix J. ESA coordination is ongoing. However, USFWS has provided preliminary reasonable and prudent measures (RPMs) for planning purposes. These RPMs are subject to change once the USFWS incidental take statement is finalized. Final RPMs will be included in the final SEIS.

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.

RPM 2. The CPRA and CEMVN will coordinate with the Service to develop a Fish Monitoring and Removal Plan for pallid sturgeon. This plan will need to be completed and Service approved prior to the construction of the cofferdam.

RPM 3. Dredging (cutterhead/suction) in the Mississippi River would be conducted using dredge operational parameters coordinated with the Service.

8.5 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act (FPPA) 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 would assess the number of prime farmland acres impacted by the proposed project. CEMVN coordination letters and responses from NRCS would be included in the final SEIS.

8.6 FLOODPLAIN MANAGEMENT

Executive Order 11988 (EO 11988) 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. CEMVN would comply with FEMA Region VI to ensure the Recommended Plan would be in compliance with EO 11988, and welcomes comments from the community floodplain administrators for St. Charles, St. James, and St. John the Baptist Parishes. CEMVN would consider all concerns and provide determination letters to floodplain administrators (Appendix J). The eight-step EO 11988-Floodplain Management

evaluation process and a determination of compliance with EO 11988 would be documented in the final WSLP SEIS.

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 coordination act report (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 Draft CAR was received on February 4, 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. A Final CAR would be included in the final SEIS.

USFWS Draft CAR Recommendations and CEMVN Responses

MSA-2 would restore critically important Mississippi River freshwater, nutrient, and suspended sediment inputs needed to address freshwater, nutrient, and sediment deprivation associated with levee construction. 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 Louisiana Department of Wildlife and Fisheries 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 contaminants 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, National Marine Fisheries Service, U.S. Environmental Protection Agency, Louisiana Department of Natural Resources, Louisiana Coastal Protection and Restoration Authority, and the Louisiana Department of Wildlife and Fisheries. 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 best management practices 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 recommends that CEMVN contact the Service and 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 Hazardous, Toxic and Radioactive Waste 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.

Engineer Regulation (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 T). The probability of encountering HTRW for the proposed action is low based on the initial assessment. 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-STEVENSON FISHERIES CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management Act (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 Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study would be provided to the NMFS for review and comment during the public review period. EFH coordination is ongoing.

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 Bald and Golden Eagle Protection Act (BGEPA) 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 SEA 570 that is ongoing. In addition, CEMVN recommends that on-site contract personnel be trained to identify colonial nesting birds and their nests and avoid affecting them during the breeding season. Coordination with the USFWS pursuant to the BGEPA and MBTA has been initiated and is ongoing. Surveys for bald eagle nests and colonial nesting waterbird nests would continue. BMPs, included the development of a NPP, would be used. Coordination with the USFWS and the LDWF is ongoing for MBTA and BGEPA trust species.

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 Advisory Council on Historic Preservation (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 entitled 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.

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 PA provides Standard Treatment Measures agreed

upon by SHPO, federally recognized Tribes, and NFS. For the Maurepas Project, CEMVN would utilize the NHPA stipulations and conditions detailed within the PA in order 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.

Archaeological Resources Protection Act of 1979

A federal permit under the Archaeological Resources Protection Act (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 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

Louisiana Scenic Rivers Act of 1988

The Louisiana Department of Wildlife and Fisheries 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 (LSRA). 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 LSRA, 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 proposed 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 I for personal coordination with Chris Davis, LA Scenic River Coordinator).

8.13 EXECUTIVE ORDER 12898: ENVIRONMENTAL JUSTICE

E.O. 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 EJ communities 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.

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 E.O. 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 E.O. 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 6-1).

Table 6-1. 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 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 E.O. 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).

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 evaluated to determine if it could meet the mitigation needs for the WSLP project and converted to mitigation alternatives and compared to the previously identified mitigation plan in EA #576.

The CPRAB, the NFS, requested in a letter dated August 23, 2021 consideration of the MSA-2. The CPRAB letter acknowledged that implementing the 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.

On September 23, 2021, an AEC meeting was conducted to evaluate three alternatives to mitigate swamp impacts incurred as result of the WSLP project. The three alternatives evaluated included two variations of the MSP and the previously selected plan from EA # 576. The alternatives considered were: MSA-1 (private and public lands), MSA-2 (public lands only), and the BBA Alternative (approved in EA #576). The PDT evaluated these projects using the design data documented during the alternative's development phase (Appendix M) as well as input provided by the NFS and the interagency team during an August 2021 inter-agency workshop.

The BBA Alternative received the highest scores in the AEC and was confirmed as the federally selected plan. The AEC process compared projects to each other in relation to six main criteria: Risk and Reliability, Environmental, Watershed and Ecological Site Considerations, Time and Schedule, Cost Effectiveness, and Other Cost Considerations.

The primary criteria that resulted in the higher AEC score for the BBA alternative were Cost Effectiveness, Other Cost Considerations and Risk and Reliability. Alternatives MSA-1 and MSA-2 scored lower in Cost Effectiveness, Other Cost Considerations, Risk and Reliability and Environmental and higher in Watershed/Ecological and equal in Time. Once the initial evaluation was complete, a sensitivity analysis was determined to be unnecessary because increasing the importance of the Risk and Reliability, Time and Schedule, Cost Effectiveness and Other Cost Considerations criteria would not result in a change in the alternative rankings.

In consideration of the results of the AEC, and the NFS request, it has been determined that the NFS preferred alternative MSA-2 would satisfy the Swamp mitigation need generated by the WSLP project. The sponsor's preferred alternative is selected for implementation, and the NFS has the full understanding that it would be responsible for the increased cost over and above implementation of the BBA alternative.

Section 10

List of Preparers

Name	Office	Discipline/Role
Tim Axtman	Chief, Plan Formulation	Sr. Plan Formulator
Terry Baldrige	Economics Division	Economist; District Quality Control (Economics)
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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.
- 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). Baldcypress 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.
- James P. Kirk, K. Jack Killgore, and Jan J. Hoover. 2008. Evaluation of Potential Impacts of the Lake Maurepas Diversion Project to Gulf and Pallid Sturgeon
- 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
- 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.
- 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., Wood, W.B., Hoepfner, 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.
- 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 Resource Conservation Agency. [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 State 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 and Roberts, 1996, J.S. Wakeley, 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>
- 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 rivières [i.e. rivières] ont été relevés à l'estime & les routes [i.e. routes] par terre relevés & mesurés 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., Eisey, 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>
- LCPR 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] Parts 1500-1508).
<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 aeriels, USGS maps. <https://www.historicaeriels.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_NE_PA.pdf.
- 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>

List of Acronyms and Abbreviations

AAHU	Average Annual Habitat Units
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AD	Anno Domini (in the year of the lord)
AEC	Alternative Evaluation Criteria
AHP	Above Head of Passes
AM	Adaptive Management
APE	Area of Potential Effect
ARDC	Amite River Diversion Channel
ARPA	Archaeological Resources Protection Act
BBA	Bipartisan Budget Act
BC	Before Christ
BGEPA	Bald and Golden Eagle Protection Act
BLH-Wet	Bottomland Hardwood Wet
BMP	Best Management Practice
BOC	U.S. Census Bureau
CAA	Clean Air Act
CAR	Coordination Act Report
CDP	Census Designated Place
CEMVN	U.S Army Corps of Engineers Mississippi Valley Division, New Orleans District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CN	Canadian National
CNWB	Colonial Nesting Wading Birds
CRMS	Coastwide Reference Monitoring System
CY	Cubic Yards

CWPPRA	Coastal Wetlands Planning, Protection, and Restoration Act
CZ	Coastal Zone
dB	Decibel
dBA	Weighted Decibel
DNL	Day-Night Average Sound Level
DNR	Department of Natural Resources
DOI	Department of Interior
EA	Environmental Assessment
EBR	East Baton Rouge
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EL	Elevation
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
°F	Fahrenheit
FMC	Fisheries Management Council
FMP	Fisheries Management Plan
FONSI	Finding of No Significant Impact
FT	Feet
FWP	Future with Project
FWOP	Future without Project
g/cm³	Gallons per cubic meter to 3 rd power
GSMFC	Gulf States Marine Fisheries Commission
HAB	Harmful Algal Bloom
HET	Habitat Evaluation Team
HSDRRS	Hurricane and Storm Damage Risk Reduction System
HTRW	Hazardous, Toxic, or Radioactive Waste
KCS	Kansas City Southern
km	Kilometer
IBA	Important Bird Area

IER	Individual Environmental Report
IERS	Supplemental Individual Environmental Report
LA	Louisiana
LAC	Louisiana Administrative Code
LaCPR	Louisiana Coastal Protection and Restoration
LaCZ	Louisiana Coastal Zone
LCRP	Louisiana Coastal Resources Program
LCWCRTF	Louisiana Coastal Wetlands Conservation and Restoration Task Force
LDNR	Louisiana Department of Natural Resources
LDOA	Louisiana Division of Archaeology
LDV	Lateral discharge valve
LDWF	Louisiana Department of Wildlife and Fisheries
LDEQ	Louisiana Department of Environmental Quality
LHRI	Louisiana Historic Resource Inventory
LIDAR	Laser Identification Detection and Ranging
LP	Lake Pontchartrain
LSRA	Louisiana Scenic Rivers Act
LWCF	Land and Water Conservation Fund
MAP	Mississippi Alluvial Plain
MBI	Mitigation Banking Instrument
MRSC	Mississippi River Ship Channel
MR&T	Mississippi River & Tributaries
MSA	Maurepas Swamp Alternative
MSRB	Mississippi River Basin
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NAVD	National American Vertical Datum
NHLM	National Historic Landmarks
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service

NPS	National Park Service
NR	National Register
NRHD	National Register Historic District
NWR	National Wildlife Refuge
O3	Ozone
OB	Other Bank
OMRR&R	Operations and Maintenance Repair Replacement and Rehabilitation
PDT	Project Delivery Team
PED	Preconstruction Engineering & Design
PIER	Programmatic Individual Environmental Report
PL	Public Law
PLD	Pontchartrain Levee District
ppm	Parts per Million
ppt	Parts per Thousand
PM	Particulate Matter
PSL	Port of South Louisiana
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
ROD	Record of Decision
ROE	Right of Entry
RPEDS	Regional Planning and Environmental Division South
RSLR	Relative Sea Level Rise
SAV	Submerged Aquatic Vegetation
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEA	Supplemental Environmental Assessment
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SHS	State Historic Site
SOI	Secretary of Interior
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Load

TSA	Tentatively Selected Alternative
TSMP	Tentatively Selected Mitigation Project
TN	Total Nitrogen
TP	Total Phosphorous
TSP	Tentatively Selected Project
USACE	U.S Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WBS	Work Breakdown Structure
WCRA	Wildlife Conservation and Restoration Account
WIIN	Water Infrastructure Improvement for the Nation Act
WMA	Wildlife Management Area
WRDA	Water Resources Development Act
WSE	Water Surface Elevation
WSLP	Westshore Lake Pontchartrain