APPENDIX L: CLEAN WATER ACT

Draft Section 404(b)(1) Evaluation Report

West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study Mitigation Plan Update

I. Project Description

(a) Purpose and Need

The purpose of the tentatively selected alternative (TSA) is to compensate for lost functions and services to swamp habitat within the Louisiana Coastal Zone (CZ) incurred because of the construction of the West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Project (hereafter WSLP Project). The proposed mitigation would replace the lost functions and services of impacted CZ swamp habitat through enhancement activities designed to increase/improve CZ swamp functions and services in the Maurepas swamp. The WSLP Project is expected to impact ~ 10,892 acres and ~ 947 Average Annual Habitat Units (AAHUs) of CZ swamp habitat.

(b) Description of the Tentatively Selected Alternative

The TSA consists of 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 improve Cypress-Tupelo swamp habitats within primary, secondary, and tertiary mitigation areas (Figure 1). Construction of the TSA would include three main groups of features, the conveyance channel (which includes the intake and outfall features), embankment features, and weirs (Figures 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 Above Head of Passes. The construction corridor for the conveyance channel extends from LA 44 (River Road) northward. 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, would consist of a 40’ to 60’ excavated channel bottom, tightly positioned between a guide levee on the west and the WSLP levee and I-wall system on the East. The conveyance channel levee would be constructed of compacted fill material and have a 1:4 slope. The 1:4 slope would decrease to 1:5 after Airline Highway until the channel outfall north of I-10.

II. Factual Determinations

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope

The following construction activities would occur for construction of the Maurepas diversion:

- The construction of temporary construction features, including access roads, staging areas, and a cofferdam
- The infilling of a previously created borrow pit on the flood side of the Mississippi River levee upstream of the diversion intake
- The rerouting of existing levees, railways, and roadways to accommodate the diversion structure and conveyance channel
- Construction of the diversion intake, structure, outfall channel and guide levees, and outfall area hydromodification intended to facilitate distribution of diverted water into wetlands south of Lake Maurepas

Portions of some of these project features would displace or impact existing aquatic habitat; the placement of dredged, fill, and construction materials would raise substrate elevations and convert aquatic habitat to manmade terrestrial features. Following conveyance channel excavation, materials such as riprap and concrete lining would be placed within the channel to provide channel scour protection. Placement of dredged, fill, and construction materials would impact a total of approximately 207 acres of aquatic habitat, including 79 acres of bottomland hardwood forest (undifferentiated between BLH-wet and BLH-dry), 95 acres of swamp, and 33 acres of surface waters (Table 1). Most of the impacts to swamp and surface waters would occur north of Airline Highway; impacts to bottomland hardwood forest would mostly occur in the southern two-thirds of the conveyance channel.

Material excavated for embankment gapping would be placed on adjacent embankment reaches, as depicted in Figures 4 and 5.

Figures 1-6 are maps that include project features, and Figures 7 and 8 are profile view maps of the diversion channel guide levees that include approximate existing ground elevations.

Table 1. Project footprint habitat types

Habitat Type	Acres	Average Annual Habitat Units (AAHUs)
BLH	79	29
Swamp	95	52
Surface Water	33	NA

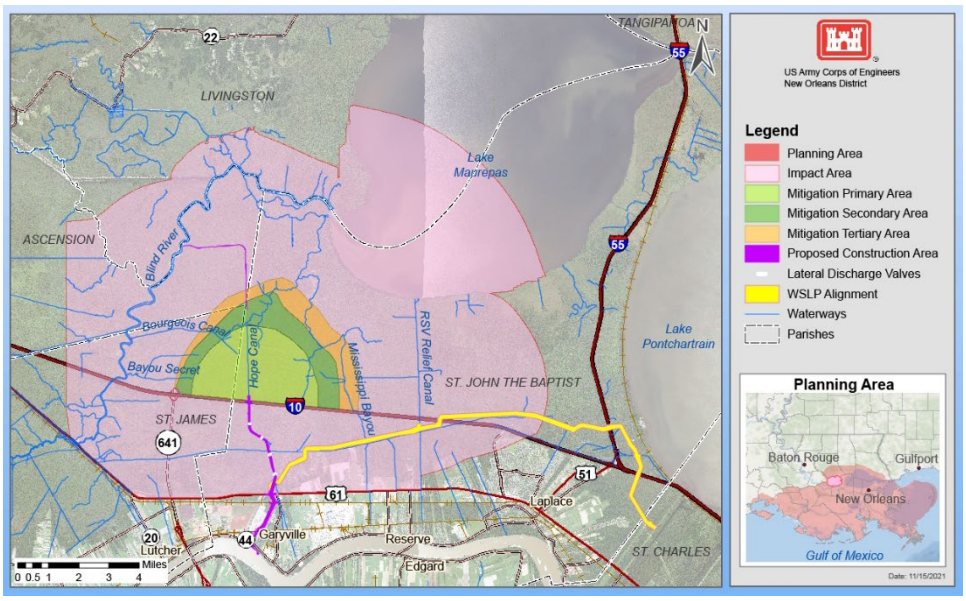

Figure 1. Project map

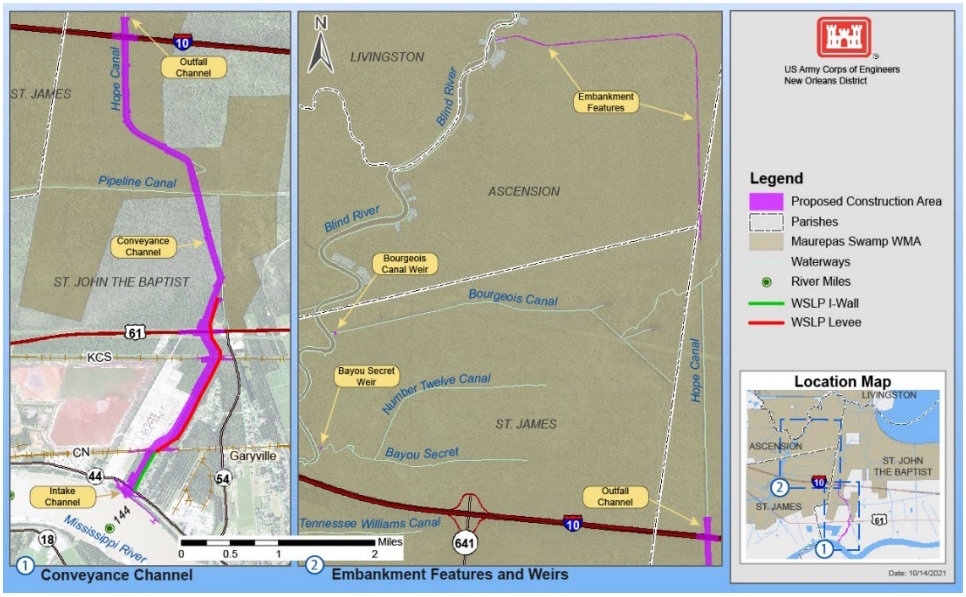

Figure 2. Conveyance channel and embankment

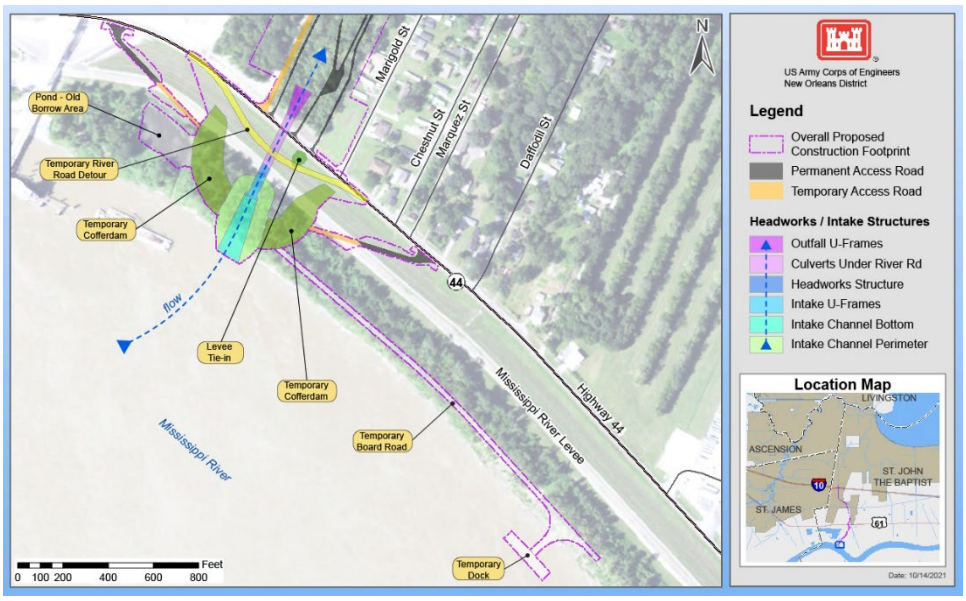

Figure 3. Intake channel

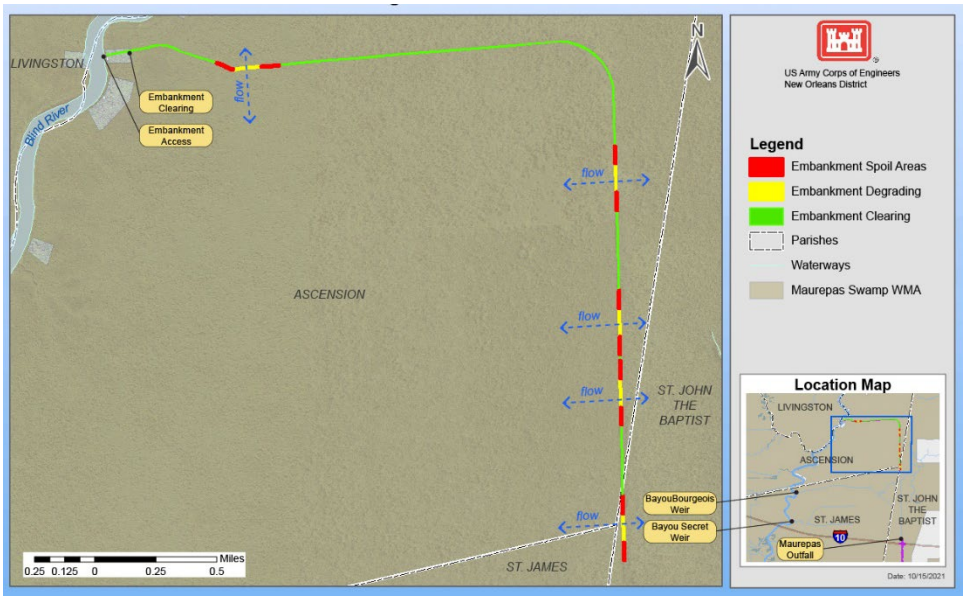

Figure 4. Embankment

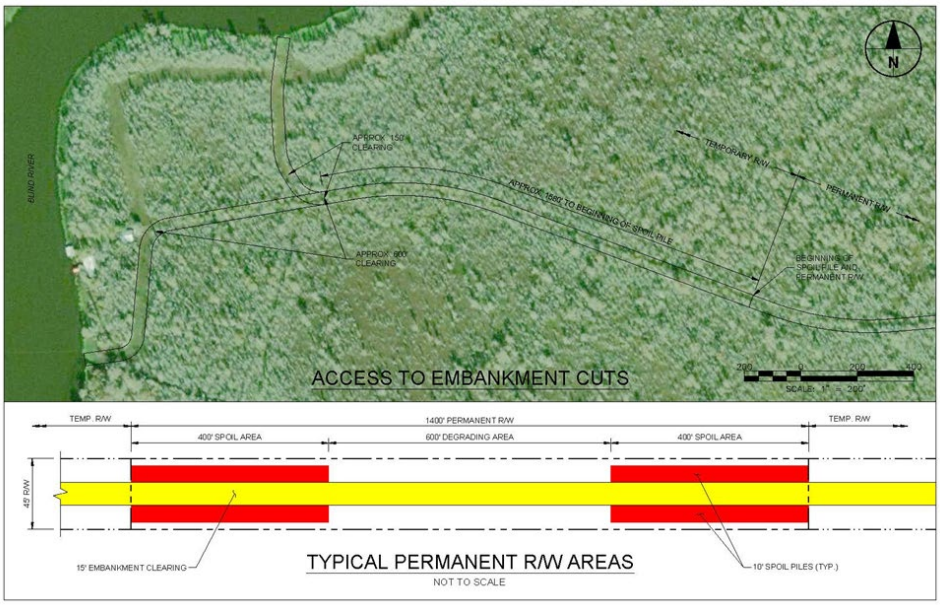

Figure 5. Typical embankment gapping

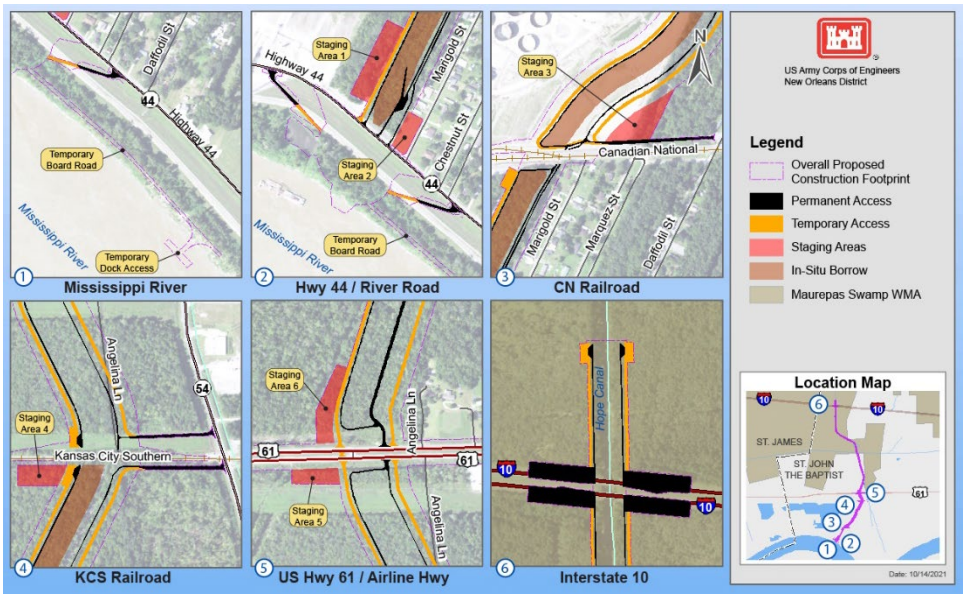

Figure 6. Access, staging, and borrow areas

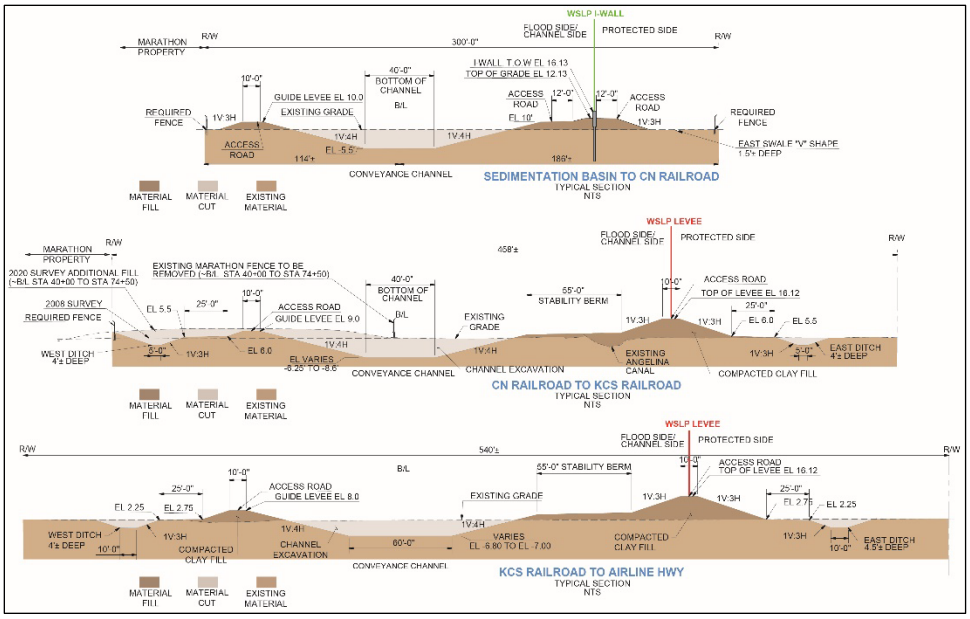

Figure 7. Diversion channel guide levees (sedimentation basin to Airline Highway)

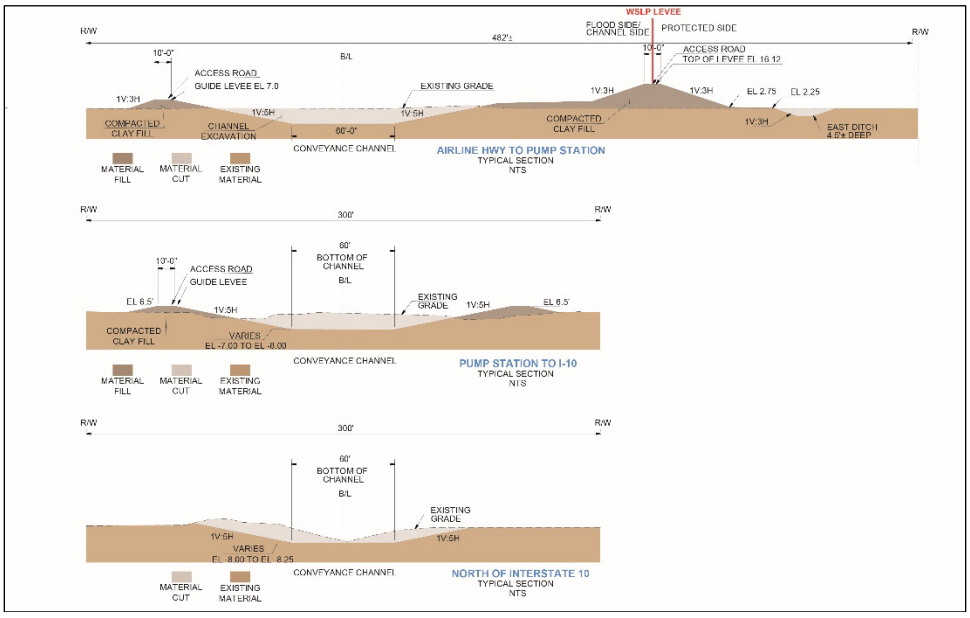

Figure 8. Diversion channel guide levees (Airline Highway to north of I-10)

(2) Sediment Type

Tables 2 and 3 provide a summary of the soil types that occur within the project footprint and the in-situ borrow area (which is within the project footprint; NSRCS 2021). Primary soil types in the project footprint include Barbary soils, Shriever clay, and Gramercy silty clay, and within the in-situ borrow area include Gramercy silty clay, Shriever clay, and Cancienne silt loam. Barbary series soils similarly consist of very deep, very poorly drained, very slowly permeable soils,

that formed in recent, slightly fluid to very fluid clayey sediments that have been deposited in water and are continuously saturated and flooded. Schriever series soils similarly consist of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. Gramercy series soils consist of very deep, poorly drained, very slowly permeable soils that formed in clayey over fine-silty alluvium. Cancienne series soils consist of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium and are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries.

Table 2. Project footprint soil types

Map Unit Symbol	Soil Type	Acres
Ba	Barbary soils, 0 to 1 percent slopes, frequently flooded	165.1
Sm	Schriever clay, 0 to 1 percent slopes, frequently flooded	81.5
GrA	Gramercy silty clay, 0 to 1 percent slopes	71.6
SkA	Schriever clay, 0 to 1 percent slopes, rarely flooded	33.3
CmA	Cancienne silt loam, 0 to 1 percent slopes	19.8
CT	Cancienne and Carville soils, gently undulating, frequently flooded	7.5
Lp	Levees-Borrow pits complex, 0 to 25 percent slopes	6.3
W	Water	1.3

Table 3. In-Situ borrow area soil types

Map Unit Symbol	Soil Type	Acres
GrA	Gramercy silty clay, 0 to 1 percent slopes	23.8
SkA	Schriever clay, 0 to 1 percent slopes, rarely flooded	9.0
CmA	Cancienne silt loam, 0 to 1 percent slopes	4.5

The soils occurring in up to 208 acres of aquatic habitat would be overlain by dredged, fill, and construction materials.

Of the approximately 1,082,781 cubic yards estimated to be excavated from the conveyance channel, approximately half may be used as fill material for construction of guide levees, a stability berm, and the West Shore Lake Pontchartrain earthen levee between Airline Highway and the Mississippi River levee. Approximately 81,242 cubic yards of this subtotal may be placed in aquatic habitat for construction of project features.

Material excavated for embankment gapping would be placed on adjacent embankment reaches.

(3) Dredged/Fill Material Movement

Dredged, fill, and construction materials used for the construction of project features are generally expected to be placed in a manner so that they would minimally slump or migrate.

(4) Physical Effects on Benthos (burial, changes in sediment types, etc.)

Immobile and less mobile life forms present in existing aquatic habitat within the project footprint are expected to be smothered by dredged, fill, and construction material placement, while more mobile life forms are more likely to leave the area, resulting in the localized elimination and displacement of aquatic communities. These areas would be converted to manmade features including a diversion channel and guide levees, staging areas, access roads, railways, and roadways. During diversion operations, the channel side of diversion channel levees would be flooded and would serve as habitat for aquatic life diverted into the channel from the Mississippi River. As the project area is subjected to the generally slow processes of subsidence and sea-level rise, dry features are expected to submerge over longer time periods, and in some areas would return to aquatic habitat without additional human intervention.

(5) Other Effects

No other effects are anticipated.

(6) Actions Taken to Minimize Impacts:

See II.a.(3) Dredged/Fill Material Movement

Placement of proposed weir construction would be adjusted to minimize impacts to forested wetlands. The conveyance channel for the diversion would be constructed using an existing, man-made channel in order to minimize new impacts to aquatic habitat.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water

(a) Salinity

Based on salinity data for Louisiana Coastal Reference Monitoring Sites (CRMS), outfall area salinities are generally below 1 ppt, generally only exceeding 2 ppt during severe drought conditions. Salinities in the Mississippi River at Baton Rouge are consistently near 0.2 ppt.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology, since the project purpose is to connect the Mississippi River with the upper

Pontchartrain estuary. These changes would provide significant amounts of freshwater to the upper estuary, with a diversion design flow rate (2,000 cfs) almost equal to the long-term (2000-2020) average discharge for the estuary's largest tributary the Amite River (2,200 cfs), which is located just northwest of the project area. An increase in freshwater inflows from the project would contribute to a reduction in upper estuary salinities and would likely affect estuary ecology beneficially or detrimentally depending on background conditions. For example, the diversion could be used beneficially to help reduce elevated salinities during drought conditions, but in contrast the additional freshwater and nutrient inflows would contribute to increases in primary productivity, including possible increases the frequency and severity of algal blooms in the upper estuary during high rainfall periods, a problem of increasing concern owing to the above average rainfall within the watershed since about 2012.

Placement of dredged, fill, and construction materials in and adjacent to aquatic habitat is not expected to have a significant direct effect on the salinity of adjacent surface waters.

(b) Water Chemistry (pH, etc.)

Based on monthly Louisiana Department of Environmental Quality (LDEQ) ambient water quality monitoring data, monthly average pH in the outfall area ranges from 6.7 in the summer to 7.2 in the winter. Based on U.S. Geological Survey (USGS) real-time water quality monitoring data, pH in the Mississippi River at Baton Rouge ranges between 7.6 during spring flood events and 8 during low water conditions.

Placement of dredged and fill materials in and adjacent to aquatic habitat is anticipated to result in short term effects on the pH of surface waters. Factors related to dredged and fill material placement may cause pH in receiving area waters to shift toward more acidic conditions. These factors include increased turbidity, organic enrichment, chemical leaching, reduced dissolved oxygen, and elevated carbon dioxide levels, among others. Following construction activities and establishment of vegetation on project features, pH effects from dredged and fill material placement are expected to diminish.

Placement of construction materials such as stone and concrete in and near aquatic habitat may result in temporary minor releases in limestone dust, which could cause benign minor local increases in pH and alkalinity of nearby surface waters. Gradually this residual limestone dust would be washed from the site by factors associated with weather and hydrology, reducing the pH effects of these materials on adjacent surface

Material placement in aquatic habitat for the construction of project

features is intended to contribute to changes in estuary hydrology. The introduction of Mississippi River water with its unique chemical signature influenced by upstream watershed activities would likely have significant effects on upper Pontchartrain estuary water quality and ecology over longer time periods. Some of these effects could be beneficial, such as replication of annual Mississippi river flooding into the estuary, while others would not, including increases in the frequency and severity of algal blooms in the estuary, and water quality and ecological effects of long-term chronic inflows of a combination of fertilizers, pesticides, and other manmade chemicals to the estuary.

(c) Clarity

NA; the nearest surface drinking water intake is located approximately 4 miles downstream on the Mississippi River and is not anticipated to be affected by placement of fill and construction materials for the proposed project.

(d) Color

NA; the nearest surface drinking water intake is located approximately four miles downstream on the Mississippi River and is not anticipated to be affected by placement of fill and construction materials for the proposed project.

(e) Odor

NA; the nearest surface drinking water intake is located approximately four miles downstream on the Mississippi River and is not anticipated to be affected by placement of fill and construction materials for the proposed project.

(f) Taste

NA; the nearest surface drinking water intake is located approximately four miles downstream on the Mississippi River and is not anticipated to be affected by placement of fill and construction materials for the proposed project.

(g) Dissolved Gas Levels

Based on LDEQ water quality monitoring data for sites in the project area, monthly average dissolved oxygen levels range from 2 mg/L during the summer to 9 mg/L in winter. Dissolved oxygen levels in the Mississippi River at Baton Rouge range between 6 mg/L during the summer to 12 mg/L in the winter.

Placement of dredged, fill, and construction materials in and adjacent to aquatic habitat may result in localized, short term increases in organic loading and oxygen demand, leading to reductions in dissolved gas levels. Following construction activities and establishment of vegetation on bare soil surfaces, impacts to dissolved gases related to project construction are expected to diminish.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. Hydromodification from the proposed project is expected to introduce Mississippi River water containing elevated dissolved gas levels into wetlands areas which presently often experience hypoxia due to long hydraulic residence times that occur within an organic-rich environment. River water is expected to promote increases in primary productivity, including increases in phytoplankton productivity. In some instances, inflows of river water would contribute to increases in the frequency and severity of algal blooms. The blooms often produce significant changes to dissolved gas levels, including supersaturation during photosynthesis and hypoxia during respiration during the evening. Additionally, a major die-off of blooms can lead to hypoxia events.

(h) Nutrients

Placement of dredged and fill materials in and adjacent to aquatic habitat is expected to result in localized releases of organic material and nutrients into adjacent surface waters. Following construction activities and establishment of vegetation on bare soil surfaces, impacts to water column nutrient levels from placement of dredged and fill material are expected to diminish.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. Hydromodification from the proposed project is expected to introduce nutrients in Mississippi River water into receiving area wetlands and surface waters and southern Lake Maurepas. Increased nutrient loading is expected to increase primary productivity within receiving area wetlands and estuary surface waters, which may promote increases in the frequency and severity of algal blooms.

(i) Eutrophication

See Section II.b.(1)(h) (Nutrients)

(j) Others as Appropriate

NA

(2) Current Patterns and Circulation

(a) Current Patterns and Flow

Surface water flows in the project area are considered to be generally slow-moving and controlled by minor surface gradients and hydrologic barriers (both natural and manmade features).

Placement of dredged, fill, and construction materials for the Maurepas diversion is expected to alter current patterns and flow within the project vicinity. The diversion channel and guide levees would block surface flows that previously occurred between inside and outside of the channel area. In addition, outfall area features would serve to reduce impoundment and promote flows and circulation in receiving area wetlands and surface waters.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. Hydromodification from the proposed project would introduce Mississippi River water into receiving area wetlands and surface waters and is intended to increase flows and reduce the residence times in receiving wetlands and upper estuary surface waters.

(b) Velocity

See II.b.(2)(a) (Current Patterns and Flow)

(c) Stratification.

Because project area salinities are generally low and area waterbodies are generally shallow (less than 10 ft in depth), the proposed alternative is not expected to contribute to water column stratification.

(d) Hydrologic Regime.

See II.b.2(a) (Current Patterns and Flow**)**

(3) Normal Water Level Fluctuations/Hydroperiod.

See II.b.(2)(a) (Current Patterns and Flow)

(4) Salinity Gradients.

See II.b.(1)(a) (Salinity)

(5) Actions That Would Be Taken to Minimize Impacts.

To minimize construction-related impacts to water quality, it is anticipated that a Stormwater Pollution Prevention Plan (SWPPP) would be implemented for construction activities. SWPPPs are prepared in accordance with good engineering practices emphasizing storm water Best Management Practices and complying with Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology. The SWPPP shall identify potential sources of pollution, which may reasonably be expected to affect storm water discharges associated with the construction activity. In addition, the SWPPP shall describe and ensure the implementation of practices which are to be used to reduce pollutants in storm water discharges associated with the construction activity and to assure compliance with the terms and conditions of this permit.

Measuring and monitoring various water quality (WQ) parameters would inform whether inputs from the Mississippi River are impacting water quality in the area. For pre-/post-construction water quality monitoring the same constituents included in Bonnet Carre monitoring, mainly nutrients, chlorophyll/phycocyanin, phytoplankton community, the algal toxin microcystin, total suspended solids, and oxygen isotopes is proposed. These parameters would help understand the impacts of nutrient loading from the diversion and other sources (e.g., the Amite River) on phytoplankton community, nutrient removal by wetlands, and the distribution of Mississippi River water vs. water from other sources in the receiving area.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site

Suspended particulate and turbidity levels in project area surface waters are relatively high owing to high organic nature of the region. The placement of dredged, fill, and construction materials in and adjacent to aquatic habitat is expected to generate temporary and localized increases in suspended particulates and turbidity. Following construction activities and establishment of vegetation on bare soil surfaces, these effects are expected to diminish.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. Hydromodification from the proposed project would introduce Mississippi River water with elevated suspended particulate and turbidity levels into receiving wetlands and surface waters. Nutrients and organic matter bound to particulates are expected to increase primary productivity within receiving area wetlands and estuary surface waters, which may promote increases in the frequency and severity of algal blooms.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light penetration

See II.c.(1) (Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site)

(b) Dissolved oxygen

See section II.b.(1)(g) (Dissolved Gas Levels)

(c) Toxic metals and organics

See section II.d (Contaminant Determinations)

(d) Pathogens

See section II.d (Contaminant Determinations)

(e) Aesthetics

Potential construction impacts on water quality would occur within the immediate vicinity (within 0.5-mile) of all active construction areas temporarily increasing turbidity. Long-term, water quality improvements resulting from hydromodification would enhance visual resources by supporting increased habitat complexity.

(f) Others as Appropriate

NA

(3) Effects on Biota

(a) Primary Production, Photosynthesis

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. 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. Increased nutrient levels would increase productivity in what is likely a nutrient starved system. 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.

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.

(b) Suspension/Filter Feeders

See II.c.(3)(a) (Primary Production, Photosynthesis)

(c) Sight Feeders

See II.c.(3)(a) (Primary Production, Photosynthesis)

(4) Actions taken to Minimize Impacts

Monitoring to assess bioaccumulation of pollutants and contaminants on fish and wildlife was requested by the US Fish and Wildlife Service (USFWS). The USFWS recommends that sampling of fish and shellfish occurs pre- and post-diversion operations from the outfall area and the Mississippi River. The USFWS recommends that USACE, in coordination with the USFWS, develop a list of contaminants to be analyzed. This list could be taken from the most recent EPA Priority Pollutants and Contaminants of Concern (COC) list (https://www.epa.gov/eg/toxic-and-priority-pollutants-under-clean-water-act), but not necessarily all pollutants on the list would be measured, and other elements, such as trace metals could be added.

d. Contaminant Determinations.

No environmental chemistry data has been collected from which to make contaminant determinations for project area sediments, including soil and sediment from channel excavation that may be used as fill for project features. A Hazardous, Toxic, and Radioactive Waste (HTRW) investigation of the project area did not reveal and significant Recognized Environmental Conditions (RECs) that would affect the proposed project. Given the industrial nature of the area, sediment is expected to include industrial pollutants from surface and groundwater flows as well as atmospheric deposition, and levels of these contaminants with respect to ecological health are unknown. While the HTRW investigation did not reveal signs of pollution at levels of concern, there is a possibility of encountering contaminated sediments.

Any excavated material used for construction of project features would be placed near its origin. If excavated material has any significant contamination, its relocation may alter the rate of release of contaminants into the aquatic environment, beneficially or detrimentally.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. The hydromodification resulting from the project could at times provide significant inflows of Mississippi River water into the upper estuary. Mississippi River water contains nutrients and pesticides primarily derived from agricultural runoff, as well as trace levels other constituents from point and non-point sources. This low-level mixture of chemicals present in river water is a major reason for the annual formation of the Gulf of Mexico hypoxic zone and also can contribute to freshwater cyanobacterial blooms in estuary waters from freshwater diversions such as Caernarvon and Davis Pond.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton

See II.c.(3)(a) Primary Production, Photosynthesis

(2) Effects on Benthos

See II.a.(4) Physical Effects on Benthos

(3) Effects on Nekton

See II.c.(3)(a) Primary Production, Photosynthesis

(4) Effects on Aquatic Food Web

See II.c.(3)(a) Primary Production, Photosynthesis

(5) Effects on Special Aquatic Sites (discuss only those found in project area or disposal site)

(a) Sanctuaries and Refuges

Nearly all of the proposed project area falls within the Maurepas Wildlife Management Area (WMA).

See II.e.(5)(b) (Wetlands) and II.e.(7) Other Wildlife

(b) Wetlands

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

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. 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 relative sea level rise. 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.

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. Approximately 7 AAHUs of negative impacts to approximately 1,830 acres of CZ BLH would occur due to construction and operations of MSA-2. These impacts would be due to increased inundation, reduced flow and reduced drainage.

Overall, there would be no indirect impacts to fresh emergent wetland resulting from MSA-2 operation north of I-10.

Approximately 19.5 AAHUs of negative indirect impacts to approximately 2,743 acres of CZ marsh between I-10 and HWY 61 would result from construction and operation of MSA-2. These impacts would be due to increased inundation, reduced flow and reduced drainage.

(c) Mud Flats

NA

(d) Vegetated Shallows

NA

(e) Coral Reefs

NA

(f) Riffle and Pool Complexes

NA

(6) Threatened and Endangered Species

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. Formal Consultation with USFWS on pallid sturgeon has been initiated and is ongoing.

(7) Other Wildlife

Impacts from construction would occur within, and in close proximity to, the footprint of each individual construction component. 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 highly mobile wildlife that may be present in the construction area 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. There would be insignificant adverse direct impacts to some wildlife species through temporary decline with implementation of this alternative.

The Louisiana Department of Wildlife and Fisheries (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. 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. 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. There would be significant adverse direct impacts to some wildlife species with implementation of this alternative.

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. 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. There would be insignificant adverse indirect impacts to some wildlife species through temporary decline with implementation of this alternative.

(8) Actions to Minimize Impacts

Approximately 32 lateral discharge valves (LDVs would be constructed and actively operated to facilitate drainage of discharged water and precipitation events to minimize potential impacts from increased inundation duration.

Sensors designed to detect chemical spills would be built into the diversion's intake structures, so that if 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.

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 (such as hunting season reductions or closures) by LDWF could potentially mitigate impacts to deer and/or alligator populations that would occur during diversion operation.

All contract personnel associated with the project would be informed of the potential presence of Pallid sturgeon.

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

If dredging, when lowering the ladder, the pumping rate should be reduced to the slowest speed feasible while the cutterhead is being lowered to the channel bottom.

If dredging, the cutterhead should remain completely buried in the channel bottom during dredging operations.

If dredging, if pumping water through the cutterhead is deemed necessary to dislodge material, or to clean the pumps, the pumping rate should be reduced to the lowest rate feasible while raising the ladder until the cutterhead is at least at mid-depth at which point the pumping rate can then be increased.

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.

The Coastal Protection and Restoration Authority (CPRA) and Corps of Engineers New Orleans District (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.

Withdrawal of water from near the surface of the river (based upon river stage and season) to make entrainment less likely.

The diversion was designed to make it possible for sturgeon to resist flow by increasing the size and/or number of gates at the intake structure to distribute flow (and reduce velocity of water through any single gate) creating water velocities lower than escape speeds of most fish.

The diversion was designed to include rough or complex substrates directly in front of the intake gates to enable PS to resist entraining flows.

All contract personnel associated with the project would be informed of the potential presence of manatees and the need to avoid collisions with manatees.

All construction personnel would be responsible for observing water-related activities for the presence of manatees.

Temporary signs would be posted prior to and during all construction/dredging activities to remind personnel to be observant for manatees during active construction/dredging operations or within vessel movement zones (i.e., the work area), and at least one sign would be placed where it is visible to the vessel operator.

Siltation barriers, if used, would be made of material in which manatees could not become entangled and would be properly secured and monitored.

If a manatee is sighted within 100 yards of the active work zone, special operating conditions would be implemented, including: moving equipment would not operate within 50 ft of a manatee; all vessels would operate at no wake/idle speeds within 100 yards of the work area; and siltation barriers, if used, would be re-secured and monitored. Once the manatee has left the 100-yard buffer zone around the work area of its own accord, special operating conditions would no longer be necessary, but careful observations would be resumed.

Any manatee sighting would be immediately reported to the U.S. Fish and Wildlife Service (337/291-3100) and the Louisiana Department of Wildlife and Fisheries (LDWF), Natural Heritage Program (225/765-2821).

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determination.

Dredged, fill, and construction materials are expected to generally be free of contaminants and would be placed in a manner to avoid impacting surface waters. Violation of water quality criteria outside of state-defined mixing zones is not anticipated, however for on-site material that will be used for construction of features no testing or evaluation has been performed to ensure compliance with criteria inside or outside of mixing zones.

(2) Determination of Compliance with Applicable Water Quality Standards.

Placement of dredged, fill, and construction materials is not expected to have long-term direct effects to water quality standards.

Material placement in aquatic habitat for the construction of project features is intended to contribute to changes in estuary hydrology. The introduction of Mississippi River water with its unique chemical signature influenced by upstream watershed activities would likely have significant effects on upper Pontchartrain estuary water quality and ecology over longer time periods. Some of these effects could be beneficial, such as replication of annual Mississippi river flooding into the estuary, while others would not, including increases in the frequency and severity of algal blooms in the estuary, and water quality and ecological effects of long-term chronic inflows of a combination of fertilizers, pesticides, and other manmade chemicals to the estuary.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and private water supply.

The nearest surface drinking water intake is located approximately four miles downstream on the Mississippi River and is not anticipated to be affected by placement of fill and construction materials for the proposed project.

(b) Recreational and Commercial Fisheries

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. Crawfish and white shrimp populations would be anticipated to increase due to increased flow, increased DO, increased vegetative productivity, and decreased salinity. This could benefit crawfish and white shrimp 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.

(c) Water Related Recreation

Due to project construction, a boat launch providing 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.)

(d) Aesthetics

See II.c.(2)(e) (Aesthetics)

(e) Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (refer to section 230.54)

See II.e.(5)(a) (Sanctuaries and Refuges)

g. Determination of Cumulative Effects on the Aquatic Ecosystem

Wetlands

Cumulative effects of past, present, and reasonably foreseeable future projects have resulted in an overall degradation in the quality of forested wetlands of the Lake Pontchartrain Basin (LPB). The 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. Relative to existing conditions, no new acres of habitat would be created, however up to approximately 5,316 acres of coastal zone 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). 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). All direct impacts incurred by MSA-2 would be mitigated appropriately. Implementation of MSA-2, combined with other swamp enhancement and restoration projects in its vicinity, would slow the decline of swamp habitat but not appreciably change the overall trend of forested wetland loss.

Other Wildlife

This alternative would help to offset an overall loss in the deltaic plain of swamp habitat necessary for many wildlife species.

This alternative, when combined with other past, present, and reasonably foreseeable

ecosystem restoration and mitigation projects in the planning area would help retard the loss of wetlands. Implementation of MSA-2, combined with other swamp enhancement and restoration projects in its vicinity 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.

Threatened and Endangered Species

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 affects to pallid sturgeon would be the combined entrainment of individuals due to the operation of the Bonnet Carre and the Maurepas diversion.

Fisheries and Aquatic Resources

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.

Water Quality

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.

h. Determination of Secondary Effects on the Aquatic Ecosystem

The purpose of MSA-2 is to reconnect the Mississippi River to the Maurepas Swamp, strategically delivering nutrient-laden river water to improve 104,746 acres of Cypress-Tupelo swamp. The secondary effects on the aquatic ecosystem are directly tied to the

purpose of the MSA-2 and are therefore included in the indirect impacts/effects discussions throughout this document as applicable.

III. Findings of Compliance or Non-compliance with the restrictions on discharge

a. Adaptation of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impacts on the Aquatic Ecosystem

Alternatives to the proposed project are presented in the Supplemental Environmental Impact Statement to West Shore Lake Pontchartrain Hurricane and Storm Damage Risk Reduction Study. Based on the SEIS impact assessment, the BBA Alternative is the least environmentally damaging preferred alternative. However, the MSA-2 alterative was selected as the tentatively selective alternative.

c. Compliance with Applicable State Water Quality Standards

CEMVN received Water Quality Certification (WQC 210426-02) from the Louisiana Department of Environmental Quality on April 30, 2021, and will comply with State Water Quality Standards, and all applicable state water laws, rules, and regulations.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act

Chemical constituents of Mississippi River water released during operations are not expected to exceed Louisiana Water Quality Standards. The proposed action would not involve the disposal or generation of toxic wastes; therefore, this guideline is not applicable. The proposed diversion's gated intake structure would be linked to sensors in the Mississippi River established to detect chemical spills from the adjacent Pin Oak oil and gas terminal. These sensors trigger an alarm which would alert the project operator to immediately close the gated intake structure to prevent chemicals from being drawn into the conveyance channel. A supervisory control and data acquisition system would be used allow for real-time monitoring and management of project operations and rapid intake closure in emergency situations (such as toxic, chemical spills in the Mississippi River).

e. Compliance with the Endangered Species Act of 1973

CEMVN has determined that the proposed action 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. ESA coordination is ongoing.

f. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972

NA

g. Evaluation of Extent of Degradation of the Waters of the United States

(1) Significant Adverse Effects on Human Health and Welfare

The proposed action would not result in significant adverse effects on human health and welfare, including municipal and private water supplies; restoration and commercial fishing; life stages or organisms dependent on the aquatic ecosystem; ecosystem diversity, productivity, and stability; or recreational, aesthetic, or economic values.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems.

There would be no significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems.

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability.

There would be no significant adverse effects on aquatic ecosystem diversity, productivity, and stability.

(4) Significant Adverse Effects on Recreational, Aesthetic, and Economic Resources.

There would be no significant adverse effects on recreational, aesthetic, and economic resources.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

See II.e (8) (Actions to Minimize Impacts) i. Based on the guidelines, the proposed discharge complies with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

IV. Evaluation Responsibility

a. Water Quality Input Prepared by:

Eric Glisch
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Hydraulics, Hydrologic, and Coastal Branch

b. Project Description and Biological Input Prepared by:

Kristen Butcher
Biologist
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Review Responsibility

a. Water Quality Input reviewed by:

Ventress Bolden
Intern Hydraulic Engineer
U.S. Army Corps of Engineers, New Orleans District
Hydraulics, Hydrologic, and Coastal Branch

b. Project Description and Biological Input reviewed by:

Elizabeth Behrens
Chief, Environmental Studies Section
U.S. Army Corps of Engineers, New Orleans District
Regional Planning and Environmental Division, South

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Date

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XXXXXXXX
Eric Williams
Chief, Environmental Planning Branch

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