Mississippi Valley Division,
Regional Planning and Environment Division South

Morganza to the Gulf, Louisiana, Hurricane and Storm Damage Risk Reduction Project SEIS

Appendix G – U.S. Fish and Wildlife Coordination Act Report

December 2025

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services
200 Dulles Drive
Lafayette, Louisiana 70506

November 4, 2025

Colonel Scotty Autin
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Autin:

The U.S. Army Corps of Engineers' (USACE) is proposing to construct levees for the Morganza to the Gulf of Mexico, Louisiana (MTG) Project, Hurricane and Storm Damage Risk Reduction System. The objective of the proposed project is to reduce hurricane-related damages up to 100-year recurrent frequency storm events. The features are described in the Final Post Authorization Change Report (PACR, 2002), the May 2013 Revised Programmatic Environmental Impact Statement (PEIS), and the March 2025 Supplemental Environmental Impact Statement (SEIS). The project is located in Terrebonne and Lafourche Parishes and consists of the construction of 98 miles of levees in the Terrebonne Basin, approximately 84 miles of which would overlay existing hydrologic barriers such as natural ridges, roadbeds, and existing levees.

This draft report contains a description of existing fish and wildlife resources in the project area, discusses the Proposed Action (Modified 2013 PACR levee alignment) and the No Action Alternative habitat conditions, identifies fish and wildlife-related impacts, and provides recommendations to improve the proposed MTG project. This document is in partial fulfillment of the Fish and Wildlife Coordination Act (FWCA) and does not constitute the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Fish and Wildlife Service (Service) will continue to coordinate with National Marine Fisheries Service (NMFS) and Louisiana Department of Wildlife and Fisheries (LDWF). Their comments will be incorporated into the final report when available; Due to the October 2025 government shutdown, the NOAA Fisheries Southeast Region has not been fully staffed.

We appreciate the cooperation of your staff on this project. Should your staff have any questions regarding the enclosed report, please have them contact David Castellanos (337/291-3112) of this office.

Sincerely,

For Brigette D. Firmin
Field Supervisor
Louisiana Ecological Services

Enclosures

cc: Environmental Protection Agency, Dallas, TX
CEMVN-PM-R
National Marine Fisheries Service, Baton Rouge, LA
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources (CMD), Baton Rouge, LA
Coastal Protection and Restoration Authority (CPRA), Baton Rouge, La

Draft Fish and Wildlife Coordination Act Report
For the
Morganza to the Gulf of Mexico, Louisiana (MTG) Project, Hurricane and Storm Damage Risk Reduction System

SUBMITTED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS

PREPARED BY
U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA
November 2025

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EXECUTIVE SUMMARY

This draft report contains a description of existing fish and wildlife resources in the project area, discusses the future with the Proposed Action Alternative (Modified 2013 Final Post Authorization Change Report (PACR) levee alignment) and the future with the No Action Alternative habitat conditions, identifies fish and wildlife-related impacts, and provides recommendations to improve the proposed Morganza to the Gulf of Mexico, Louisiana (MTG) Project, Hurricane and Storm Damage Risk Reduction System (as named in the Water Resources Development Act of 2007). This document is in partial fulfillment of the Fish and Wildlife Coordination Act (FWCA) and does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Fish and Wildlife Service (Service) will coordinate with the National Marine Fisheries Service (NMFS) and the Louisiana Department of Wildlife and Fisheries (LDWF). Their comments will be incorporated into the final report when available; due to the October 2025 government shutdown, the NOAA Fisheries Southeast Region has not been fully staffed.

The features are described in the PACR and Revised Programmatic Environmental Impact Statement (RPEIS) dated May 2013. The project consists of the construction of 98 miles of levees, approximately 84 miles of which would overlay existing hydrologic barriers such as natural ridges, roadbeds, and existing levees.

Marshes, swamps, and bottomland hardwood (BLH) forests are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (i.e., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries).

The MTG project is anticipated to directly impact the Terrebonne basin with a loss of approximately 2,177 acres (-620.2 AAHUs) saline marsh, 464 acres (-88.3 AAHUs) brackish marsh, 1,516 acres (-421.6 AAHUs) fresh/intermediate marsh, 324 acres (-147.3 AAHUs) BLH, and 178 acres (-120.4 AAHUs) of swamp. Additionally, there is a potential for nearly 6,000 acres of forested wetlands and just under 14,700 acres of marsh to be indirectly impacts from the MTG project that should continue to be considered by the U.S. Army Corps of Engineers (USACE). For unavoidable impacts, compensatory mitigation is required to replace the loss of jurisdictional wetland function and area.

The Service supports the construction of the Proposed Action provided that the following fish and wildlife recommendations are carried out concurrently with project implementation:

1. Coastal marshes and forested wetlands are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (i.e., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). The Service recommends that losses of high-value habitats, which are becoming scarce, be avoided or minimized to the greatest extent possible. The Service recommends unavoidable losses of such habitats should be fully compensated by replacement of the same kind of habitat value; this is called “in-kind” mitigation. The Service should be consulted in the development of plans and specifications for mitigation of unavoidable impacts to coastal marshes and forested wetlands.

2. To the greatest extent possible, design (e.g., implementation of "T"-walls, sheet-pile, and/or cement floodwall in levee designs) and position flood protection features so that adverse impacts to forested and emergent wetlands are avoided or minimized.

3. The USACE should provide mitigation for habitat directly impacted by the construction of earthen levees, floodwalls, ROW, haul route roads, floodgates, sector gates, and environmental control structures throughout the levee alignment estimated as follows: 2,177 acres (-620.2 AAHUs) saline marsh, 464 acres (-88.3 AAHUs) brackish marsh, 1,516 acres (-421.6 AAHUs) fresh/intermediate marsh, 324 acres (-147.3 AAHUs) BLH, and 178 acres (-120.4 AAHUs) of swamp. Those estimated AAHUs should be considered highly accurate but provisional until the impacts analyses are reviewed by the HET. Final post-review AAHUs required for all habitat types should be completed and included in the Final SEIS, FONSI, ROD, and Final FWCA report.

4. The results of hydrologic models are now available and have been analyzed for most, but not all, aspects of the effects of the proposed action. The modeling has provided enough information to indicate potential areas of indirect wetland impacts. Preliminary review indicates nearly 6,000 acres of forested wetlands and just under 14,700 acres of marsh may be indirectly impacted. However, time did not allow for appropriate impacts analysis yet, which will be completed prior to the Final SEIS. The Service recommends the USACE continue to coordinate with our office and other resource agencies on indirect impacts analysis. Mitigation for those indirect impacts would be added to the direct impacts previously mentioned (reference recommendations 3) to determine the total impacts of the Proposed Action.

5. The FONSI and SEIS should clearly reiterate that features of the Proposed Action would be designed to maintain existing freshwater inflows from the Atchafalaya River via the GIWW, and will be designed, operated, and monitored to achieve coastal wetland conservation through improved re-distribution of freshwater flows to wetlands wherever feasible (i.e., in a manner that does not compromise hurricane protection, minimizes impacts to navigation and aquatic resources and does not induce flooding).

6. GIWW Floodgate sluice gates should be kept open, except in the event of a tropical storm, to allow exchange and tidal flow within the system. Operational plans for floodgates and water control structures should be developed to maximize the open cross-sectional area for as long as possible. Water control structure operation manuals or plans should be developed in coordination with the Service and other natural resource agencies.

7. The environmental control structures and floodgates of the system will be closed when the water level reaches either 2.5 ft NAVD88 or 3.0 ft NAVD88, depending on the structure location and type. Currently, the trigger for structure and gate closures would likely be in anticipation of tropical storm events, therefore, it is not expected that the Proposed Action would cause the closure of the system more often due to higher daily water level fluctuations. It is unknown at present how water levels within the system would be managed if a change in operation due to relative sea level rise (RSLR) is realized. Increased closures have not been assessed for hydrologic or wetland impacts. Hence, we are concerned that there is a potential for substantial additional indirect impacts to wetland habitat and fish and wildlife resources to occur. The Service

recommends the USACE continue to coordinate with our office on new studies in regard to operations of structures and gates. The Service requests that the USACE provide annual reports on structure operations indicating the number of days per year (and season) that structures and gates are closed. If structures are closed more than 30 times a year (nonconsecutively), the USACE should study the need for potential operational changes, assess additional wetland impacts, and the need for more mitigation while continuing to coordinate with the Service.

8. Project features contained in the SEIS are considered constructable. Note this does not include or apply to Reach A, Segment 2 near Mandalay National Wildlife Refuge (NWR) where the USACE has committed to first looking for opportunities to avoid impacting Mandalay NWR. Impacts from project features in the SEIS should have adequate mitigation planned at the time this draft report is submitted. Impacts analyses may be incomplete, or project features may be revised by the time this draft report is submitted. Once any habitat impacts revisions are concluded, they should be included in the Final SEIS, Final FWCA report, FONSI, and ROD that includes the MTG constructible features.
9. During in-water work in areas that potentially support manatees, all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable. Detailed conservation measures are included in this FWCA report. For more detail on avoiding contact with manatees contact this office. Should a proposed action directly or indirectly affect the West Indian manatee, consultation with this office will be necessary.
10. The eastern black rail may be present in the project vicinity. The contractor shall instruct all personnel associated with the project of the potential presence of the eastern black rail in the area, and the need to avoid contact with the species. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing eastern black rails, which are protected under the Endangered Species Act of 1973 and the Migratory Bird Treaty Act. Detailed conservation measures are included in this FWCA report.
11. Care should be taken to avoid impacts to bald eagles and their nesting habitat. Prior to and during any project construction, on-site personnel should be informed of the possible presence of nesting bald eagles in the vicinity of the project boundary, and should identify, avoid, and immediately report any such nests to this office. Prior to construction, the Service and the LDWF recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nests during the nesting season (October through mid-May). If a bald eagle nest occurs or is discovered within 1,500 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line using the Service's guidance and determination tool. Any take should

be reported to this office and the LDWF. Bald eagle nest (active, inactive, or seemingly abandoned) should be protected, and no large trees should be removed.

12. Avoid adverse impacts to nesting wading bird colonies through careful design of project features and timing of construction. The Service and the LDWF recommend that a qualified biologist inspect the proposed work site for the presence of nesting colonies during the nesting season (September 1 through February 15).
13. Avoid adverse impacts to alligator snapping turtle by minimizing disturbance and alteration of nesting habitat, particularly in the nesting season (April-June), including minimizing the removal of log jams in streams.
14. The Service recommends avoiding impacts to the Mandalay National Wildlife Refuge and any other National Wildlife Refuges (NWR), LDWF Wildlife Management Areas, and CWPPRA projects. If direct and indirect impacts to NWRs cannot be avoided after coordination with the Service Refuge Project Leader, impacts will need to be mitigated on site of the NWR impacted. In addition, project features on refuge land would need a special use permit. If the project features are determined not compatible with the Refuge purpose(s), land would need to be purchased and exchanged with the refuge. These exchanged lands must be within the congressionally-approved refuge acquisition boundary. The applicant would then own the lands needed to build and maintain flood control features. All project related activities on the refuge must be coordinated with Refuge Project Leader. Close coordination by the applicant must be maintained with the Refuge Project Leader.
15. To minimize impacts to fisheries, flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable. Water control structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure to enhance organism passage. Various ramp designs should be considered. Please coordinate with the NMFS, Craig Gothreaux (craig.gothreaux@noaa.gov) on this issue.
16. The impacts to Essential Fish Habitat should be discussed with the NMFS to determine if the project complies with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Magnuson-Stevens Act; P.L. 104-297, as amended) and its implementing regulations.
17. If soils must be removed prior to levee construction, those soils should be used to create or restore emergent wetlands to the greatest extent possible or be used for levee construction as suggested by USACE.
18. Material from dredging or borrow pits should not be piled outside of, or allowed to erode outside the ROW.
19. Disturbed areas should be revegetated with native plant species, including species of nectar-producing plants and milkweed endemic to the area; we recommend consultation with state botanists to determine appropriate species where possible.
20. Access roads across existing wetlands should be avoided if possible and secondary impacts to wetland hydrology should be prevented or reduced. To avoid changes to hydrology, the Service recommends appropriately sized culverts (minimum 24-inch

culverts) be installed and maintained every 250 feet across access roads through wetlands with additional culverts placed at stream crossings and drainage features. Alternatively, upon completion of construction activities, access roads should be degraded to restore natural hydrology.

21. Please include this office in future considerations of any additional project features and any planned levee lifts as additional consultation will likely be necessary.

22. To avoid unplanned shortfalls in mitigation acreage, the Service recommends that the target marsh acreage be calculated to exclude any internal borrow areas used for construction of the marsh creation area containment dikes.

    a. Marsh creation projects must provide at least the required acreage within 3 years of project implementation to be considered as having achieved the intended mitigation. This will depend on achieving a settled disposal area elevation conducive to growth of marsh vegetation.

23. With the new definition of the Waters of the United States (WOTUS, published Aug 29, 2023) all enclosed (protected side) wetlands may be redefined as non-jurisdictional wetlands because of this project, thus impacting all enclosed wetlands. There is concern that this would increase developmental pressures on enclosed wetlands. The Service recommends the USACE coordinate with us once they receive guidance on how they will implement that new rule to ensure protection of enclosed wetlands. Enclosed wetlands will still be connected hydrologically, and thus will still be tidally influenced via the planned major structures (i.e., floodgates) and any additional environmental structures and/or culverts, etc. For this reason, it is the Service's and the NMFS's opinion that the enclosed wetlands in question should be exempt from redefinition implications.

24. If it becomes necessary to use borrow sources other than the previously proposed environmentally cleared sites, the Service recommends the USACE begin investigating potential borrow sources in coordination with the Service. Borrow sites to be considered should have minimal impacts to fish and wildlife resources. The Service identified a priority selection process and list for borrow sites in our November 15, 2023, Planning-aid letter to USACE (Appendix A). That prioritization process should be utilized if additional borrow sites are needed (please contact Cathy Breaux (337) 291-3122 for more information).

25. NEPA evaluations for some portions of the MTG project have occurred previously or are concurrent with the MTG SEIS (Reach A, Reach F). Please refer to the coordinating FWCA reports associated with those projects for our specific recommendations for those actions as they are also a part of the MTG project. Specifically reference our FWCA report for Reach A Recommendation #7 regarding Mandalay National Wildlife Refuge and the USACE response (copied here for your convenience):

    7. The Service recommends avoiding impacts on the Mandalay National Wildlife Refuge (NWR). If impacts cannot be avoided, impacts will need to be mitigated for on the Mandalay NWR. Please coordinate all activities with refuge staff and with Mr. Pon Dixon, Project Leader of the Bayou Sauvage Urban NWR Complex (985/882-2014).

CEMVN Response: Concur. Constructible features of the Proposed Action would not impact the NWR.CEMVN will continue to look for opportunities to avoid and minimize impacts to the Mandalay NWR. At the current level of design, a portion of the programmatic levee in the Proposed Action would cross the NWR. The information we have to date is preliminary and additional engineering and design is necessary to fully inform the design of programmatic features of the Proposed Action its potential impacts to the NWR. Supplemental NEPA analysis would be conducted prior to impacting and constructing on the NWR. CEMVN has and will continue to coordinate with the NWR.

26. NEPA evaluation and mitigation for the MTG surveys and borings work should be completed, and all mitigation requirements for impacts described in the Service's January 5, 2024, draft FWCA report should be fulfilled.

The Service recommends that the USACE contact the Service 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 and or finalized.

INTRODUCTION

This draft report contains a description of existing fish and wildlife resources in the project area, discusses the future with the Proposed Action Alternative (Modified 2013 Final Post Authorization Change Report (PACR) levee alignment) and the future with the No Action Alternative habitat conditions, identifies fish and wildlife-related impacts, and provides recommendations to improve the proposed Morganza to the Gulf of Mexico, Louisiana (MTG) Project, Hurricane and Storm Damage Risk Reduction System (as named in the Water Resources Development Act of 2007). This document is in partial fulfillment of the Fish and Wildlife Coordination Act (FWCA) and does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Fish and Wildlife Service (Service) will coordinate with the National Marine Fisheries Service (NMFS) and the Louisiana Department of Wildlife and Fisheries (LDWF). Their comments will be incorporated into the final report when available; due to the October 2025 government shutdown, the NOAA Fisheries Southeast Region has not been fully staffed.

This project was authorized in May of 2011 through the Water Resource Development Act of 2007. Please reference the following reports from the Service: April 2002 FWCA report for MTG Feasibility Study, March 2013 FWCA report for the MTG PACR, April 2013 revised FWCA report for the MTG PACR, January 2024 draft FWCA report for MTG Surveys and Borings Environmental Assessment, April 2024 draft FWCAR for MTG Reach A Environmental Assessment, November 2024 draft FWCA report for MTG Reach F Environmental Assessment, and the draft FWCA report for MTG Supplemental Programmatic Environmental Impact Statement (SPEIS). These reports can be found here. The project features have been previously described in the 2013 PACR and Revised Programmatic Environmental Impact Statement (RPEIS), and the SPEIS.

The MTG project consists of the construction of 98 miles of levees, approximately 84 miles of which would overlay existing hydrologic barriers such as natural ridges, roadbeds, and existing levees. The MTG project also consists of the construction of several floodgates, and structures that control the flow of water in small and major waterways.

DESCRIPTION OF THE PROJECT AREA

The MTG study area lies within a region dominated by extensive wetlands created by deltaic processes of the Mississippi River. The study area occupies portions of three hydrologic subbasins within the Terrebonne Basin.

Penchant Subbasin

The Penchant Subbasin is bounded by Atchafalaya Bay and the Atchafalaya River on the west and Bayou du Large on the east. The Gulf of America, formerly the Gulf of Mexico, forms its southern boundary; the subbasin extends north to the natural levee along Bayou Black. The northern rim of the basin supports bottomland hardwood forests and cypress-tupelo swamps. South of those forested wetlands is an extensive zone of fresh marshes. Those marshes are usually underlain by floating or semi-floating organic soils, except near the Atchafalaya River and Atchafalaya Bay

where more mineral soils are found. The fresh marshes that dominate the northern half of the subbasin grade into intermediate, brackish, and, finally, saline marshes along the Gulf coast. That portion of the study area within the Penchant Subbasin lies roughly east of a line extending southward from Bayou Copasaw to Lake Mechant. The Mauvais Bois and Marmande ridges bisect this portion of the study area, separating the fresh marsh zone from the more brackish and tidally influenced marshes to the south. The Small Bayou LaPointe ridge further subdivides this tidal zone. Wetlands between the Small Bayou LaPointe ridge and Bayou du Large grade from fresh marsh at the upper end to brackish marsh adjacent to Lake Mechant. During high Atchafalaya River stages, water levels are elevated throughout the northern Penchant Subbasin. Under those conditions, Atchafalaya River water and drainage from the Lake Verret Basin flows eastward via the Gulf Intracoastal Waterway (GIWW) across the northern Penchant Subbasin toward Houma (Paille 1997). From the GIWW, water also flows southward down Bayou Copasaw and Minor's Canal into the tidal zone. During low Atchafalaya River stages, water levels tend to be lower, and the freshwater supply is limited to rainfall and runoff from a portion of the Lake Verret Basin drainage. During high Atchafalaya River flows, fresh water from Minor's Canal and other sources bathes the tidal marshes south of the Marmande and Mauvais Bois ridges. The marshes south of the Small Bayou LaPointe ridge are less influenced by this fresh water. During the late summer and fall, low to moderate salinities occur throughout most of this tidal zone.

Timbalier Subbasin

The Timbalier Subbasin is located between Bayou du Large to the west and Bayou Lafourche on the east. It is bounded on the south by the Gulf of America and on the north by the GIWW. Former distributary channels that radiate from the Houma area divide the area into a series of interdistributary basins. Those channels include Bayou Grand Caillou, Bayou Petit Caillou, Bayou Terrebonne, Bayou St. Jean Charles, and Bayou Pointe au Chien. Lands along distributary channels are the highest naturally occurring lands within the area; they are widest and highest in the northern portion of the basin. Closer to the Gulf, they generally become progressively lower and narrower. Because of the higher banks along the former distributary channels, human settlement and development is located predominantly along those features.

The northern portion of the interdistributary basin between Bayou du Large and Bayou Grand Caillou supports an extensive zone of cypress swamp. Dead swamps and low-salinity marshes grade into brackish and saline marshes south of the living swamps. The hydrology of this basin is strongly influenced by the Houma Navigation Canal (HNC). During high Atchafalaya River stages, up to 8,000 cubic feet per second (cfs) of freshwater flow from the GIWW southward to the Gulf through the HNC. Under these conditions, much of the area is freshened. From its junction with the HNC, fresh water also flows southward down lower Bayou Grand Caillou and freshens adjacent marshes. During periods of low river stages, and especially during the fall, brackish conditions prevail throughout this area. Because the HNC is such an efficient channel, tides may push salt water up the HNC and adversely affect cypress swamp and adjacent low-salinity marshes.

Louisiana Highway 57 crosses the interdistributary basin between Bayou Grand Caillou and Bayou Petit Caillou. That highway separates the Lake Boudreaux Basin from the saline marshes to the south. Living and dead cypress swamps occur in northern portions of the Lake Boudreaux Basin; most of the northern area is occupied by low-salinity and brackish marshes. The lower Lake Boudreaux Basin consists primarily of brackish and saline marshes amid large open water areas. The HNC cuts diagonally through the zone south of Louisiana Highway 57 and seasonally provides

that area with fresh water. Fresh water from the HNC may also flow via Bayou Dulac into the western portion of the Lake Boudreaux Basin, seasonally reducing salinities in that area.

The interdistributary basin between Bayou Petit Caillou and Bayou Terrebonne is bisected by Bush Canal. Brackish marshes north of that canal are protected by an existing hurricane protection levee system, and tidal exchange is regulated by water control structures. The saline marshes south of Bush Canal are not enclosed by a levee system. At several locations, oilfield canals cut from east to west across that portion of the subbasin, allowing saline waters from Lake Barre to readily move into Bayou Petit Caillou.

Of the marshes located between Bayou Terrebonne and Bayou Pointe au Chien, the study area includes only those areas north of Lake Barre. Open water and remnants of brackish marsh dominate the northern portion of that area. During high Atchafalaya River stages, a small amount of freshwater flows from the GIWW southward through Company Canal, Bayou Terrebonne, and into open water areas east of Bayou Terrebonne via Humble Canal. The southern portion of the study area is dominated by broken saline marshes located along the northern shore of Lake Barre and Lake Felicity.

The Grand Bayou interdistributary basin lies between Bayou Pointe au Chien and Bayou Lafourche. Some fresh marsh remains in the extreme northwestern portion of this basin. Fresh water from the GIWW seasonally enters the northern end of this basin through Bayou L'Eau Bleu and helps to maintain the fresh and low-salinity marshes in the basin's northern end. Most of the basin, however, is dominated by brackish and saline marshes.

Fields Subbasin

The Fields Subbasin is located between Bayou Lafourche to the northeast, Bayou Terrebonne to the west and northwest, and Louisiana Highway 24 to the south. This inland subbasin is characterized by fresh marsh and cypress-tupelo swamp and is nearly surrounded by developed lands. The hydrology of this basin is heavily influenced by external sources of fresh water supplied by the GIWW and Bayou Lafourche via Company Canal. The year-round freshwater conditions which prevail throughout this subbasin result from those abundant freshwater inflows in combination with minimal daily tidal effects.

DESCRIPTION OF ALTERNATIVES

Prior to authorization in 2007, a Programmatic Environmental Impact Statement (PEIS) was completed in 2002 as part of the MRT-MTG Feasibility Report. Following Hurricane Katrina, revisions to design criteria for hurricane and storm damage risk reduction necessitated significant changes in the design of the MRT-MTG project. A Revised Programmatic Environmental Impact Statement (RPEIS) was completed in May 2013 as part of the PACR, which was developed to seek reauthorization of the project with the post-Katrina design changes. The RPEIS Record of Decision was signed on December 9, 2013.

The modifications proposed in the Supplemental Environmental Impact Statement (SEIS) to the 2013 PACR authorized alignment were determined to be only technical design changes within the Chief of Engineer's discretionary authority to approve changes to authorized projects. Therefore, no

detailed reformulation is needed, and two alternatives were developed for the SEIS, the No Action Alternative and the Modified PACR Alignment which incorporates construction completed by the NFS and considerations to avoid and/or minimize impacts to sensitive habitats.

No Action Alternative (Future without Project Condition)

The National Environmental Policy Act (NEPA) requires that a federal agency consider a "No Action" Alternative along with analysis of the Proposed Action. The No Action Alternative evaluates taking no federal action and describes the future without project (FWOP) condition by which alternatives are compared. The No Action Alternative includes the existing environment including construction activities taken by the non-federal sponsor (NFS) prior to executing a Project Participation Agreement as the NFS for the federal project in 2021. The NFS constructed earthen levees to an elevation ranging from 10 to 11.5 ft NAVD 88, which is less than heights required to provide the 100-year level of risk reduction (LORR) and does not result in a closed hurricane and storm risk reduction system. In addition, the NFS constructed a total of 23 structures consisting of barge floodgates, environmental control structures, and fronting protection for existing pump stations. Under the FWOP condition, the Terrebonne Levee and Conservation District (TLCD) would continue to operate the forced drainage and partial hurricane risk reduction system that currently exists. Storm surges would continue to cause property damage, destruction of natural habitat, and human suffering in the two-parish study area.

Proposed Action

The authorized MTG Project includes a 98-mile levee system that provides a 100-year LORR consisting of 13 reaches, 30 environmental control structures, 15 barge floodgates, 9 floodwalls to protect existing pump stations, 8 roadway floodgates, and a 2.5-mile floodwall (16.5 feet in height) along the GIWW in Larose (Figure 1). Approximately 18 miles of the proposed levee alignment were assessed under separate NEPA documents for Reaches A and F (EAs #598 and #602, respectively).

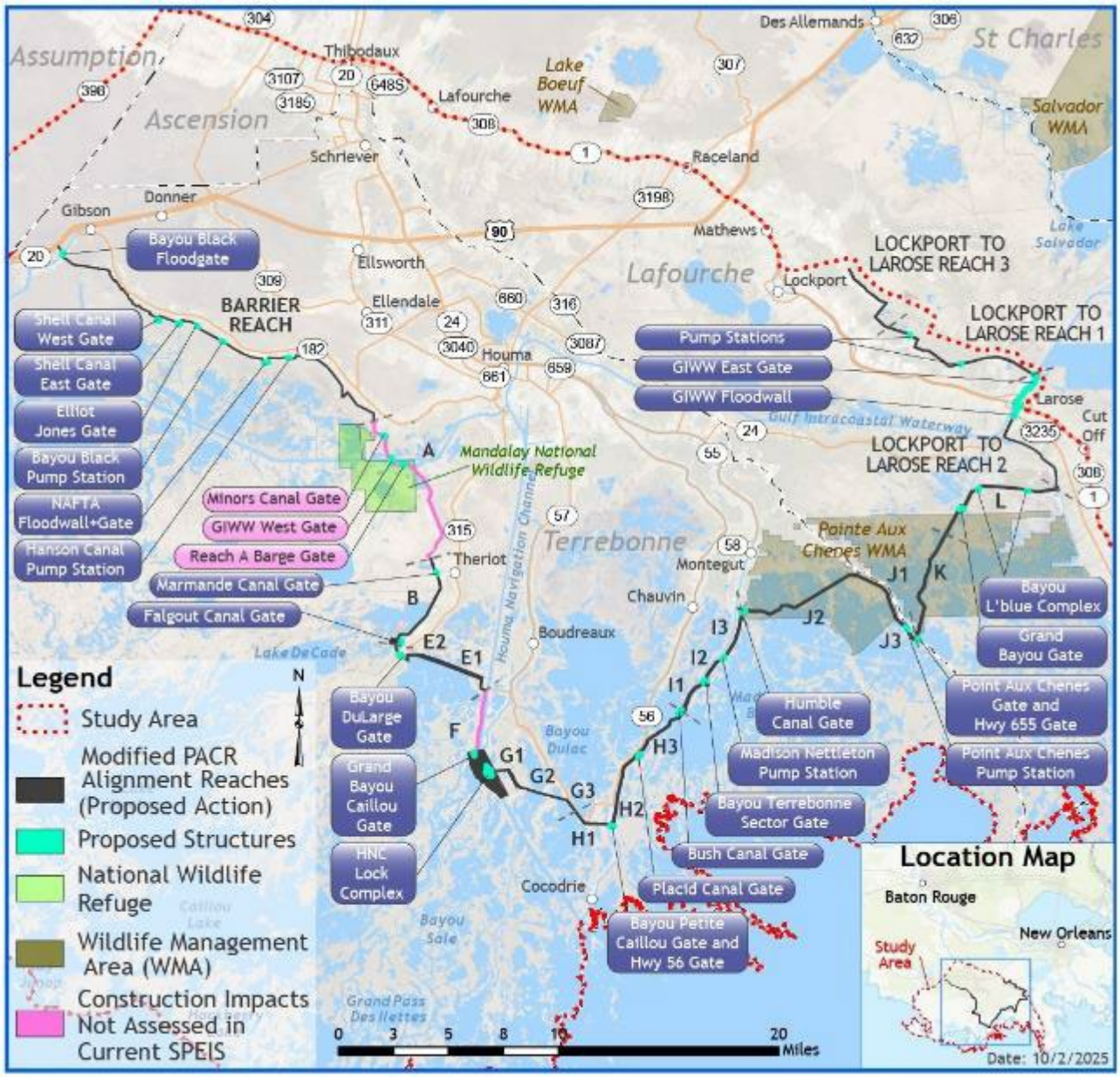

Figure 1. Project Features of the Proposed Action.

The Proposed Action assessed in the SEIS includes construction of the remaining 80 miles of proposed levees and structures integrated into the levee alignment to provide a 100-year LORR. The Proposed Action is similar to that assessed in the 2013 PACR/RPEIS, as authorized by WRRDA 2014, with technical design changes approved by the Chief of Engineer's discretionary authority and revisions to the proposed levee alignment to incorporate approximately 80 miles of initial-lift levees constructed by the NFS since 2013.

The SEIS is an assessment of the direct, indirect, and cumulative impacts associated with construction and operation of the Proposed Action, which includes features of the MTG authorized Project in its entirety, with the exception of (1) the Reach A levee and all Reach A structures, (2) the Reach F levee, and (3) the HNC Lock. NEPA compliance for Reach A was completed in 2024,

and NEPA compliance for the Reach F levee is being completed currently, with an expected completion date of June 2025. The HNC Lock Complex was assessed as a constructible feature in the 2013 PACR/RPEIS; therefore, NEPA compliance was completed under that RPEIS. The cumulative impacts of the construction and operation of these features are included in the cumulative impacts analysis of the SEIS.

Main Structural Components

Earthen Levees

Most of the project consists of construction of earthen levees to form a continuous barrier around the project area except for openings such as floodgates and other water control structures. Specific dimensions would vary by reach, with a levee width range between 145 and 500 feet and a total right of way (ROW) width of between 400 and 600 feet. The typical levee slope would be 6:1 on the flood side and 4:1 on the protected side. Crown width would typically be 10 feet. See Figure 2.

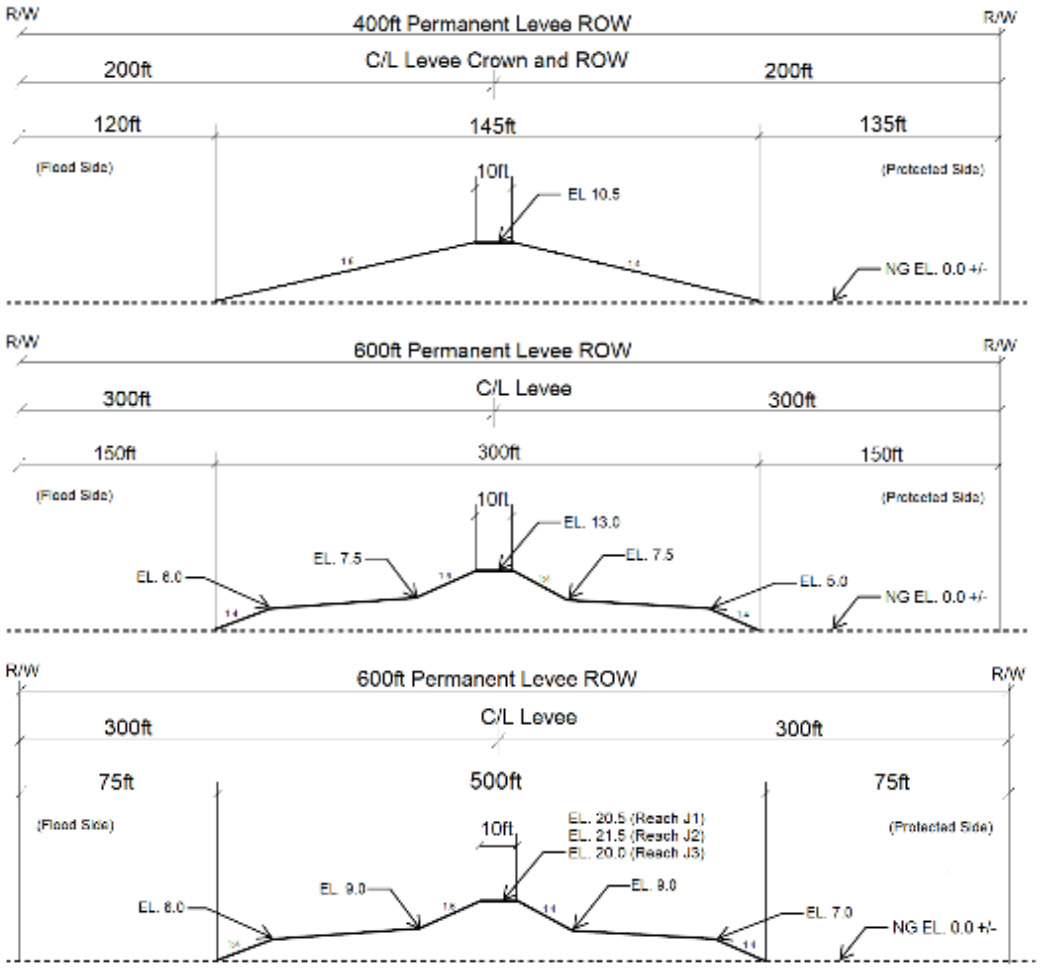

Figure 2. Typical levee dimensions for the MTG project.

Barge Floodgates

A barge gate is constructed of a braced steel frame with sheet metal or solid plate exterior in a hollow box configuration that resembles a hopper barge (Figure 3). The gate normally contains

several individual compartments that are watertight. The gate would have a pivot arm at one end that allows the gate to articulate in a 90° arc to open and close. The pivot arm would be mounted onto a fixed pivot pile that would allow the gate and pivot arm free travel in the vertical direction (for flotation). When the gate is in either the open or closed position, pumps fill the compartments with water until the buoyancy is overcome and the structure settles onto a receiving structure. While in the open position, the gate would also function as a guide wall to aid the vessels in navigating through the structure. In the closed position, the gate is ballasted down to an underwater foundation with gravity loads transferred through the base seal and the base support. Lateral loads from high tides or storm surge on the barge gate are transferred into two concrete abutment reaction walls on either end of the gate structure. T-wall type floodwalls would extend from the gate and tie into the adjacent levees.

The cross section at the gate location would be designed such that the pre- and post- project conditions would not impede the natural movement of aquatic organisms. The default operation would be open to avoid additional indirect impacts to vegetation and fish and wildlife due to changes in the natural hydrologic regime. The floodgate would be opened as soon as is safely possible after a closure for storm passage. The velocities around and through the gate may require the channel bottom to be layered with 2-feet of riprap. The riprap is required in the channel, extending approximately 100 linear feet on both the land side and the flood side.

Barge gates would be constructed approximately in the center of the existing channel. A bypass channel would be constructed immediately adjacent to and to the east side of the barge gate cofferdam footprint prior to beginning construction of the floodgate to allow safe navigational passage of marine traffic, as well as all aquatic organisms to pass safely until the floodgate structure is complete. Sluice gates would typically be incorporated into the sidewalls of barge gate structures. The designs of the proposed floodgates have not been finalized and would depend in part on detailed geotechnical investigations not yet completed.

Figure 3. Typical Barge Floodgate.

Sector floodgate

This floodgate type consists of two leaves joined at the center of the navigable channel width that rotate into gatebay recesses when opened (Figure 4). Each gate leaf is shaped as a sector of a cylinder, or pie-shape, with a vertical axis. The cross section at the gate location would be designed such that the pre- and post- project conditions would not impede the natural movement of aquatic organisms. The default operation would be open to avoid additional indirect impacts to vegetation and fish and wildlife due to changes in the natural hydrologic regime. The floodgate would be opened as soon as is safely possible after a closure for storm passage. The velocities around and through the gate may require the channel bottom to be layered with 2-feet of riprap.

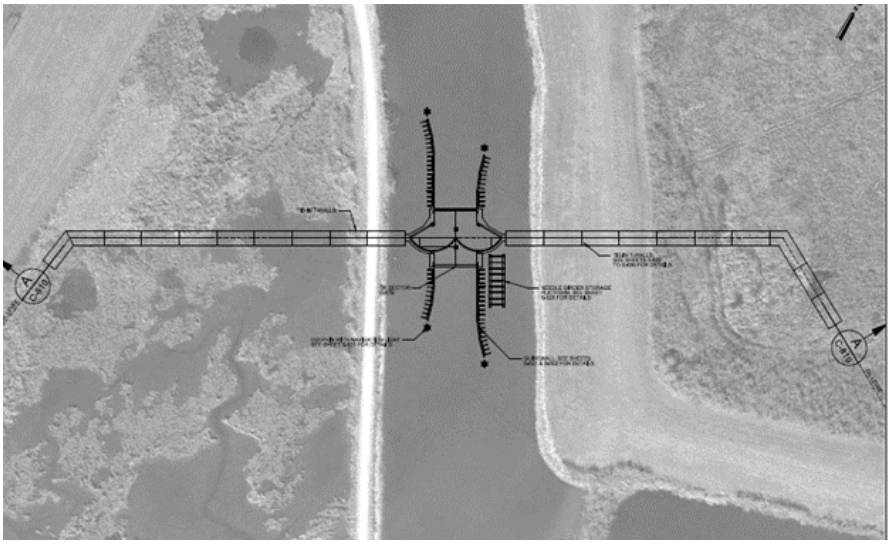

Figure 4. Typical sector floodgate.

Stoplog floodgates

Stoplog type floodgates are placed in the middle of waterways and don't have attached movable structures for closure. Closures required by the operation plan would require separate pieces called stop logs to be placed by crane into the floodgate opening to close it and prevent water flow.

Environmental control structures

These structures would be incorporated into earthen levees and are primarily sluice gates. A sluice gate is a structure that contains a movable gate or series of movable gates that, when lifted, allow material and water to flow under it. The sluice gate would provide an opening in the system to allow unimpeded tidal flow, except when a tropical system approaches the Gulf of America when the gates would be closed. Sluice gates are not navigable as they do not raise high enough, or they have fixed components that do not allow vessels to pass through.

Floodwalls

These concrete walls would be installed on each side of water control structures to bridge the connection between the floodgate and the earthen levees. Additionally, concrete slabs would be laid on top of the earthen levee where the floodwall joins the earthen levee to protect the levee from scour damage.

Reaches

Barrier Reach

The western end of the Barrier Reach is the western terminus of the MTG project as well. That western end is located in Terrebonne Parish, Louisiana, near its border with St. Martin Parish, Louisiana. This reach includes 15.69 miles of earthen levee, oriented southeast to northwest between the beginning of the overall MTG levee project at the beginning of the reach, located at LA 182 (Bayou Black Road) approximately 1,800 feet north of Zimmer Road, to the beginning of Reach A located roughly 2,400 feet southwest of the intersection of LA182 and Sportsman's Court. The levee reach would also include three environmental control structures, comprised of box culverts with sluice gates.

The proposed levee will be constructed along the alignment of the existing NFS constructed levee. The crown of the proposed levee will be shifted to the protected side of the existing NFS crown with flood side toes matching. The approximate elevation of the existing NFS levee is 6.0 feet NAVD88. The levee would be constructed to a 2035 design elevation of 10.5 feet NAVD88 (plus 2.0 feet of overbuild to account for probable settlement of levee sediments. Total permanent ROW for this portion of the reach would be 400 feet wide.

Future lifts will bring the levee up to the 2085 design elevation of 17.0 (not including overbuild), requiring approximately 3,168,156 cubic yards of additional embankment material. The borrow sites, staging areas, and haul routes utilized would be the same as used for construction of the Barrier Reach to the 2035 design elevation.

This reach includes the Shell Canal East Barge Floodgate, a 125 feet-wide barge type floodgate with sluice gates near the mouth of the Shell facility slip with a top elevation of +17.0 feet NAVD88, and a slab invert elevation of -12.0 feet NAVD88.

Reach B

Reach B includes 5.06 miles of earthen levee running generally north to south constructed on top of the existing NFS levee along the west side of the existing Thibodeaux Canal, to the west and parallel to Bayou Dularge. The beginning of the reach starts at the south end of Reach A and is located approximately 1.08 miles northwest of the intersection of Dr. Beatrous Rd. and LA315. The reach ends approximately 1,200 feet south of the Falgout Canal, where Reach E begins.

The proposed levee will be constructed along the alignment of the existing NFS constructed levee that has an approximate elevation of 8.0 feet NAVD88. The crown of the proposed levee will be shifted to the floodside of the existing NFS crown with protected side toes matching. The levee would be constructed to a 2035 design elevation of 13.0 NAVD88 (plus 2.0 feet of overbuild to account for probable settlement of levee sediments), a base width (levee toe to levee toe) of 300 feet. Total permanent ROW for Reach B would be 600 feet wide, although this estimated width would be refined during designs and specifications.

A levee lift would be required to bring the levee to the 2085 design elevation of 18.5 (not including overbuild to address probably settlement of levee sediments). requiring approximately 1,682,200 cubic yards of additional embankment material. The borrow sites, staging areas, and haul routes utilized would be the same as used for construction of Reach B to the 2035 design elevation.

This reach includes two flood gates: (1)The Falgout Canal Barge Floodgate, a 56 ft wide barge type floodgate with a top elevation of +18.5 feet NAVD88, and a slab invert elevation of -9.0 feet NAVD88, with nine 6’x16’ sluice gates , and (2) The Marmande Canal Stoplog Floodgate, a 30 ft wide stoplog floodgate with a top elevation of 18.5 ft NAVD88, and a slab invert elevation of -8.0 ft NAVD88.

Reach E

This reach entails construction of 4.40 miles (23,248 linear feet) of earthen levee from the end of Reach B on the west to the beginning of Reach F on the east terminus, primarily along the Falgout Canal between Bayou Dularge and the Houma Navigation Canal. The levee reach would also

include two environmental control structures, comprised of box culverts with sluice gates.

The proposed levee will be constructed on top of or along the alignment of the existing NFS constructed levee. The approximate elevation of the existing NFS levee is 8.0. Reach E consists of design reaches Reach E1 and Reach E2. The levee for Reach E1 would be constructed to a 2035 design elevation of 17.0 (plus 2.0 feet of overbuild), a base width (levee toe to levee toe) of 300 feet. The levee for Reach E2 would be constructed to a 2035 design elevation of 17.5 (plus 2.0 feet of overbuild), a base width (levee toe to levee toe) of 300 feet. Total permanent ROW for both portions of Reach E would be 600 feet wide.

Future lifts will bring the Reach E1 levee up to the 2085 design elevation of 20.0 ft NAVD88 and Reach E2 levee up to the 2085 design elevation of 21.0 (not including overbuild). To construct Reach E to the 2085 design elevations of 20.0 ft NAVD88 for Reach E1 and 21.0 ft NAVD88 for Reach E2, approximately 1,353,800 cubic yards of additional embankment material would be required.

This reach includes a barge floodgate within Bayou Dularge that would be a 56 feet wide with a top elevation of 21.0 ft NAVD88, and a slab invert elevation of -7.0-ft NAVD88.

Reach G

This reach includes the construction of 4.48 miles of earthen levee running west to east from the Houma Navigational Canal, (the end of Reach F), to a point approximately 1.5 miles west of Bayou Petit Caillou, (the beginning of Reach H). .

The proposed levee will be constructed on top of the existing NFS constructed levee that has an approximate elevation of 8.0 ft NAVD88. Reach G consists of design reaches Reach G1, Reach G2, and Reach G3. The levee for Reach G1 would be constructed to a 2035 design elevation of 17.0 ft NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 300 feet. The levee for Reach G2 would be constructed to a 2035 design elevation of 17.5 NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 300 feet. The levee for Reach G3 would be constructed to a 2035 design elevation of 18.0 ft NAVD88 (plus 2.0 feet of overbuild), a base width (levee toe to levee toe) of 300 feet. Total permanent ROW for all of Reach G would be 600 feet wide.

Future levee lifts would bring the Reach G1 levee up to the 2085 design elevation of 19.5 ft NAVD88 and the Reach G2 and G3 levees up to the 2085 design elevation of 20.5 ft NAVD88 (not including overbuild), requiring 1,437,700 cubic yards of additional embankment material. The borrow sites, staging areas, and haul routes utilized would be the same as used for construction of Reach G to the 2035 design elevation.

This reach would also include three environmental control structures, comprised of box culverts with sluice gates.

Reach H

This reach includes construction of 5.70 miles of earthen levee running south to north along the eastern side of Bayou Terrebonne from the Bush Canal (end of Reach G) to the Humble Canal (beginning of Reach I) in Terrebonne Parish.

The proposed levee will be constructed on top of the alignment of the existing NFS constructed levee that has an approximate elevation of 8.0 ft NAVD88. Reach H consists of design reaches Reach H1, Reach H2, and Reach H3. The levee for Reach H1 would be constructed to a 2035 design elevation of 17.0 ft NAVD88 (plus 2.0 feet of overbuild), a base width (levee toe to levee toe) of 450 feet. The levee for Reach H2 would be constructed to a 2035 design elevation of 18.0 ft NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 450 feet. The levee for Reach H3 would be constructed to a 2035 design elevation of 20.0 ft NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 450 feet. Total permanent ROW for all of Reach H would be 600 feet wide.

Future lifts would bring the Reach H1 levee up to the 2085 design elevation of 20.0 ft NAVD88, Reach H2 levee up to the 2085 design elevation of 22.0 ft NAVD88, and Reach H3 levee up to the 2085 design elevation of 24.0 ft NAVD88 (not including overbuild).

This reach includes two floodgates: (1) The Bayou Petite Caillou Barge Floodgate, a 56 ft wide barge type floodgate with a top elevation of +20.0 feet NAVD88, and a slab invert elevation of -8.0 feet NAVD88 with six 16 ft x16 ft sluice gates, and (2) The Placid Canal Barge Floodgate, a 56 ft wide barge type floodgate with a top elevation of +22.0 ft NAVD88, and a slab invert elevation of -8.0 ft NAVD88, with six 16 ft x16 ft sluice gates on the sides.

The levee reach would also include two environmental control structures, comprised of culverts with sluice gates.

Reach I

This reach includes 5.70 miles of earthen levee running south to north along the eastern side of Bayou Terrebonne from the Bush Canal, (the end of Reach H), to the Humble Canal, (the beginning of Reach J) built over the NFS's existing levee alignment in Terrebonne Parish.

Reach I consist of three design reaches: Reach I1, Reach I2, and Reach I3. The levee for Reaches I1 and I3 would be constructed to a 2035 design elevation of 20.0 feet NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 432 feet. The levee for Reach I2 would be constructed to a 2035 design elevation of 21.0 feet NAVD88 (plus 2.0 feet of overbuild), and a base width (levee toe to levee toe) of 442 feet. Total permanent ROW for Reach I would be 600 feet wide. The proposed levee would be constructed over the alignment of the existing NFS constructed levee (8.0 ft NAVD elevation), but the crown of the proposed levee will be shifted to the floodside of the existing NFS levee crown with protected side toes matching.

Future lifts would bring the Reach I1 levee up to the 2085 design elevation of 24.0 feet NAVD88, Reach I2 levee up to the 2085 design elevation of 25.0 ft NAVD88, and Reach I3 levee up to the 2085 design elevation of 24.5 NAVD88 (not including overbuild), requiring approximately 2,748,300 cubic yards of additional embankment material. The borrow sites, staging areas, and haul routes utilized would be the same as used for construction of Reach I to the 2035 design elevation.

This reach includes three floodgates: (1) Humble Canal Floodgate, a 56-ft-wide sector floodgate with a top elevation of +24.5 ft NAVD88, and a slab invert elevation of -10 ft NAVD88, (2) Bush Canal Barge Floodgate, a 56-ft-wide barge type floodgate with a top elevation of +24.0 ft NAVD88

and a slab invert elevation of -12.0 ft NAVD88 with nine 16 ft x 16 ft sluices gates on the sides, (3) Bayou Terrebonne Floodgate, a 56-ft-wide barge type floodgate with a top elevation of +25.0 ft NAVD88 and a slab invert elevation of -9.0 ft NAVD88.

Reach J

This reach includes 9.41 miles of earthen levee running west to east starting at the Humble Canal floodgate near Bayou Terrebonne (the end of Reach I) with its eastern terminus located at the Pointe Aux Chenes floodgate located near Cutoff Canal (the beginning of Reach K). Reach J consists of three design reaches: Reach J1, Reach J2 , and Reach J3.

The levee for Reach J1 would be constructed to a 2035 design elevation of 20.5 ft NAVD88 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 500 feet.

The J2 levee reach is proposed to be a constructable feature in the current EIS. The levee would be constructed to a 2035 design elevation of 21.5 ft NAVD88 (plus 2.0 feet of overbuild), a base width (levee toe to levee toe) of 500 feet, with 1V:4H flood side and 1V:4H protected side slopes above the levee berm, and a crown width of 10 feet. The J2 reach levee enlargement will include a land side shift and a flood side shift. Stage one construction will consist of degrading the existing levee and placing embankment for the new levee to and elevation of 15 ft. NAVD88. Stage two construction will consist of finishing placement of levee embankment to an elevation of 23.5 ft NAVD88. Total permanent ROW for this portion of the reach would be approximately 600 feet wide. In addition to the levee, this reach would also include construction of two T-walls sections with a top elevation of 25 ft NAVD88 with sluice gates openings penetrating the floodwall to allow for closure of the system during an event. The sluice gate would provide an opening in the system to allow unimpeded tidal flow, except when a tropical system approaches the Gulf of America when the gates would be closed. These floodwall segments would be built adjacent to, and on the floodside of, two existing environmental control structures within the existing levee. A third (eastern most) existing structure will be replaced with a similar floodwall/sluice gate feature. These existing environmental control structures are operated and maintained by the Louisiana Department of Wildlife and Fisheries and the new structure will be operated by the Nonfederal Sponsor (NFS) (Figure 5).

The levee for Reach J3 would be constructed to a 2035 design elevation of 20.0 ft NAVD88 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 500 feet. Total permanent ROW for all of Reach J would be 600 feet wide. The proposed levee will be constructed over the alignment of the existing NFS constructed levee.

The crown of the proposed J1 and J3 levees will be shifted to the floodside of the existing NFS crown with protected side toes matching with the J2 levee being shifted to the protected side with floodside toes matching to avoid utility conflicts with gas line running adjacent to J2's floodside toe. Future lifts will bring the Reach J1 levee up to the 2085 design elevation of 24.0 ft NAVD88, the Reach J2 levee up to the 2085 design elevation of 25.0 ft NAVD88, and the Reach J3 levee up to the 2085 design elevation of 23.5 ft NAVD88 (not including overbuild).To construct Reach J to the 2085 design elevations, approximately 4,514,400 cubic yards of additional embankment material would be required. The borrow sites, staging areas and haul routes utilized would be the same as used for construction of Reach J to the 2035 design elevation.

Figure 5. Location of existing environmental control structures in Reach J2. Structures operated by Louisiana Department of Wildlife and Fisheries are marked in green. Structure operated by the Nonfederal Sponsor is marked in orange.

Reach K

This reach includes construction of 7.07 miles of earthen levee beginning from approximately 200 feet north of the intersection of LA 665 and High Tide Court (end of Reach J), to the Grand Bayou Floodgate (beginning of Reach L) in Terrebonne Parish.

The levee would be constructed over the NFS's existing 8.0-ft-NAVD88-elevation levee to a 2035 design elevation of 20.5 ft NAVD88 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 446 feet. The crown of the proposed levee will be shifted to the protected side of the existing NFS crown with protected side toes matching. Total permanent ROW for Reach K would be 600 feet wide. The levee maintenance road will be located within this ROW beyond the protected side levee toe.

Future lifts will bring the levee up to the 2085 design elevation of 26.0 ft NAVD88 (not including overbuild, requiring approximately 3,038,000 cubic yards of additional embankment material. The staging areas and haul routes utilized would be the same as used for construction of Reach K to the 2035 design elevation.

This reach includes the Pointe Aux Chenes Barge Floodgate, a 56-ft-wide floodgate with sluice gates having a top elevation of +23.5 feet NAVD88 and a slab invert elevation of -6.0 ft NAVD88 at Bayou Pointe Aux Chenes.

The levee reach would also include two environmental control structures, each comprised of six 6 ft x 6 ft box culverts with sluice gates.

Reach L
This reach includes 3.97 miles of earthen levee running west to east from the beginning of the reach, located at the Grand Bayou Floodgate (the end of Reach K), to approximately 3,150 feet west of the intersection of LA 3235 and LA 3161 (tying into the Larose-Golden Meadow Levee) in Terrebonne Parish.

The levee would be constructed over the NFS's existing 8.0-ft-NAVD88-elevation levee to a 2035 design elevation of 20.5 feet NAVD88 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 446 feet. Total permanent ROW for Reach L would be 600 feet wide. The crown of the proposed levee will be shifted to the protected side of the existing NFS crown with protected side toes matching. The levee maintenance road would be located within this ROW beyond the protected side levee toe.

Future lifts will bring the levee up to the 2085 design elevation of 24.5 ft NAVD88 (not including overbuild), requiring approximately 1,893,000 cubic yards of additional borrow material. The staging area and haul route used would be the same as used for construction to the 2035 design elevation.

This reach includes two floodgates: (1) the Grand Bayou Floodgate and Sluice Gate, a 56-ft-wide floodgate with a top elevation of +24.5 feet NAVD88 and a slab invert elevation of -9.0 ft NAVD88 with three 16 ft x 16 ft sluice gates, and (2) the Bayou L'Bleu Stoplog Floodgate and Sluice Gates, a 15-ft-wide stoplog floodgate with a top elevation of +24.5 ft NAVD88, and a slab invert that is yet to be determined, with four sluice gates (size to be determined).

Larose C North (LCN) Reach
This reach includes 7.37 miles of levee running southeast to northwest from the end of Reach L to the GIWW East Floodgate where the Lockport to Larose (L2L) Reach 1 levee begins along the NFS levee alignment in Lafourche Parish.

The LCN Reach levee would be constructed to a 2035 design elevation of 18.0 ft NAVD88 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 450 feet. The crown of the proposed levee will be shifted to the protected side of the existing NFS crown with protected side toes matching. Total permanent ROW for this portion of the reach would be 600 feet wide. The levee maintenance road will be located within this ROW beyond the protected side levee toe. The NFS's existing levee and structures along this alignment will have to be either modified or replaced as the Larose Golden Meadow loading condition is opposite what the Morganza to the Gulf loading would be.

Future lifts will bring the levee up to the 2085 design elevation of 20.5 feet NAVD88 (not including overbuild), requiring approximately 2,900,500 cubic yards of additional embankment material. The staging area and haul route used would be the same as used for construction to the 2035 design elevation.

This reach includes the Larose Barge Gate Floodgate, a 56-ft-wide floodgate having a top elevation

of +16.5 ft NAVD88 and a slab invert elevation of -12.3 ft NAVD88 that would be constructed within Bayou Lafourche. It would be located approximately 600 ft downstream of the existing sector gate.

Lockport to Larose (L2L) Reach

This reach includes 10.78 miles of earthen levee running southeast to northwest immediately west of the GIWW Floodgate (tying into the Larose-Golden Meadow Levee system), to Company Canal (the overall end of the MTG Levee Project) in Lafourche Parish.

The L2L levee would be constructed in 3 reaches. Reach 1 would be constructed along an alignment with no existing levee and reaches 2 and 3 would be constructed over the NFS's existing levee that has an elevation of 6.0 ft NAVD88. The L2L levee would be constructed to a 2035 design elevation of 9.5 (plus 2.0 feet of overbuild) and a base width (levee toe to levee toe) of 145 feet. The crown of the proposed levee will be shifted to the protected side of the existing NFS crown with flood side toes matching. The approximate elevation of the existing NFS levee is 6.0. Total permanent ROW for this portion of the reach would be 400 feet wide.

Future lifts will bring the levee up to the 2085 design elevation of 13.0 (not including overbuild), requiring approximately 2,588,100 cubic yards of additional embankment material. The borrow sites, staging areas, and haul routes utilized would be the same as used for construction of the Lockport to Larose levee to the 2035 design elevation.

This reach includes construction of a 225-ft-wide sector floodgate within the GIWW and floodwall tie-ins to the rest of the levee. It would be located approximately 1.3 miles northwest of the town of Larose.

The levee reach would also include six environmental control structures, comprised of culverts with sluice gates.

Nonstructural Project Components

Staging Areas For Levee Construction

There would be 1 to 8 temporary staging areas (typically 0.5 acres to 2 acres) for each levee reach for MTG for equipment and construction trailer siting. Approximately 6 inches of stone would be placed to provide a dry area as needed within the staging area limits. These staging areas located near to the levee reach for which they would be used. Upon completion of the project, the areas would be restored to original conditions. According to the USACE, staging areas are devoid of fish and wildlife habitat.

Disposal of Debris

For all MTG project construction, debris disposal would be similar. Material collected from clearing and grubbing of the levee ROW may be disposed of by either windrowing, burning, chipping, or removal from the site. Windrowing, burning, and chipping would occur within the ROW. Debris resulting from clearing and grubbing the borrow site would be buried in the borrow pit.

Vegetative debris, including grass, organic material, and brush trees, may be placed in windrows on either the protected side or the flood side of the levee. The windrows would extend from ROW to

15 feet from levee toe not to exceed the levee height. Vegetative debris may be collected into piles and burned within the ROW. Approximately 90 to 310 burns (for each reach, depending on local conditions) over the duration of the project would be anticipated, with approximately 4,000 cubic yards of material per burn.

Cut timber, down timber, dead timber, branches, and brush may be chipped. Chipping operations may be conducted over the duration of the project. The chips would be deposited in windrows. Windrows would extend from the limit of ROW to 15 feet from the levee toe not to exceed the levee height. At the option of the Contractor, the chips may be either sold or spread over worksite areas as a dust preventive measure or may be used within the project area as a mulch for plantings. Disposal by spreading shall be acceptable only in areas where the wood chips cannot be washed either into ditches, streams, or off the ROW by rainfall runoff.

Haul Routes

Most haul routes in the project area are located on existing roads with the following exceptions: a new haul road for Lockport to Larose, a new haul road for Reach J, a temporary pontoon bridge for Reach B borrow hauling, and Reach H barge offloading sites.

In the Lockport to Larose Reach, Haul Route 2 would be a newly constructed access road within a 40-foot-wide crown and 60-foot-wide ROW along existing embankment and farm roads (Figure 6). Construction of Haul Route 2 would include clearing and grubbing of any vegetation within the ROW, placement of two feet of sand topped with geotextile fabric and 7 inches of crushed stone.

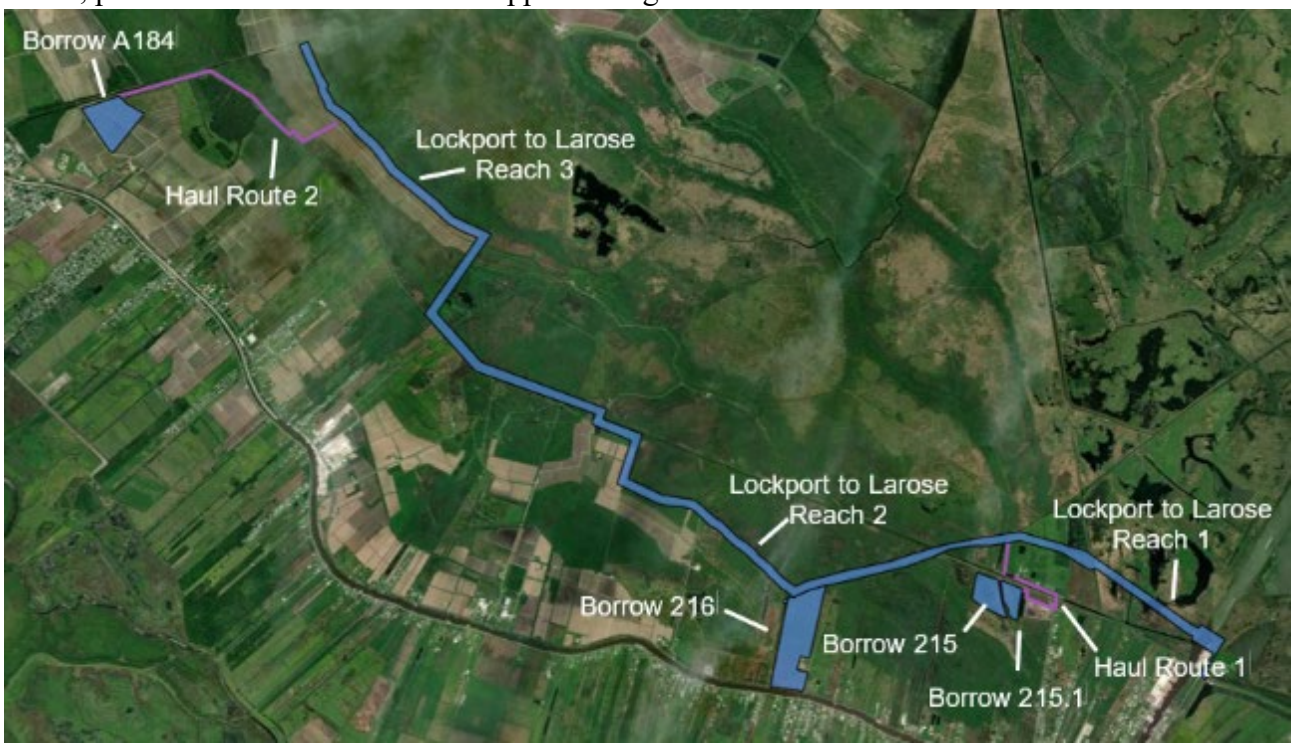

Figure 6. Borrow sites and haul route for Lockport to Larose Reach.

This haul route would remain in place after construction, and a perpetual road easement would be acquired by the NFS from the landowner.

A new haul road for use with Reach J and Reach K construction would be a 30-foot-wide constructed road that would provide access between borrow site A213 and haul route 1 (Figure 7).

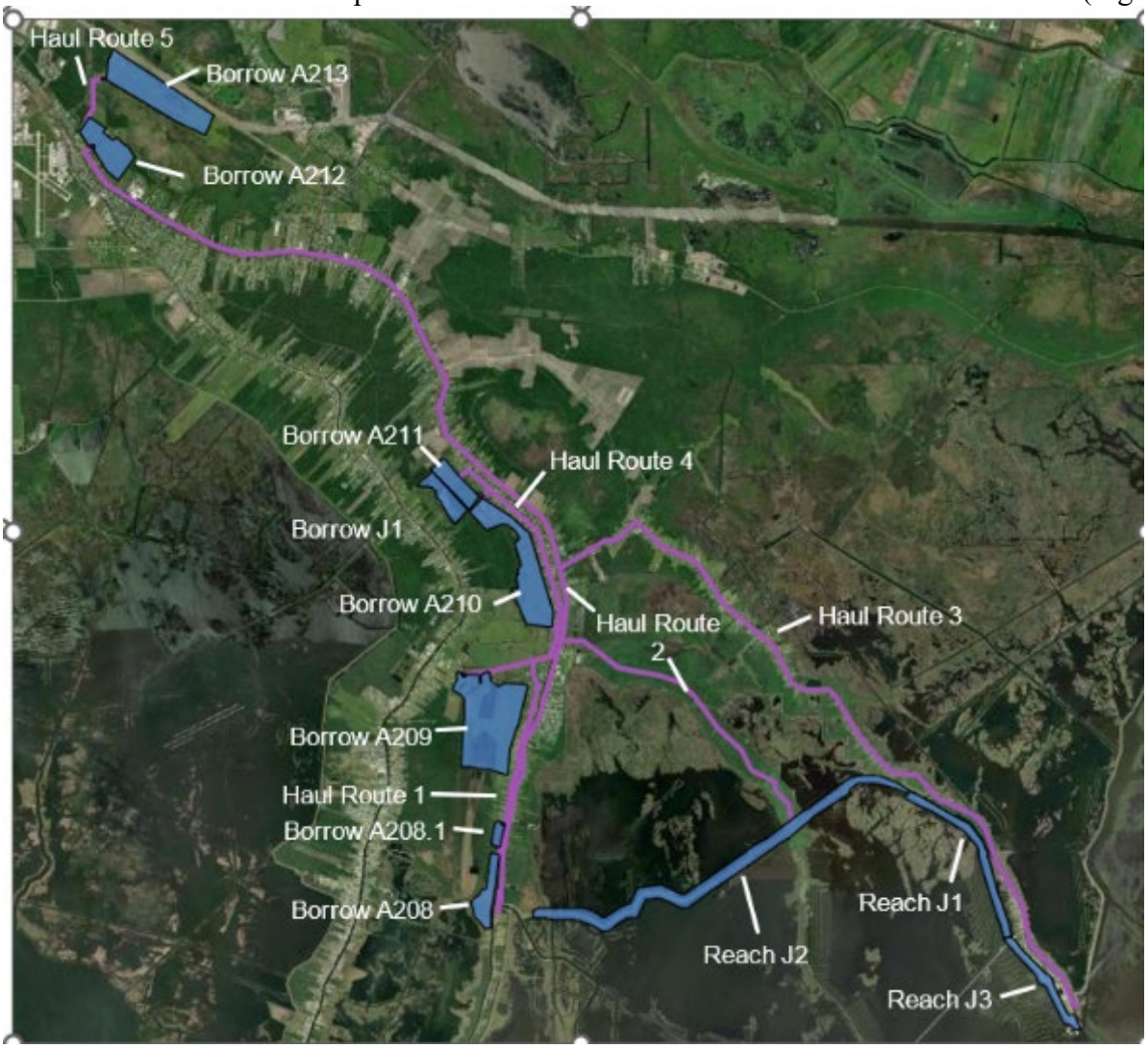

Figure 7. Borrow sites and haul routes for use with Reach J and Reach K.

For Reach B, a temporary floating pontoon bridge consisting of sectional barges, spuds, and ramps would be installed across a canal to haul embankment material from each of these borrow sites to the levee reach (Figure 8). Once construction is complete, the bridge, anchors, and timber mat ramps would be disassembled and removed. No accommodation would be made for navigation within the waterway during construction because this canal is a drainage canal and not used for navigation.

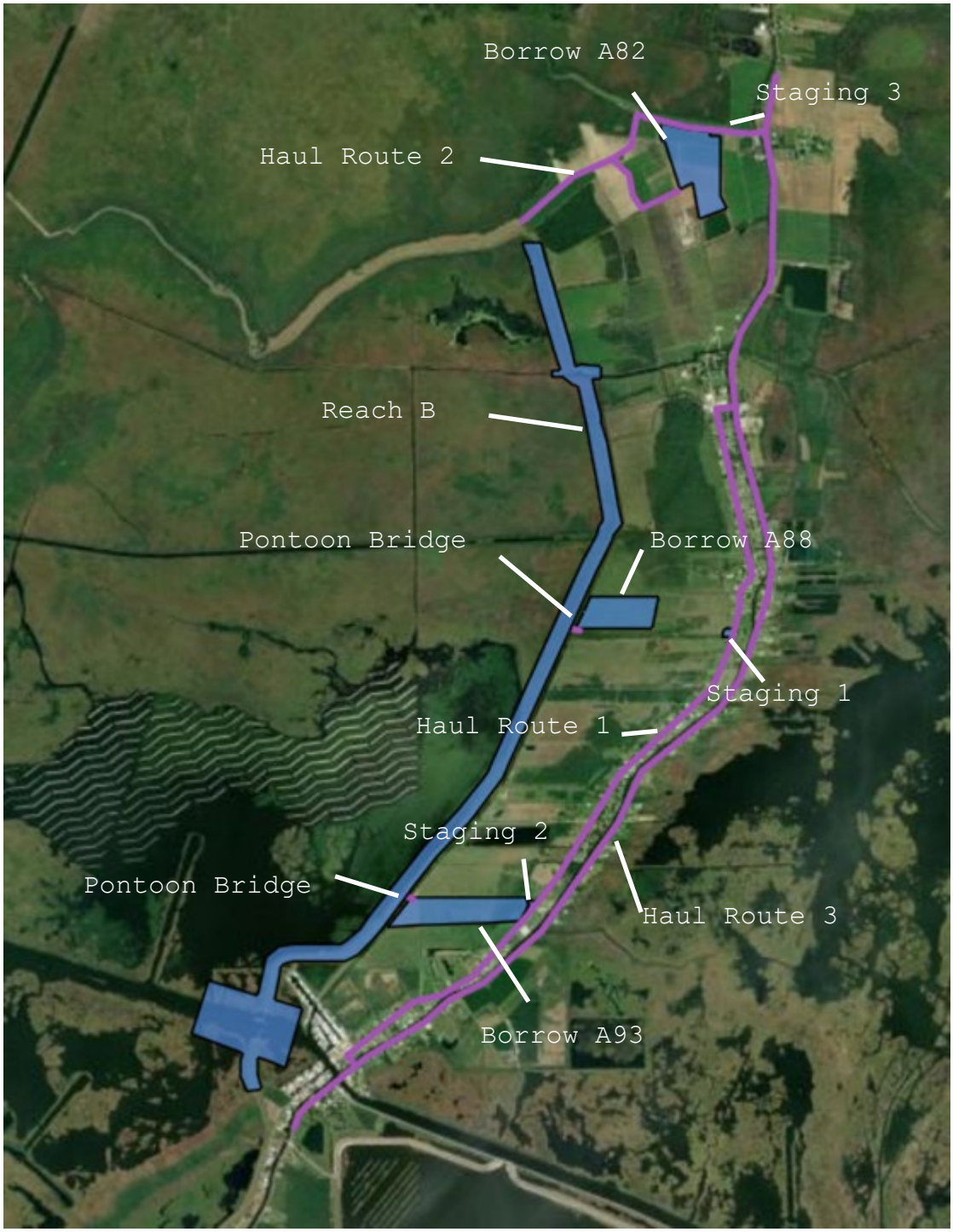

Figure 8. Reach B haul routes, borrow sites, staging areas, and pontoon bridge locations.

Barges carrying borrow material and construction equipment would travel along Bayou Terrebonne, Bush Canal, and Bayou Petite Caillou to one or more of the existing cleared areas along the Reach H levee (Figure 9), where they would be anchored for borrow material and equipment offloading. An example of an existing cleared area to be used for barge offloading along the Reach H levee is shown in Figure 10. A temporary timber-mat ramp would be placed within the existing cleared area,

such that no vegetation or surface waters would be impacted, to offload equipment from the barge to the levee. An excavator on the levee or the barge would be used to move material from the barge into dump trucks for delivery along the levee reach.

Figure 9. Location of potential barge offloading sites.

Figure 10. Example of existing cleared areas to be used for barge offloading.

Borrow Sites

Sites were chosen by USACE following guidance from the Service (Appendix A). According to the SEIS, any wetlands, including marsh and wet pasture, or forested areas located within the delineated borrow site areas would be avoided and not disturbed. If it is determined that those habitats cannot be avoided, additional NEPA analysis and coordination with the Service would be required along with plans for adequate additional mitigation.

Water Control Structures Proposed Operations Plan

The following is an operation plan for the navigation gates, flood gates, and environmental control structures that are incorporated into the MTG Levee System. The following plan must be routinely reevaluated, at least every 5 years, by USACE New Orleans District. Updates may include, but are not limited to, increasing trigger water surface elevations to account for sea level rise, updating closure/reopening procedure for specific environmental conditions such as salinity or sedimentation, or impacts to interior wetlands; and updating instantaneous gages that are acceptable for use in determining closure or reopening of structures and gates.

Acceptable Use

All real-time water surface elevations used to determine closure, or reopening should be read at the location of the structure or gate. If there is not a gage at the structure or gate location, the following gages are acceptable to use to retrieve instantaneous stages in and around the MTG Levee System. It is imperative that the stages obtained from the USGS website are converted to water surface elevations in NAVD88 (if necessary) using the conversion published on the gage's page, which is also listed below. Gages both internal of and external to the MTG Levee System may be used to determine a closure but only gages external of the MTG Levee System may be used to determine reopening. No structure or gate can be closed or reopened when the pressure head differential exceeds the design capability. Additionally, no structure or gate can be reopened until the storm force winds have dropped to a level which is safe for personnel to access the area and operate the machinery.

Operating Plan

The USACE developed operation guidance for the structures located within each levee reach shown in Figure 11 (Table 1). The HNC Lock has additional salinity criteria for acceptable closure. Historic gage data from the USGS, USACE, and CRMS was utilized to approximate appropriate water surface elevation triggers. For each group of levee reaches, the selected trigger water surface elevations corresponded to approximately the 0.2% annual exceedance probability (AEP) value, using October 2013 to November 2023 for the statistical analysis period. The duration for a 0.2% flooding event and corresponding water surface elevations would depend on the storm but is estimated to be 12 to 24 hours. The trigger elevations were chosen to be consistent with the existing levee system operation plan. The statistical analysis allowed more clarity to the frequency of these values occurring. Future sea level rise conditions were not assessed.

Gages internal of the MTG Levee System:

USGS 07381150 Bayou Lafourche at Lockport, LA

- Subtract 3.9 feet from the stage to get elevation in NAVD88

USGS 07381350 Company Canal at Hwy 1 at Lockport, LA

- Subtract 0.7 feet from the stage to get elevation in NAVD88

USGS 07381355 Company Canal at Salt Barrier near Lockport, LA

- Subtract 1.18 feet from the stage to get elevation in NAVD88

Gages external to the MTG Levee System:

USGS 073813498 Caillou Bay SW of Cocodrie, LA

- Subtract 0.41 feet from the stage to get elevation in NAVD88

USGS 292952090565300 CRMS 0411-H01-RT

- Subtract 0.91 feet from the stage to get elevation in NAVD88

USGS 07381349 – Caillou Lake (Sister Lake) SW of Dulac, LA

- Subtract 1.03 feet from the stage to get elevation in NAVD88

USGS 07380330 Bayou Perot at Point Legard near Cutoff, LA

- Add 1.67 feet to the stage to get elevation in NAVD88

USGS 2951190901217 L. Cataouatche at Whiskey Canal S of Waggaman, LA

- Subtract 3.5 feet from the stage to get elevation in NAVD88
-

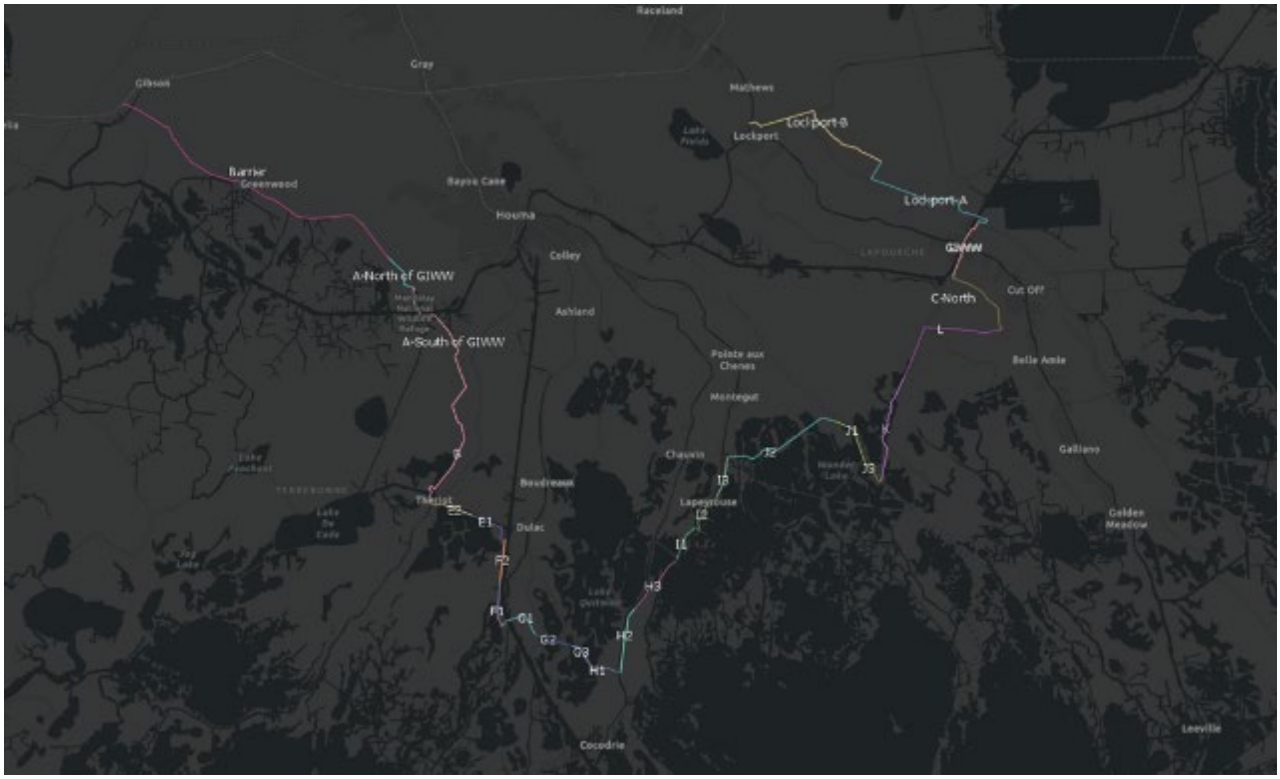

Figure 11: Morganza to the Gulf Levee Reaches

Table 1: Morganza to the Gulf Structure Operation Guidance

<table>
<tr><th>Reach Name</th><th>Structures/Gates</th><th>Closure Conditions[3]</th><th>Reopening Conditions</th></tr>
<tr><td>Barrier Reach</td><td>Bayou Black Floodgate
Shell Canal West Floodgate (Stoplog Gate)
Shell Canal East Floodgate
NAFTA Canal
Environmental Control Structures</td><td rowspan="3">1. A named storm is in the Gulf of America that is threating the Louisiana coast,

<u>OR</u>

2. The water surface elevation measured at the gate/structure location reaches +3.0 ft NAVD88</td><td rowspan="3">1. The water surface elevation on the outside of the gate/environmental control structure drops below +3.0 ft NAVD88,

<u>AND (for ONLY Navigation Gates)</u>

1. The NHC small craft advisory no longer applies to the area,
2. The channel has been cleared of debris or obstructions so that navigation can safely resume.</td></tr>
<tr><td>Reach A North of GIWW</td><td>Environmental Control Structures</td></tr>
<tr><td>Reach A South of GIWW</td><td>Minors Canal Floodgate
GIWW West[1]
Environmental Control Structures</td></tr>
<tr><td>Reach B</td><td>Marmande Canal Floodgate (Stoplog Gate)
Falgout Canal Floodgate[1]</td><td rowspan="4">1. A named storm is in the Gulf of America that is threating the Louisiana coast,

<u>OR (for ONLY Navigation Gates)</u>

2. The water surface elevation measured at the gate location reaches +2.5 ft NAVD88,</td><td rowspan="4">1. The water surface elevation measured on the exterior of the System at the gate location drops below +2.5 ft NAVD88,

<u>OR</u>

1. The water surface elevation measured on the exterior of the System at the environmental control structure location drops below +3.0 ft NAVD88,</td></tr>
<tr><td>Reach E (1&2)</td><td>Bayou Dularge Floodgate
Environmental Control Structures</td></tr>
<tr><td>Reach F (1&2)</td><td>Bayou Grand Caillou Floodgate[1]
HNC Lock Complex[2]</td></tr>
<tr><td>Reach G (1-3)</td><td>Four Point Bayou Floodgate (Stoplog Gate)
Environmental Control Structures</td></tr>
</table>

<table>
<tr><td>Reach H (1-3)</td><td>Bayou Petit Caillou Floodgate[1]
Placid Canal Floodgate[1]
Environmental Control Structures</td><td rowspan="5">OR (for ONLY Environmental Control Structures)

2. The water surface elevation measured at the structure location (or nearest approved instantaneous gage) reaches +3.0 ft NAVD88.</td><td rowspan="5">AND (for ONLY Navigation Gates)

1. The NHC small craft advisory no longer applies to the area,
2. The channel has been cleared of debris or obstructions so that navigation can safely resume.</td></tr>
<tr><td>Reach I (1-3)</td><td>Bush Canal Floodgate[1]
Bayou Terrebonne Floodgate
Humble Canal Floodgate</td></tr>
<tr><td>Reach J (1-3)</td><td>Bayou Pointe Aux Chenes Floodgate[1]
Environmental Control Structures</td></tr>
<tr><td>Reach K</td><td>Environmental Control Structures</td></tr>
<tr><td>Reach L</td><td>Grand Bayou Floodgate[1]
Proposed Structure at Bayou Blue</td></tr>
<tr><td>GIWW Reach</td><td>Larose Floodgate</td><td rowspan="3">1. A named storm is in the Gulf of America that is threating the Louisiana coast,

OR

2. The water surface elevation measured at the gate/structure location reaches +3.0 ft NAVD88</td><td rowspan="3">1. The water surface elevation on the outside of the gate/environmental control structure drops below +3.0 ft NAVD88,

AND (for ONLY Navigation Gates)

1. The NHC small craft advisory no longer applies to the area,
2. The channel has been cleared of debris or obstructions so that navigation can safely resume.</td></tr>
<tr><td>Lockport Reach A</td><td>GIWW East[1]</td></tr>
<tr><td>Lockport Reach B</td><td>Environmental Control Structures</td></tr>
<tr><td>Reach J</td><td>Environmental Control Structure #1 and #2</td><td>Managed according to current LA Wildlife and Fisheries Permit.</td><td>Managed according to current LA Wildlife and Fisheries Permit.</td></tr>
</table>

Notes:

1. Structure contains culverts within or adjacent to the floodgate for continued flow passage when the gate is closed. Most culverts include a flap gate and/or sluice gate that can also be closed if the closure conditions are reached.
2. HNC Lock Complex has additional criteria for acceptable closure, see "**Additional Salinity Triggers for HNC Lock Complex**" section.
3. All water surface elevations should be read at the gate or structure location to satisfy closure conditions. If the gate or structure does not have a gage on location, the water surface elevation must be taken from an approved gage. See "**Acceptable Use**" section, above, for approved gages.
4. NHC = National Hurricane Center

Additional Salinity Triggers for HNC Lock Complex

The HNC Lock Complex will be closed for salinity control only if:

1. Flows in the Atchafalaya River flows are below 100,000 cfs as measured on the Simmesport gage (USGS 07381490 Atchafalaya River at Simmesport, LA)

OR

2. A gage on the outside of the HNC Lock complex exceeds a salinity value that has been correlated with preventing exceedance of the maximum allowable chloride level of 250 ppm as defined in EPA's secondary drinking water standard at the Houma Treatment Plant. The structure should be closed for at least 12 hours and fluctuations in chloride levels should be monitored and recorded hourly. This to be determined salinity value at the new gage should correlate with the value of 7.5 ppt measured at the HNC at Dulac monitoring station. The 7.5 ppt trigger will be used to perform the indirect impact analysis in this document. Once the new trigger is established, the impact analysis will be reviewed to verify the assumptions made.

The HNC Lock Complex may be reopened when:

1. The NHC small craft advisory no longer applies to the area, and the channel has been cleared of obstructions,

OR

2. The differential between the interior water level and exterior water level is equal to or less than +1.0 foot, as measured on the upstream and downstream staff gage, respectively.

AND

3. After monitoring chloride levels over the 12-hour period at the new gage on the outside of the HNC Lock complex drops below the salinity closure trigger described above. For the analysis of indirect impacts, a salinity level of 13 ppt as measured near Cocodrie (LUMCON Station) will be used. The LUMCON station replaces the Bayou Grand Caillou USACE 76305 from the 2002 feasibility report because it has a more robust dataset. If the USACE re-evaluates the salinity trigger at the LUMCON station and comes up with a trigger different than 13ppt, this trigger may change. Once the new trigger is established the impact analysis will be reviewed to verify the assumptions made.

FISH AND WILDLIFE RESOURCES

Description of Habitats

Existing conditions

Forested Wetlands – Forested wetlands in the study area consist of bottomland hardwood forests (BLH). BLH found in coastal portions of the project area occur primarily on the natural levees of distributary channels and along constructed levees. Dominant vegetation may include sugarberry (*Celtis laevigata* Willd), water oak (*Quercus nigra* L.), live oak (*Quercus virginiana* Mill.), bitter pecan (*Carya aquatica* (Michx. f.) Nutt.), black willow *(Salix nigra* Marshall), American elm (*Ulmus americana* L.), Drummond red maple (*Acer rubrum* L.), Chinese tallow-tree (*Triadica loureiro*), boxelder (*Acer negundo* L.), green ash (*Fraxinus pennsylvanica* Marshall), baldcypress (*Taxodia* Rich.), and elderberry (*Sambucus* L.). Cypress-tupelo (*Nyssa* L.) swamps are located along the flanks of larger distributary ridges as a transition zone between bottomland hardwoods and lower-elevation marsh or scrub-shrub habitats. Cypress-tupelo swamps exist where there is

little or no salinity and usually minimal daily tidal action. All identified swamp habitat within the project footprint is in the Barrier Reach and the Lockport to Larose Reach. The majority of BLH also occurs in those reaches, with smaller amounts in reaches B, E, G, H, I, and L.

Scrub-Shrub – Scrub-shrub habitat is often found along the flanks of distributary ridges. Typically, it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry (*Sambucus* L.), wax myrtle (*Morella cerifera* (L.) Small), buttonbush (*Cephalanthus* L.), black willow (*Salix nigra* Marshall), Drummond red maple (*Acer rubrum* L.), Chinese tallow-tree (*Triadica Loureiro*), and groundselbush (*Baccharis halimifolia* L.). Varying amounts of scrub-shrub occur in most reaches.

Fresh Marsh – Fresh marshes occur at the upper ends of interdistributary basins and are often characterized by floating or semi-floating organic soils. Most fresh marshes exhibit minimal daily tidal action; fresh marshes in the Atchafalaya River delta and adjacent to Atchafalaya Bay are the exceptions. Vegetation may include maidencane (*Panicum hemitomon* Schult.), bulltongue (*Sagittaria lancifolia* L.), cattail (*Typha* L.), California bulrush (*Schoenoplectus californicus* (C.A. Mey.) Palla), pennywort (*Hydrocotyle* L.), giant cutgrass (*Zizaniopsis miliacea* (Michx.) Döll & Asch.), American cupscale (*Sacciolepis striata* (L.) Nash), spikerushes (*Eleocharis* R. Br.), bacopa (*Bacopa* Aubl.), and alligatorweed (*Alternanthera philoxeroides* (Mart.) Griseb.). Associated open water habitats may often support extensive beds of floating-leafed and submerged aquatic vegetation including water hyacinth (*Eichhornia Kunth*), Salvinia (*Salvinia* Ség.), duckweeds (*Lemna* L.), American lotus *(Nelumbo lutea* Willd.), white waterlily (*Nymphaea odorata* Aiton), water lettuce (*Pistia stratiotes* L.), coontail (*Ceratophyllum demersum* L.), Eurasian milfoil (*Myriophyllum spicatum* L.), hydrilla (*Hydrilla* Rich.), pondweeds (*Potamogeton* L. or *Stuckenia* Börner), naiads (*Najas* L.), fanwort (*Cabomba* Aubl.), American eelgrass (*Vallisneria americana* Michx.), water stargrass (*Heteranthera dubia* (Jacq.) MacMill.), elodea (*Egeria densa* Planch.), and others. Fresh/Intermediate marshes occur in reaches B, E, J, L, L2L, and LCN.

Intermediate Marsh – Intermediate marshes are a transitional zone between fresh and brackish marshes and are often characterized by organic, semi-floating soils. Typically, intermediate marshes experience low levels of tidal action. Salinities are negligible or low throughout much of the year, with salinity peaks occurring during late summer and fall. Vegetation includes saltmeadow cordgrass (*Spartina patens*), deer pea (*Vigna luteola*), three cornered grass (*Schoenoplectus americanus*), cattail, bulltongue, seashore paspalum (*Paspalum vaginatum* Sw.), fall panicgrass (*Panicum dichotomiflorum*), and bacopa (*Bacopa monnieri* (L.) Pennell). Ponds and lakes within the intermediate marsh zone often support extensive submerged aquatic vegetation including southern naiad (*Najas guadalupensis*), Eurasian milfoil, and widgeongrass (*Ruppia maritima* L.). Fresh/Intermediate marshes occur in reaches B, E, J, L, L2L, and LCN.

Brackish Marsh – Brackish marshes are characterized by low to moderate daily tidal energy and by soils ranging from firm mineral soils to organic semi-floating soils. Freshwater conditions may prevail for several months during early spring; however, low to moderate salinities occur during much of the year, with peak salinities in late summer or fall. Vegetation is usually dominated by saltmeadow cordgrass, but also includes saltgrass (*Distichlis spicata*), saltmarsh cordgrass (*Spartina alterniflora*), three cornered grass, leafy three-square (*Schoenoplectus maritimus*), and deer pea. Shallow brackish marsh ponds also support beds of widgeongrass. Brackish marshes occur in

reaches G, H, and K.

Saline Marsh – Saline marshes occur along the southern fringe of coastal wetlands. Those marshes usually exhibit firm mineral soils and experience moderate to high daily tidal energy. Vegetation is dominated by saltmarsh cordgrass, but also includes black needlerush (Juncus roemerianus), saltgrass, saltmeadow cordgrass, and leafy three-square. Submerged aquatic vegetation is rare. Within the study area, intertidal mud flats are the most common non-emergent habitat type. Saline marshes occur in reaches G, H, I, and J.

Developed Areas – Most developed areas are located on higher elevations of former distributary channels and are typically well drained. They include agricultural lands, as well as commercial and residential developments. Existing levees area also considered developed. Nearly all of the reaches of the project contain some developed areas; mostly in the form of levees.

Canals and Bayous – Canals and larger bayous typically range in depth from 4 or 5 feet, to over 15 feet. Strong tidal flows may occur at times through those waterways, especially where they provide hydrologic connections to other large waterbodies. Such canals and bayous may have mud or clay bottoms that range from soft to firm. Dead-end canals and small bayous are typically shallow, and their bottoms may be filled in to varying degrees with semi-fluid organic material. Erosion due to wave action and boat wakes, together with shading from overhanging woody vegetation, tends to retard the amount of intertidal marsh vegetation growing along the edges of those waterways. All project reaches contain or are immediately adjacent to some type of waterway.

No Action Alternative
The construction of the NFS levee resulted in the filling or removal of marsh, shrub-scrub, and BLH habitat. These impacts have been mitigated through the USACE's regulatory program. Under this alternative no additional widening or increase in elevation of levees would be performed and no additional water control structures would be constructed.

Under the no action alternative, water elevation and salinity are projected to continue to increase in most of coastal Louisiana including most of the project area. In marsh where those increases occur over a relatively short period of time, the resulting vegetation stress would cause plant death and marsh elevation decreases due to lack of vertical accretion. Those degraded marshes would also more easily eroded by wave energy resulting in marsh fragmentation and loss. Emergent marsh would eventually be replaced by open water lakes and bays. Freshwater input from the Atchafalaya River via the GIWW would attenuate some of the salinity intrusion from the higher saline coastal areas. Some areas of freshwater marsh in the project area remain relatively stable and land loss is expected to occur more slowly over the 60-year analysis period (Barrier, L2L, LCN, Reach B). Other wetland areas would likely transition from lower salinity to higher salinity marshes but still increase in water relative to emergent marsh acres. Increasing water elevation and salinity would also cause tree stress and death causing BLH acres to decrease in most parts of the project area; swamp habitat would experience loss of trees or at least slower growth by the end of the analysis period.

Fishery/Aquatic Resources

Existing conditions
Wetlands throughout the study area are occupied by small-bodied resident fishes and shellfishes such as least killifish (*Heterandria formosa*), rainwater killifish (*Lucania parva*), sheepshead minnow (*Cyprinodon variegatus*), mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), grass shrimp (*Palaemonetes*), 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. Fresh water and low-salinity marshes provide habitat for commercially and recreationally important resident freshwater fishes such as largemouth bass (*Micropterus salmoides*), yellow bass (*Morone mississippiensis*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), warmouth (*Lepomis gulosus*), blue catfish (*Ictalurus furcatus*), channel catfish (*Ictalurus punctatus*), buffalo (*Ictiobus*) spp., freshwater drum (*Aplodinotus grunniens*), eyetail bowfin (*Amia ocellicauda*), and gar (*Lepisosteidae*). Areas supporting stable freshwater fisheries occur in the northern portion of the Penchant Subbasin. Freshwater fishes may also utilize low-salinity areas (intermediate marsh zone), provided they have access to fresher areas during periods of high salinity.

The coastal marshes also provide nursery habitat for many estuarine-dependent commercial and recreational fishes and shellfishes. Because of the protection and abundant food afforded by those wetlands, they are critical to the growth and production of species such as blue crab (*Callinectes sapidus*), white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), Gulf menhaden (*Brevoortia patronus*), Atlantic croaker (*Micropogonias undulatus*), red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), black drum (*Pogonias cromis*), sand seatrout (*Cynoscion arenarius*), spot (*Leiostomus xanthurus*), southern flounder (*Paralichthys lethostigma*), striped mullet (*Mugil cephalus*), and others. Those species are generally most abundant in the brackish and saline marshes; however, blue crab, white shrimp, Gulf menhaden, red drum, and Atlantic croaker and several other species also utilize fresh and low-salinity marshes, especially as juveniles.

Because tidal marshes provide essential nursery habitat, commercial shrimp harvests are positively correlated with the area of tidal emergent wetlands (Turner 1977 and 1982). Future commercial harvests of shrimp and other fishes and shellfishes could be adversely impacted by the high rates of marsh loss throughout the study area (Turner 1982).

The eastern oyster (*Crassostrea virginica*) occurs throughout much of the brackish and saline marsh zones within the study area. Oyster harvesting constitutes a valuable fishery in the northern portions of that zone, where salinities range from 10 to 15 parts per thousand (ppt).

No Action Alternative
Marshes undergoing fragmentation and subsidence would initially benefit fishery resources due to the increase in edge habitat and possibly the increase in organic matter added to the system from dead plant material that serves as a food web base (Browder et al. 1989). However, that edge habitat would decrease when open water area becomes greater than the marsh area (Browder et al. 1985) and therefore the marsh would become less productive over time (Minello and Rozas 2002). Expected salinity increases in the project area would increase the amount of estuarine area available

to estuarine and marine fishery species (Chesney et al. 2000, Zimmerman et al. 2000), but it would also likely exacerbate marsh loss (Chabreck and Linscombe 1982, McKee and Mendelssohn 1989). Increasing salinities could shrink and/or shift the zone for optimal oyster production in areas away from the freshwater influence of the Atchafalya River via the GIWW.

Essential Fish Habitat

Existing conditions
The project is located at least partially within an area identified as Essential Fish Habitat (EFH) by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, Magnuson-Stevens Act; P.L. 104-297). The updated and revised 2006 generic amendment to the Gulf of Mexico Fishery Management Plans, prepared by the Gulf Council , identifies estuarine wetlands and associated waters in the project area that are considered EFH for various life stages of multiple federally managed species. Specific habitat types designated as EFH include estuarine emergent marsh, submerged aquatic vegetation, soft bottom, sand and shell bottom, and associated water column. These habitat types serve as EFH for Federally managed species including brown shrimp, white shrimp, red drum, lane snapper (*Lutjanus synagris*), and gray snapper (*Lutjanus griseus*). The 2017 Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan describes EFH for HMS spatially rather than by habitat type, and estuarine waters in the project area would be considered EFH for bull sharks (*Carcharhinus leucas*).

In addition to being designated as EFH for these species, water bodies and wetlands in the project area provide nursery and foraging habitats supportive of a variety of economically important marine fishery species, such as striped mullet, Eastern oyster, pinfish (*Lagodon rhomboides*), spot, Gulf killifish (*Fundulus grandis*), bay anchovy (*Anchoa mitchilli*), Atlantic croaker, Gulf menhaden, spotted seatrout, sand seatrout, southern flounder (*Paralichthys lethostigma*), black drum (*Pogonias cromis*), white shrimp, brown shrimp, and blue crab. Some of these species also serve as prey for other fish species managed under the Magnuson-Stevens Act by the Gulf Council (i.e., mackerels, snappers, and groupers) and highly migratory species managed by the NMFS (i.e., billfishes and sharks). Wetlands in the project area also produce nutrients and detritus, important components of the aquatic food web, which contributes to the overall productivity and economic value of the estuary.

No Action Alternative
Because much of the marsh habitat in the project area is designated as EFH, the impact to EFH would be comparable to that of fishery resources.

Wildlife Resources

Existing conditions

Numerous species of birds utilize study-area marshes, including large numbers of migratory waterfowl which winter there. Project-area fresh and intermediate marshes provide excellent wintering habitat for migratory waterfowl, especially puddle ducks. For this reason, the North American Waterfowl Management Plan's Gulf Coast Joint Venture has recognized this area, the Terrebonne Unit (which includes fresh and intermediate marshes in this study area), as a key waterfowl wintering area. Brackish marshes having abundant submerged aquatic vegetation may

also support large numbers of puddle ducks. Puddle ducks that occur in the study area include mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), northern pintail (*Anas acuta*), blue-winged teal (*Spatula discors*), green-winged teal (*Anas carolinensis*), American wigeon (*Mareca americana*), wood duck (*Aix sponsa*), and northern shoveler (*Spatula clypeata*). The resident mottled duck (*Anas fulvigula*) also utilizes project-area coastal marshes. Diving ducks prefer larger ponds, lakes, and open water areas. Common diving duck species include lesser scaup (*Aythya affinis*), canvasback (*Aythya valisineria*), redhead (*Aythya americana*), ring-necked duck (*Aythya collaris*), red-breasted merganser (*Mergus serrator*), common merganser (*Mergus merganser*), and hooded merganser (*Lophodytes cucullatus*). The snow goose (*Anser caerulescens*) and the greater white-fronted goose (*Anser albifrons*) also utilize coastal marshes. Other migratory game birds found in coastal marshes include the king rail (*Rallus elegans*), clapper rail (*Rallus crepitans*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), American coot (*Fulica americana*), common moorhen (*Gallinula chloropus*), and common snipe (*Gallinago gallinago*).

Marshes and associated shallow open-water areas provide habitat for a number of wading birds, shorebirds, seabirds, and other nongame birds. Common wading birds include the little blue heron (*Egretta caerulea*), great blue heron (*Ardea herodias*), green-backed heron (*Butorides striatus*), yellow-crowned night heron (*Nyctanassa violacea*), black-crowned night heron (*Nycticorax nycticorax*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), reddish egret (*Egretta rufescens*), white-faced ibis (*Plegadis chihi*), white ibis (*Eudocimus albus*), and roseate spoonbill (*Platalea ajaja*). Shorebirds include the killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), common snipe (*Gallinago gallinago*), and various species of sandpipers (*Scolopacidae*) including western sandpiper (*Calidris mauri)*. Seabirds include American white pelican (*Pelecanus erythrorhynchos*), brown pelican (*Pelecanus occidentalis*), black skimmer (*Rynchops niger*), herring gull (*Larus argentatus*), laughing gull (*Leucophaeus atricilla*), and several species of terns (*Sterna*). Other nongame birds such as boat-tailed grackle (*Quiscalus major*), red-winged blackbird (*Agelaius phoeniceus*), seaside sparrow (*Ammospiza maritima*), neotropic cormorant (*Phalacrocorax brasilianus*), northern harrier *(Circus hudsonius*), belted kingfisher (*Megaceryle alcyon*), and sedge wren (*Cistothorus platensis*) also utilize coastal areas.

Common mammals occurring in the coastal marshes include nutria (*Myocastor coypus*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), river otter (*Lontra canadensis*), raccoon (*Procyon lotor*), swamp rabbit (*Sylvilagus aquaticus*), white-tailed deer (*Odocoileus virginianus*), and coyote (*Canis latrans*).

Reptiles are most abundant in fresh and low-salinity coastal wetlands. Common species include the American alligator (*Alligator mississippiensis*), cottonmouth (*Agkistrodon piscivorus*), water snakes (*Nerodia*), mudsnake (*Farancia abacura*), speckled kingsnake (*Lampropeltis holbrooki*), western ribbon snake (*Thamnophis proximus*), Texas ratsnake (*Pantherophis obsoletus*), red-eared slider (*Trachemys scripta elegans*), common snapping turtle (*Chelydra serpentina*), alligator snapping turtle (*Macrochelys temminckii*), common mud turtle (*Kinosternon subrubrum*), and spiny softshell turtle (*Apalone spinifera*). Amphibians commonly found in the area include the American bullfrog (*Lithobates catesbeianus*), pig frog (*Lithobates grylio*), bronze frog (*Lithobates clamitans*), southern leopard frog (*Lithobates sphenocephalus*), cricket frogs (*Acris*), tree frogs (*Hyla*), chorus frogs (*Pseudacris*), three-toed amphiuma (*Amphiuma tridactylum*), sirens (*Siren*), and several species of toads. The American alligator may also occur in brackish marshes, and the diamond-backed terrapin

(*Malaclemys terrapin*) and salt marsh snake (*Nerodia clarkii*) are found in brackish and saline marshes.

Forested wetlands and scrub-shrub areas provide habitats for songbirds such as the mockingbird (*Mimus polyglottos*), yellow-billed cuckoo (*Coccyzus americanus*), northern parula (*Setophaga americana*), yellow-rumped warbler (*Setophaga coronata*), prothonotary warbler (*Protonotaria citrea*), white-eyed vireo (*Vireo griseus*), Carolina chickadee (*Poecile carolinensis*), and tufted titmouse (*Baeolophus bicolor*). Additionally, these areas also provide important resting and feeding areas for songbirds migrating across the Gulf of America. Other avian species found in forested wetlands include the American woodcock (*Scolopax minor*), common flicker (*Colaptes auratus*), brown thrasher (*Toxostoma rufum*), belted kingfisher (*Megaceryle alcyon*), loggerhead shrike (*Lanius ludovicianus*), pileated woodpecker (*Dryocopus pileatus*), red-headed woodpecker (*Melanerpes erythrocephalus*), downy woodpecker (*Dryobates pubescens*), common grackle (*Quiscalus quiscula*), and American crow (*Corvus brachyrhynchos*). Numerous other bird species use forested wetlands throughout the study area.

Forested habitats and associated waterbodies also support raptors such as the red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), Mississippi kite *(Ictinia mississippiensis*), northern harrier, screech owl (*Megascops asio*), great horned owl (*Bubo virginianus*), and barred owl (*Strix varia*). Wading bird colonies typically occur in cypress swamp and scrub-shrub habitat. Species found in those nesting colonies include anhinga (*Anhinga anhinga*), great egret (*Ardea alba*), great blue heron, black-crowned night heron, tricolored heron (*Egretta tricolor*), little blue heron, cattle egret, snowy egret, white-faced ibis (*Plegadis chihi*) and glossy ibis (*Plegadis falcinellus*), and reddish egret. Waterfowl species found in forested wetlands and adjacent waterbodies in the project area include, but are not limited to, wood duck, mallard, green-winged teal, gadwall, and hooded merganser.

Game mammals associated with forested wetlands include eastern cottontail (*Sylvilagus floridanus*), swamp rabbit, gray squirrel (*Sciurus carolinensis*) and fox squirrels (*Sciurus niger*), and white-tailed deer. Commercially important fur bearers include river otter, muskrat, nutria, mink, and raccoon. Other mammals found in forested wetlands include striped skunk (*Mephitis mephitis*), coyote, Virginia opossum (*Didelphis virginiana*), bobcat (*Lynx rufus*), armadillo (*Dasypus novemcinctus*), gray fox (*Urocyon cinereoargenteus*), and red bat (*Lasiurus borealis*). Smaller mammal species serve as forage for both mammalian and avian carnivores and include the cotton rat (*Sigmodon hispidus*), marsh rice rat (*Oryzomys palustris*), white-footed deermouse (*Peromyscus leucopus*), eastern wood rat (*Neotoma floridana*), eastern harvest mouse (*Reithrodontomys humulis*), least shrew (*Cryptotis parva*), and southern flying squirrel (*Glaucomys volans*).

Reptiles which utilize study area bottomland hardwoods, cypress swamps, and associated shallow water include the American alligator, ground skink (*Scincella lateralis*), five-lined skink (*Eumeces fasciatus*), broad-headed skink (*Eumeces laticeps*), green anole (*Anolis carolinensis*), Gulf coast ribbon snake (*Thamnophis proximus orarius*), yellow-bellied water snake (*Nerodia erythrogaster flavigaster*), speckled kingsnake, southern copperhead (*Agkistrodon contortrix contortrix*), cottonmouth, pygmy rattlesnake (*Sistrurus miliarius*), broad-banded water snake (*Nerodia fasciata confluens*), diamond-backed water snake (*Nerodia rhombifer*), spiny softshell turtle, red-eared slider, southern painted turtle (*Chrysemys dorsalis*), mud turtle, stinkpot (*Sternotherus odoratus*), common snapping turtle and alligator snapping turtle, in addition to numerous other species.

Some of the amphibians believed to be in study-area forested wetlands include dwarf salamander (*Eurycea quadridigitata*), three-toed amphiuma, lesser siren (*Siren intermedia*), central newt (*Notophthalmus viridescens louisianensis*), Gulf coast toad (*Incilius nebulifer*), eastern narrow-mouthed toad (*Gastrophryne carolinensis*), green treefrog (*Hyla cinerea*), squirrel treefrog (*Hyla squirella*), pig frog, bullfrog, southern leopard frog, bronze frog, upland chorus frog (*Pseudacris feriarum*), southern cricket frog (*Acris gryllus gryllus*), and spring peeper (*Pseudacris crucifer*).

Most developed areas provide low-quality wildlife habitat. Sites developed for agricultural purposes are located on low ridges and on lower elevation areas that have improved drainage. In agricultural areas, wildlife habitat is primarily provided by unmaintained ditch banks and field edges, fallow fields, pasture lands, and rainfall-flooded fields. Cultivated crops, especially soybeans, provide forage for some wildlife species. Game species that utilize agricultural lands include the white-tailed deer, mourning dove (*Zenaida macroura*), northern bobwhite (*Colinus virginianus*), eastern cottontail, and common snipe. Seasonally flooded cropland and fallow fields may provide important feeding habitat for wintering waterfowl, wading birds, and other waterbirds.

Wildlife with Conservation Concerns
Many of the wildlife resources that may occur in the project area are species with conservation concern in Louisiana. These include reddish egret, gull-billed tern (*Gelochelidon nilotica*), black skimmer, mottled duck, bobwhite, little blue heron, roseate spoonbill, king rail, sandwich tern, seaside sparrow, bald eagle, red head, lesser scaup, and dickcissel. Additionally: northern pintail, gadwall, lesser scaup, blue-winged teal, mottled duck, redhead, northern bobwhite, loggerhead shrike, seaside sparrow, western sandpiper, reddish egret, little blue heron, king rail, gull-billed tern and black skimmer are considered priority species by the Gulf Coast Joint Venture.

No Action Alternative
All types of marsh (fresh, intermediate, brackish and saline), swamp and BLH would continue to be lost at the current rate under the No Action Alternative. Over time, small mammals, ground dwelling birds, and the few amphibians and reptiles that may use those habitats would be displaced by the removal of marsh and scrub-shrub. Additionally, the loss of forested wetland habitat in the area would decrease the amount of feeding, roosting, and nesting habitat for birds in the area.

Endangered and Threatened Species

West Indian Manatee (Trichechus manatus) – Threatened – Marine Mammal (Protection Act)
The threatened West Indian manatee (*Trichechus manatus*) is known to regularly occur in Lakes Pontchartrain and Maurepas and their associated coastal waters and streams. It also can be found less regularly in other Louisiana coastal areas, most likely while the average water temperature is warm. Based on data maintained by the LDWF Wildlife Diversity Program, approximately 84 percent of reported manatee sightings (1990-2019) in Louisiana have occurred from the months of June through December. Manatee occurrences in Louisiana appear to be increasing and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of southeastern Louisiana. Manatees may also infrequently be observed in the Mississippi River and coastal areas of southwestern Louisiana. Cold weather and outbreaks of red tide may adversely affect these animals. However, human activity is the primary

cause for declines in species number due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution.

During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable.

All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). We recommend the following to minimize potential impacts to manatees in areas of their potential presence:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).

- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at “no wake/idle” speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.

- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.

- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8½ " X 11" reading language similar to the following: “CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT”. A second temporary sign measuring 8½ " X 11” should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: “CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION”.

- To ensure manatees are not trapped due to construction of containment or water control structures, we recommend that the project area be surveyed prior to commencement of work activities. Should manatee be observed within those areas, the contractor should immediately contact the Service’s Louisiana Ecological Services Office (337/291-3100) and

the LDWF, Wildlife Diversity Program (225/765-2821).

- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service's Louisiana Ecological Services Office (337/291-3100) and the LDWF, Wildlife Diversity Program (225/765-2821). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

Eastern Black Rail (Laterallus jamaicensis ssp. Jamaicensis) – Threatened
The eastern black rail (*Laterallus jamaicensis jamaicensis*) occupies high marsh habitats, with soils moist or flooded to a shallow depth. The subspecies requires dense vegetative cover (i.e., greater than 6 stems at 10-20 cm) that allows movement underneath the canopy, and because birds are found in a variety of salt, brackish, and freshwater wetland habitats that can be tidally or non-tidally influenced, plant structure is considered more important than plant species composition in predicting habitat suitability (Flores and Eddleman 1995). Impounded intermediate marshes of the Gulf Coast Chenier Plain of Louisiana and Texas are typified by dominance of salt meadow cordgrass (*Spartina patens*) (Gabrey et al. 2001, p. 220), while unimpounded intermediate marshes include both salt meadow cordgrass and gulf cordgrass (*Spartina spartinae*). In addition, shallow pools that are 1-3 cm deep may be the most optimal for foraging and for chick-rearing. Some elevational variability in the substrate is needed; eastern black rails require elevated refugia with dense cover to survive high water events due to the propensity of juvenile and adult black rails to walk and run rather than fly and chicks' inability to fly. If the Proposed Action would directly or indirectly affect the eastern black rail or its habitat, further consultation with the Service will be necessary.

At-Risk Species
The Service's Southeast Region has defined "at-risk species" as those that are: 1) proposed for listing under the ESA by the Service; 2) candidates for listing under the ESA, which means the species has a "warranted but precluded 12-month finding"; or 3) petitioned for listing under the ESA, which means a citizen or group has requested that the Service add them to the list of protected species. Petitioned species include those for which the Service has made a substantial 90-day finding as well as those that are under review for a 90-day finding. As the Service develops proactive conservation strategies with partners for at-risk species, the states' Species of Greatest Conservation Need (defined as species with low or declining populations) will also be considered.

The Service's goal is to work with private and public entities on proactive conservation to conserve these species, thereby precluding the need to federally list as many at-risk species as possible. While not all species identified as at-risk will become ESA listed species, their potentially reduced populations warrant their identification and attention in project planning. Listed below are species currently designated as "at-risk" that may occur within the proposed study area.

Proposed Species

Alligator Snapping Turtle
The alligator snapping turtle (AST, *Macrochelys temminckii*) has a wide geographic range and occurs in bayous, rivers, streams, swamps, and lakes in Texas, Louisiana, Oklahoma, Arkansas, Missouri, Illinois, Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida. They prefer

water bodies (small streams [perennial], bayous, canals, swamps, lakes, reservoirs, ponds, and oxbows) with overhang banks and adjacent riparian forest, especially bald cypress bordered banks. Sections of waterways with steep-sloped banks, or those lined with concrete, stone, etc. are likely avoided, especially when there are no trees on the bank. However, relatively short sections of non-preferred bank composition do not necessarily preclude occupation of the entire waterway. They may venture onto the adjacent floodplain during high water events. Although they have been found at the edge of the Gulf of America, coastal marshes and saline water are not their preferred habitat type. They also prefer waterbodies with snags and submerged logs, tree root masses, or other debris in the water. Adults generally stick to deeper water (enough to cover their body to deeper than 20ft), but in areas with deep, loose mud, they have been found in 10 inches of water with a mud layer of several feet. Juveniles can be found in shallow streams less than 1 foot deep. AST are sensitive to water temperature and will change locations as needed to thermoregulate. AST generally stay on the water bottom, but they do move along the bottom and can travel considerable distances (miles) in just days or weeks. Trapping surveys are generally effective at locating AST, but lack of capture, especially during short-term limited area survey efforts, does not confirm absence.

AST rarely leave the water except for nesting females generally from April to early July (typically April-May in southern parts of the range including Louisiana and May-July in north/western portion of the range). Egg incubation time is generally between 96 and 143 days. Nesting areas may have varying amounts of canopy cover. Nests are generally located between 4 and 656 feet from the water line, and more likely less than 300 feet from the water line.

Alligator snapping turtle is considered vulnerable (S3) by LDWF. LDWF recommends minimizing disturbance and alteration of nesting habitat, particularly during nesting season (April – June). Nesting typically occurs close to riverbanks and lake shores. Additionally, LDWF recommends minimize removal of log jams in streams, as woody debris provides cover and hunting areas used by this species. Stream alteration should be avoided to protect turtle habitat. If dredging is needed, material should be dumped away from potential turtle nesting sites or dumped prior to egg laying (May – early June). Please contact Keri Lejeune at 337-735-8676 for more information.

Should the proposed project directly or indirectly affect the alligator snapping turtle or its habitat, further conference with this office will be necessary.

Candidate Species

Monarch Butterfly
The monarch butterfly (*Danaus plexippus*) is a candidate species and not yet listed or proposed for listing. Consultation with U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act is not required for candidate species, like the monarch. We encourage agencies, however, to take advantage of any opportunity they may have to conserve the species.

On June 20, 2014, President Obama signed a Presidential Memorandum, “Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators,” outlining an expedited agenda to address the devastating declines in honey bees and native pollinators, including the monarch butterfly. Recent research has shown dramatic declines in monarchs and their habitats leading conservation groups to petition the Service to list the species under Endangered Species Act (ESA). Ensuring adequate and sustainable habitats, meeting all the life history needs of these

species is of paramount importance. The Service and its partners are taking immediate actions to replace and restore monarch and pollinator habitat on both public and private lands across the U.S. landscape. Therefore, the Service recommend revegetation of disturbed areas with native plant species, including species of nectar-producing plants and milkweed endemic to the area, we recommend consultation with state botanists to determine appropriate species where possible.

Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA)

There are several species found throughout the project area that are protected under the Migratory Bird Treaty Act (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and/or the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d), including bald eagle, brown pelican and other colonial nesting birds, and most native bird species.

Care should be taken to avoid impacts to bald eagles and their nesting habitat. Prior to and during any project construction, on-site personnel should be informed of the possible presence of nesting bald eagles in the vicinity of the project boundary, and should identify, avoid, and immediately report any such nests to this office. Prior to construction, the Service and the LDWF recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nests during the nesting season (October through mid-May). If a bald eagle nest occurs or is discovered within 1,500 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line using the Service's guidance and determination tool. Any take should be reported to this office and the LDWF. Bald eagle nest (active, inactive, or seemingly abandoned) should be protected, and no large trees should be removed.

Colonial Nesting Waterbirds

In accordance with the Migratory Bird Treaty Act of 1918 (as amended) and FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), please be advised that the project area is located in habitats which are commonly inhabited by colonial nesting waterbirds and/or seabirds.

Please be aware that entry into or disturbance of active breeding colonies is prohibited by the LDWF. In addition, LDWF prohibits work within a certain radius of an active nesting colony.

Colonies may be present that are not currently listed in the database maintained by the LDWF. Though the waterbird colony database is extensive and updated often, colony nesting site locations are very fluid, particularly, in marsh habitats where late nesters or new colonies can be established between surveys. Due to the difficult nature of documenting all nesting colonies, the Service recommends that a qualified biologist inspect the proposed construction site for the presence of documented and undocumented nesting colonies during the nesting season of each year that project construction is ongoing. This field visit should take place no more than two weeks before project construction begins.

Following the field visit a survey report should be provide LDWF and the Service which is to include the following information:

1. qualifications of survey personnel;

2. survey methodology including dates, site characteristics, and size of survey area;
3. species of birds present, activity, estimates of number of nests present, and general vegetation type including digital photographs representing the site; and
4. topographic maps and ArcGIS shapefiles projected in UTM NAD83 Zone 15 to illustrate the location and extent of the colony.

Please email to the Service and mail survey reports by electronic mail to:

Wildlife Diversity Program
La. Dept. of Wildlife & Fisheries
P.O. Box 98000
Baton Rouge, LA 70898-9000

To minimize disturbance to colonial nesting birds, the following conservation measures should be considered:

1. For colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present).

2. For colonies containing nesting gulls, terns, and/or black skimmers, all activity occurring within 650 feet of a rookery should be restricted to the non-nesting period (i.e., September 16 through April 1, exact dates may vary within this window depending on species present).

In addition, we recommend that on-site contract personnel including project-designated inspectors be trained to identify colonial nesting birds and their nests and avoid affecting them during the breeding season (i.e., the time period outside the activity window). Should on-site contractors and inspectors observe potential nesting activity, coordination with the LDWF and the Service should occur. If no nesting colonies are found within 1,000 feet (2,000 feet for Brown Pelicans) of the proposed project, no further consultation with LDWF and the Service will be necessary. If you have any questions or need additional information on birds from LDWF, please contact Rob Dobbs (337/735-8675).

Migratory Birds
The Migratory Bird Treaty Act (MBTA) prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (https://fwsepermits.servicenowservices.com/fws). The following migratory birds may be present at your project location at certain times of the year (Table 2).

Table 2: Migratory birds of note in study area.

Common Name	**Species name**	**Breeding Season**
Bald Eagle	*Haliaeetus leucocephalus*	Sep1 to Jul 31
Chimney Swift	*Chaetura pelagica*	Mar 15 to Aug 25
Dickcissel	*Spiza americana*	May 5 to Aug 31

Gull-billed Tern	*Gelochelidon nilotica*	May 1 to Jul 31
Kentucky Warbler	*Oporornis formosus*	Apr 20 to Aug 20
Lesser Yellowlegs	*Tringa flavipes*	Breeds Elsewhere
Little Blue Heron	*Egretta caerulea*	Mar 10 to Oct 15
Painted Bunting	*Passerina ciris*	Apr 25 to Aug 15
Pectoral Sandpiper	*Calidris melanotos*	Breeds elsewhere
Prairie Warbler	*Dendroica discolor*	May 1 to Jul 31
Prothonotary Warbler	*Protonotaria citrea*	Apr 1 to Jul 31
Reddish Egret	*Egretta rufescens*	Mar 1 to Sep 15
Rusty Blackbird	*Euphagus carolinus*	Breeds elsewhere
Sandwich Tern	*Thalasseus sandvicensis*	Apr 25 to Aug 31
Swallow-tailed Kite	*Elanoides forficatus*	Mar 10 to Jun 30
Wood Thrush	*Hylocichla mustelina*	May 10 to Aug 31

Refuges and Wildlife Management Areas and CWPPRA Projects

The Service administers 10 National Wildlife Refuges (NWR) encompassing more than 301,700 acres in coastal Louisiana. As proposed in the USACE's It is likely the proposed levee construction for Reach A of the MTG project will impact Mandalay NWR. Detailed information about potential impacts can be found in the Service's April 5, 2024, FWCA report that assessed Reach A. Should levee construction fall within the Mandalay NWR, said construction would not be compatible with the purposes for which the refuge was established. The Service recommends that the USACE coordinate further with the Service through the NEPA process and avoid impacts on the Mandalay NWR. If impacts cannot be avoided, mitigation for impacts will need to be located on the Mandalay NWR. Please coordinate all activities that could be planned to take place on Mandalay NWR with refuge staff and with Mr. Pon Dixon, Project Leader of the Bayou Sauvage Urban NWR Complex (985/882-2014).

The LDWF operates 17 refuges, preserves, and wildlife management areas (WMA) in coastal Louisiana, comprising more than 572,000 acres. The Pointe aux Chenes WMA is in the Timbalier Subbasin within the project area. It extends from Bayou Terrebonne eastward to the existing hurricane protection levee along Bayou Lafourche. Construction of Reaches J, K, and L of the Proposed Action levee alignment and multiple water control structures would impact the WMA. The Service recommends avoiding or minimizing impacts on the Pointe aux Chenes WMA. Please coordinate all activities that may take place on Pointe aux Chenes WMA with the appropriate LDWF staff.

According to information available at https://coastal.la.gov/ (accessed February 13, 2025) 38 CWPPRA projects have been constructed or implemented in the project area including hydrologic restoration, marsh creation and nourishment, water diversion, vegetative planting, barrier island restoration, shoreline protection, and herbivory control. Three (North Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management, West Lake Boudreaux Shoreline Protection

and Marsh Management, Mandalay Bank Protection Demonstration) of those projects would likely be impacted by construction of the Proposed Action. The Service recommends working with CWPPRA project managers to find ways to avoid or minimize impacts to those projects.

EVALUATION METHODOLOGY

To quantify anticipated direct project impacts to fish and wildlife resources, the Service used the 2017 (version 2) USACE Approved Wetland Value Assessment (WVA) models. The WVA model was developed to evaluate restoration projects proposed for funding under Section 303 of the CWPPRA and was modified through the USACE approval process for use in the USACE planning process. These models are approved for regional use on USACE Civil Works projects. Further information on this model may be obtained from the USACE's New Orleans District, Regional Planning and Environmental Division South at https://ecolibrary.sec.usace.army.mil/ (use the search term "WVA"). The WVA quantifies changes in fish and wildlife habitat quality and quantity that are expected to result from a proposed project. The WVA operates under the assumption that optimal conditions for fish and wildlife habitat within a given coastal wetland habitat type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of community models developed specifically for each habitat type. The results of the WVA, measured in Average Annual Habitat Units (AAHUs), can be combined with cost data to provide a measure of the effectiveness of a project in terms of cost per AAHU gained or lost.

The WVA community models have been designed to function at a community level and therefore attempt to define an optimum combination of habitat conditions for all fish and wildlife species utilizing a given habitat type. The WVA models operate under the assumption that optimal conditions for 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 to provide an index of habitat quality. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index (SI) 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 habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI. The output of each model (the HSI) is assumed to have a linear relationship with the suitability of a coastal wetland system in providing fish and wildlife habitat. The WVA models assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. This standardized, multi-species, habitat-based methodology facilitates the assessment of project-induced impacts on fish and wildlife resources.

Field data were used in conjunction with the above-discussed mathematical models to compute an HSI value for each target year (TY). Target years were established when significant changes in habitat quality or quantity were expected during the 61-year project life, under future with-project and future without-project conditions.

The product of an HSI value and the acreage of available habitat for a given target year is known as the Habitat Unit (HU). The HU is the basic unit for measuring project effects on fish and wildlife habitat. Future HUs change according to changes in habitat quality and/or quantity. Results are

annualized over the project life to determine the Average Annual Habitat Units (AAHUs) available for each habitat type.

The change (increase or decrease) in AAHUs for each future with-project scenario, compared to future without-project conditions, provides a measure of anticipated impacts. A net gain in AAHUs indicates that the project is beneficial to the habitat being evaluated; a net loss of AAHUs indicates that the project is damaging to that habitat type. In determining future with-project conditions, all project-related direct (construction) impacts were assumed to occur in Target Year 1.

Five types of USACE certified wetland value assessments (WVAs) were used to determine direct impacts to fish and wildlife resources: swamp, bottomland hardwood (BLH), and saline, brackish, and fresh/intermediate marsh models.. For all WVAs, data was collected both in the field, using satellite imagery, and Coastwide Reference Monitoring System (CRMS) data.

The WVA brackish and saline marsh model consists of six variables: 1) percent of wetland covered by emergent vegetation; 2) percent open water dominated by submerged aquatic vegetation (SAV); 3) degree of marsh edge and interspersion; 4) percent of open water less than or equal to 1.5 feet deep; 5) mean high salinity during the growing season; and 6) aquatic organism access. The WVA model for swamp consists of seven variables: 1) stand structure; 2) stand maturity; 3) water regime; 4) mean high salinity during the growing season; 5) size of contiguous forested area; 6) Suitability and traversability of surrounding land uses and 7) disturbance. The WVA model for bottomland hardwood consists of seven variables: 1) tree species composition; 2) stand maturity; 3) understory/midstory cover; 4) hydrology; 5) size of contiguous forested area; 6) Suitability and traversability of surrounding land uses and 7) disturbance. Changes in each variable are predicted for future without-project and future with-project scenarios over a 60-year project life. By incorporating variables for SAV and shallow open water into each of the marsh models, impacts to those habitat components are combined with impacts to emergent marshes. Because emergent marsh is of higher overall fish and wildlife value than SAV, and because SAV is of higher value than shallow open water, those latter components receive proportionally less weight when combined into one AAHU value. The swamp and BLH models do not include SAV or shallow open water variables; hence, impacts to those habitats are not included in the WVA analysis for swamp.

Specific explanations and procedures for how abiotic and biotic data was gathered and prepared for inclusion into WVA models are included in the overarching project information sheets (OPIS) and the individual reach project information sheets (PIS) which document those processes. Estimates of future water level or inundation used in the WVAs were based on the USACE medium sea level rise (SLR) scenario for reporting, however low and high SLR scenarios were also analyzed. Further explanation of how impacts/benefits are assessed within the WVA process and an explanation of the assumptions affecting HSI values for each target year will be available for review at the Service's Louisiana Ecological Services field office website (ServCat - Project - (Code: 185272)).

PROJECT IMPACTS

Direct Impacts

Construction of levees, floodwalls, water control structures, two haul route roads, and surrounding ROW, is expected to directly impact marsh, swamp, and BLH habitat. Acres lost would range from 2,177 (-620 AAHUs) for saline marsh to 178 (-120 AAHUs) for swamp and total 4,659 (-1,398

AAHUs) for the Proposed Action (Table 2). Note that the AAHUs have been calculated but have not been reviewed by the interagency habitat evaluation team (HET) which could result in minor adjustments in AAHUs. HET-reviewed AAHU values for the impacted habitats will be included in the final FWCA report.

Table 3. Wetland impacts within the Proposed Action Construction Footprint.

Wetland Habitat Classification	AAHUs	Acres
BLH	-147.3	324
Swamp	-120.4	178
Fresh/Intermediate Marsh	-421.6	1516
Brackish marsh	-88.3	464
Saline Marsh	-620.2	2177
Total	**-1397.7**	**4659**

Table 4. Forested Wetland Impacts within the Proposed Action Construction Footprint (levee and structures) by Reach and habitat type.

Reach	Habitat	AAHU	Existing Wetland Habitat Acres
Barrier	BLH	-80.1	170
Barrier	Swamp	-50.8	84
B	BLH	-2.2	8
E	BLH	-4.0	9
G	BLH	-0.4	3
H	BLH	-8.4	21
I	BLH	-1.1	4
J	BLH	-0.1	1
Lockport to Larose	Swamp	-67.2	90
Lockport to Larose	BLH	-50.5	107
Lockport to Larose Haul_Route	BLH	-0.1	0
Larose C-North	Swamp	-2.3	4
Larose C-North	BLH	-0.2	1
Total Direct BLH	BLH	**-147.3**	**324**
Total Direct Swamp	Swamp	**-120.4**	**178**
Total Forested Direct	Both	**-267.6**	**502**

Table 5. Direct marsh impacts within the Proposed Action Construction Footprint (levee and structures) by reach and habitat type.

Reach	Habitat	AAHU	Existing Wetland Habitat Acres
Barrier	Fresh/Int	-98.2	222
B	Fresh/Int	-80.8	245
E	Fresh/Int	-41.3	254
F	Brackish	-32.5	85
G	Saline	-391.8	1050
G	Brackish	-7.2	28
H	Fresh/Int	-5.5	19
H	Saline	-116.4	365
I	Saline	-59.6	376
J	Fresh/Int	-16.8	141
J	Saline	-52.4	386
K	Brackish	-48.6	351
L	Fresh/Int	-82.8	395
Lockport to Larose	Fresh/Int	-88.1	191
Lockport to Larose Haul Route	Fresh/Int	-0.1	0
Larose C-North	Fresh/Int	-8.0	49
Total Direct Fresh/Int Marsh		**-421.6**	**1516**
Total Direct Brackish Marsh		**-88.3**	**464**
Total Direct Saline Marsh		**-620.2**	**2177**
Total Direct Marsh		**-1130.1**	**4157**

Potential borrow sites have been identified by the USACE to provide material for construction of the MTG earthen levee (Appendix B). The borrow sites delineated by the USACE appear to largely avoid fish and wildlife habitat, but some sites appear to contain some BLH and possibly other habitat types. The USACE has indicated that no wetland or forested habitat would be impacted by borrow excavation. If it is determined that fish and wildlife habitat would be impacted, the USACE would coordinate further with the Service to ensure that the required mitigation is implemented.

Indirect Impacts

Most of the project area currently has levees and water control structures that divide it into a flood side and protected side. Notable exceptions include substantial portions of the Barrier Reach, Reach A, Reach L, and the L2L Reach. The flood gates and environmental control structures are intended to provide the same amount of water flow through the levee system as the existing condition (No action alternative) under typical weather and water level conditions. High water levels and high salinity (HNC flood gate only) (see section Proposed Action above) would trigger structure closures. The temporary closure of the MTG system would protect wetlands and people from storm surge energy, excess inundation, and excess saline water, but some negative indirect impacts would result from the complete enclosure of the project area due to the Proposed Action.

The Service's 2002 FWCA report indicated the potential for indirect impacts, but quantification of those impacts was not possible at that time. Further study of potential hydrologic impacts associated with the MTG in the 2013 PACR led to an estimate of the loss of 200 or more AAHUs due to the

indirect effects of the MTG project, but the Service recommended that indirect impacts should be refined during the engineering and design phase.

For the SEIS, the USACE conducted several hydrologic modelling studies to examine potential effects of the Proposed Action and existing conditions (No Action Alternative), including the Morganza to the Gulf, Adaptive Hydraulics Modelling of Hydrodynamics and Salinity for Historical, Existing, and Proposed Conditions (AdH) model. Some caveats and limitations to that study include: the potential loss of accuracy toward the east side of the modelled area (GIWW East), the model only considered the system to have all water control structures either open or closed at the same time, uncertainty of sea level rise predictions, salinity estimates should only be used for relative comparisons. Overall, the AdH model predicted a difference in average salinity, of 1 to 2 ppt and a difference in maximum salinity of 5 ppt in 2035 and 10 ppt in 2085 between existing conditions and the Proposed Action. The largest differences were salinity reduction and discharge increase with the Proposed Action at the eastern boundary of the project area in the area outside of the MTG levee. Because the relatively small decreases of salinity that would occur in brackish marsh, impacts due to the Proposed Action would be minimal.

A Hydrologic Engineering Center River Analysis System (HEC-RAS) hydrologic model was used to simulate typical tidal and rainfall conditions. Model scenarios for existing conditions and with the Proposed Action for 2035 and 2085 sea levels were run. The results of that hydrologic model have been analyzed for most, but not all, aspects of the effects of the proposed action. The modeling has provided enough information to indicate potential areas of indirect wetland impacts. Year 2021 National Land Cover Data (NLCD) was used to delineate marsh vs forest vs other habitat types that would be potentially impacted. Preliminary review indicates nearly 6,000 acres of forested wetlands and just under 14,700 acres of marsh may be indirectly impacted. However, time did not allow for appropriate impacts analysis yet, which will be completed prior to the Final SEIS.

The “Morganza to the Gulf of Mexico: Larval Aquatic Organisms Transport Study” used the Particle Tracking Model to predict movement aquatic larval organisms in and out of the MTG system for historical, existing (No Action Alternative), and Proposed Action with the HNC Lock Complex either open or closed. All model scenarios assumed that all other structures were open. Particle behavior did not appear to be the most influential factor in determining recruitment level. The historical scenario produced the greatest recruitment as expected because many existing and proposed water control structures did not exist at that time. Existing conditions and Proposed Action scenarios did not differ greatly, and recruitment varied among checkpoints and seasonal model runs. Some checkpoints had greater recruitment with the Proposed Action scenario, whereas other checkpoints had greater recruitment with the No Action or existing conditions scenario. In general, recruitment was greater for March than September for all model runs. The overall recruitment into the system did not change significantly with the HNC closed simulation run. Particles were able to enter the system through Bayou Grand Calliou, bypassing the HNC lock complex. No significant impacts to larval organism transport are expected, but some potential shortcomings or modelling artifacts were noted.

The environmental control structures and floodgates of the system will be closed when the water level reaches either 2.5 ft NAVD88 or 3.0 ft NAVD88, depending on the structure location and type. Currently, the trigger for structure and gate closures would likely be in anticipation of tropical storm events, therefore, it is not expected that the Proposed Action would cause the closure of the

system more often due to higher daily water level fluctuations. It is unknown at present how water levels within the system would be managed if a change in operation due to relative sea level rise (RSLR) is realized. Increased closures have not been assessed for hydrologic or wetland impacts. However, closing the system to tidal influence and from fresh oxygenated water from the Atchafalaya River via the GIWW could cause negative impacts such as soil toxicity caused by hypoxic or anoxic conditions. Those conditions could lead to emergent marsh plant death especially in the more saline marshes. Hence, we are concerned that there is a potential for substantial additional indirect impacts to wetland habitat and fish and wildlife resources to occur. The Service recommends the USACE continue to coordinate with our office on new studies in regard to operations of structures and gates. The Service requests that the USACE provide annual reports on structure operations indicating the number of days per year (and season) that structures and gates are closed. If structures are closed more than 30 times a year (nonconsecutively), the USACE should study the need for potential operational changes, assess additional wetland impacts, and the need for more mitigation while continuing to coordinate with the Service.

Fishery Resources

Construction of the Proposed Action would remove marsh habitat and alter wetland hydrology. Some aquatic organisms would be killed, and others would be displaced to other marsh areas that could vary in quality compared to the areas removed. Through coordination of USACE the Service and NMFS, direct impacts to marsh habitat from the construction of the Proposed Action have been minimized. Water level and salinity changes would likely cause some mobile aquatic organisms to move to other areas and potentially cause stress to sessile organisms such as oysters. The level of impact cannot be estimated at this time.

Essential Fish Habitat

EFH would be lost due the construction of the Proposed Action, negatively impacting some fish species. Through coordination of the USACE, the Service and the NMFS, the agencies have attempted to minimize direct impacts to habitat from the construction of the Proposed Action. Total direct impacts to EFH include the loss of 2,495 acres of brackish and saline marsh (Table 3). Indirect impacts to enclosed marshes are still being studied. The USACE should mitigate for all impacts to essential fish habitat and continue to coordinate with the Service and NMFS when developing water control structure operational plans that might lead to increased impacts.

Wildlife

Through coordination of the USACE, the Service, and the NMFS, the agencies have attempted to minimize direct impacts to habitat from the construction of the Proposed Action. Wildlife will likely be disturbed during levee construction. More mobile species would flee the area during construction, others would be killed or injured by heavy machinery. The majority of the permanent impacts would be removal of plant life that constitutes the habitat of animals in the area. Wildlife will likely return to areas post construction but will face the loss and fragmentation of linear strips of habitat. Many displaced animals would likely find similar suitable habitat that exists along the levee alignment.

Threatened and Endangered Species

The USACE is responsible for determining whether the Proposed Action is likely (or not likely) to adversely affect any listed species and/or critical habitat, and for requesting the Service's concurrence with that determination. If USACE determines that the selected alternative is likely to adversely affect listed species and/or critical habitat, a request for formal consultation in accordance with Section 7 of the ESA should be submitted to the Service. That request should also include USACE's rationale supporting their determination.

Migratory Bird Treaty Act (MBTA) and Bald and Eagle Protection Act (BGEPA)

During project construction, the Service recommends that on-site contract personnel be informed of the need to identify nesting bald eagles and colonial nesting birds and their nests and should avoid affecting them during the breeding season. For specific details reference the MBTA and BGEPA section above.

At-Risk Species and Gulf Coast Joint Venture

Through coordination of the USACE, the Service and the NMFS, the agencies have attempted to minimize direct impacts to habitat from the construction of the Proposed Action. The project is not expected to have long term benefits or negative impacts to At-Risk or Gulf Coast Venture species. But there will be some level of habitat destruction and fragmentation that will impact species' historic feeding, resting and nesting habits and cause displacement of individuals.

FWS Concerns

Material from dredging or borrow pits should not be piled outside of the ROW. If it becomes necessary to use borrow sources other than the previously proposed environmentally cleared sites, the Service recommends USACE begin investigating potential borrow sources in coordination with the Service. Borrow sites to be considered should have minimal impacts to fish and wildlife resources. The USACE should specify which portions of borrow sites would be excavated if the delineated site contains any fish and wildlife resources or habitat that would require mitigation. The Service identified a priority selection process and list for borrow sites in our November 15, 2023, Planning-aid letter to USACE (Appendix A). That prioritization process should be utilized if additional borrow sites are needed (please contact Cathy Breaux (337)291-3122 for more information).

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Act regulations to include:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- compensation for the impact by replacing or providing substitute resources or environments.

The Service's mitigation policy (88 FR 31000, May 15, 2023) establishes fundamental mitigation principles and provides a framework for applying a landscape-scale approach to achieve, through application of the mitigation hierarchy, no net loss of resources and their values, services, and functions resulting from proposed actions.

Achieving the mitigation goal of this policy involves:

1. Avoiding and minimizing those impacts that most seriously compromise resource sustainability
2. rectifying and reducing impacts over time by restoring or maintaining conditions in the affected area to attain resource sustainability, and
3. strategically compensating for impacts so that actions result in no net loss of the affected resources.

Coastal marshes and forested wetlands are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (i.e., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). Coastal marsh and forested wetlands that cannot be avoided have the mitigation goal of no net loss of in-kind habitat value.

Potential sites where marsh and/or forested wetlands can be created to provide mitigation for the Proposed Action and mitigation banks that could be utilized for marsh, BLH, and swamp impacts have been identified by the Service and the USACE (Appendix C) based on the mitigation potential found in Table 6. Those mitigation plans are expected to provide mitigation for the Proposed Action discussed in this report. Mitigation for the unavoidable impacts to marsh, BLH, and swamp would be required to provide the necessary amount of AAHUs to match the impacts due to the Proposed Action.

Table 6. Mitigation sites with mitigation potential.

Mitigation Site	Habitat	Mitigation Potential
Avoca	Fresh/Int	0.20
Lake Salvador	Fresh/Int	0.40
Delta Farms	Fresh/Int	0.39
East Penchant	Fresh/Int	0.25
Falgout 464	Brackish	0.30
Barataria Bay West 213	Brackish	0.34
Barataria Bay East 214	Saline	0.32
3 Mile Bay 67	Saline	0.28
West Terrebonne Lower West 956	Saline	0.36
West Terrebonne Upper 497	Saline	0.36
West Terrebonne Lower East 696	Saline	0.35
Isle de Jean Charles East Lower 540	Saline	0.25
Isle de Jean Charles East Middle 509	Saline	0.30
Isle de Jean Charles East Upper 1 711	Saline	0.28
Isle de Jean Charles East Upper 2 512	Saline	0.20
Isle de Jean Charles West 703	Saline	0.15

To avoid unplanned shortfalls in mitigation acreage, the Service recommends that the target marsh acreage be calculated to exclude any internal borrow areas used for construction of the marsh creation area containment dikes. Internal borrow areas for containment dike construction often never vegetate. Hence all the acreage within the containment dikes does not become marsh and a shortfall in created marsh may occur. Marsh creation projects must provide at least the required acreage within 3 years of project implementation to be considered as having achieved the intended mitigation. This will depend on achieving a settled disposal area elevation conducive to growth of marsh vegetation. The Service should be consulted in the further development of plans and specifications for mitigation of unavoidable impacts to coastal marshes and forested wetlands.

With the new definition of the Waters of the United States (WOTUS, published Aug 29, 2023) all enclosed (protected side) wetlands may be redefined as non-jurisdictional wetlands because of the MTG project, thus impacting all enclosed wetlands. There is concern that this would increase developmental pressures on enclosed wetlands. The Service recommends the USACE coordinates with us once they receive guidance on how they will implement that new rule to ensure protection of enclosed wetlands. Enclosed wetlands will still be connected hydrologically and thus will still be tidally influenced via the planned major structures (i.e., floodgates) and any additional environmental structures and/or culverts, etc. For this reason, it is the Service's and the NMFS's opinion that the enclosed wetlands in question should be exempt from redefinition implications.

SERVICE POSITION AND RECOMMENDATIONS

The Proposed Action has potential for achieving large-scale wetland protection and restoration benefits through a comprehensive design to protect against hurricane impacts, reduce saltwater intrusion, and improve distribution of Atchafalaya River flows. The distribution and quantity of those Atchafalaya River freshwater flows within the Terrebonne Basin, along with recommendations for their maximum benefit, were described in several Service Planning Aid Reports for the Mississippi River and Tributaries Morganza, Louisiana, to the Gulf of Mexico Feasibility Study and others. The Proposed Action could also cause negative indirect impacts to fish and wildlife resources and their habitats because of (1) the potential for disruption of existing water flow into the project area from the north and from tidal and wind action from the south, and (2) substantial direct wetland losses resulting from construction activities. As mentioned earlier in this document, avoidance and minimization of direct wetland impacts should be pursued to the greatest extent practicable and appropriate mitigation should be provided for unavoidable impacts.

Because of the complexity of the project, we understand that some details regarding the project design, operation, and impacts may change in ways that could have an effect on fish and wildlife resources. Therefore, the Service recommends continued coordination with the Service during further study and/or the preconstruction engineering and design phase of this project.

The Service provides the following recommendations for conservation of fish and wildlife resources and mitigation for unavoidable impacts to those resources. The Service does not object to the Proposed Action on the condition that the USACE report recommends completing all indirect impacts analyses, and the following recommendations are considered and implemented to the extent that is satisfactory to fulfill Service responsibilities under the FWCA.

1. Coastal marshes and forested wetlands are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (i.e., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). The Service recommends that losses of high-value habitats, which are becoming scarce, be avoided or minimized to the greatest extent possible. The Service recommends unavoidable losses of such habitats should be fully compensated by replacement of the same kind of habitat value; this is called “in-kind” mitigation. The Service should be consulted in the development of plans and specifications for mitigation of unavoidable impacts to coastal marshes and forested wetlands.
2. To the greatest extent possible, design (e.g., implementation of “T”-walls, sheet-pile, and/or cement floodwall in levee designs) and position flood protection features so that adverse impacts to forested and emergent wetlands are avoided or minimized.
3. The USACE should provide mitigation for habitat directly impacted by the construction of earthen levees, floodwalls, ROW, haul route roads, floodgates, sector gates, and environmental control structures throughout the levee alignment estimated as follows: 2,177 acres (-620.2 AAHUs) saline marsh, 464 acres (-88.3 AAHUs) brackish marsh, 1,516 acres (-421.6 AAHUs) fresh/intermediate marsh, 324 acres (-147.3 AAHUs) BLH, and 178 acres (-120.4 AAHUs) of swamp. Those estimated AAHUs should be

considered highly accurate but provisional until the impacts analyses are reviewed by the HET. Final post-review AAHUs required for all habitat types should be completed and included in the Final SEIS, FONSI, ROD, and Final FWCA report.

4. The results of hydrologic models are now available and have been analyzed for most, but not all, aspects of the effects of the proposed action. The modeling has provided enough information to indicate potential areas of indirect wetland impacts. Preliminary review indicates nearly 6,000 acres of forested wetlands and just under 14,700 acres of marsh may be indirectly impacted. However, time did not allow for appropriate impacts analysis yet, which will be completed prior to the Final SEIS. The Service recommends the USACE continue to coordinate with our office and other resource agencies on indirect impacts analysis. Mitigation for those indirect impacts would be added to the direct impacts previously mentioned (reference recommendations 3) to determine the total impacts of the Proposed Action.
5. The FONSI and SEIS should clearly reiterate that features of the Proposed Action would be designed to maintain existing freshwater inflows from the Atchafalaya River via the GIWW, and will be designed, operated, and monitored to achieve coastal wetland conservation through improved re-distribution of freshwater flows to wetlands wherever feasible (i.e., in a manner that does not compromise hurricane protection, minimizes impacts to navigation and aquatic resources and does not induce flooding).
6. GIWW Floodgate sluice gates should be kept open, except in the event of a tropical storm, to allow exchange and tidal flow within the system. Operational plans for floodgates and water control structures should be developed to maximize the open cross-sectional area for as long as possible. Water control structure operation manuals or plans should be developed in coordination with the Service and other natural resource agencies.
7. The environmental control structures and floodgates of the system will be closed when the water level reaches either 2.5 ft NAVD88 or 3.0 ft NAVD88, depending on the structure location and type. Currently, the trigger for structure and gate closures would likely be in anticipation of tropical storm events, therefore, it is not expected that the Proposed Action would cause the closure of the system more often due to higher daily water level fluctuations. It is unknown at present how water levels within the system would be managed if a change in operation due to relative sea level rise (RSLR) is realized. Increased closures have not been assessed for hydrologic or wetland impacts. Hence, we are concerned that there is a potential for substantial additional indirect impacts to wetland habitat and fish and wildlife resources to occur. The Service recommends the USACE continue to coordinate with our office on new studies in regard to operations of structures and gates. The Service requests that the USACE provide annual reports on structure operations indicating the number of days per year (and season) that structures and gates are closed. If structures are closed more than 30 times a year (nonconsecutively), the USACE should study the need for potential operational changes, assess additional wetland impacts, and the need for more mitigation while continuing to coordinate with the Service.
8. Project features contained in the SEIS are considered constructable. Note this does not include or apply to Reach A, Segment 2 near Mandalay National Wildlife Refuge

(NWR) where the USACE has committed to first looking for opportunities to avoid impacting Mandalay NWR. Impacts from project features in the SEIS should have adequate mitigation planned at the time this draft report is submitted. Impacts analyses may be incomplete, or project features may be revised by the time this draft report is submitted. Once any habitat impacts revisions are concluded, they should be included in the Final SEIS, Final FWCA report, FONSI, and ROD that includes the MTG constructible features.

9. During in-water work in areas that potentially support manatees, all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable. Detailed conservation measures are included in this FWCA report. For more detail on avoiding contact with manatees contact this office. Should a proposed action directly or indirectly affect the West Indian manatee, consultation with this office will be necessary.
10. The eastern black rail may be present in the project vicinity. The contractor shall instruct all personnel associated with the project of the potential presence of the eastern black rail in the area, and the need to avoid contact with the species. All construction personnel shall be advised that there are civil and criminal penalties for harming, harassing, or killing eastern black rails, which are protected under the Endangered Species Act of 1973 and the Migratory Bird Treaty Act. Detailed conservation measures are included in this FWCA report.
11. Care should be taken to avoid impacts to bald eagles and their nesting habitat. Prior to and during any project construction, on-site personnel should be informed of the possible presence of nesting bald eagles in the vicinity of the project boundary, and should identify, avoid, and immediately report any such nests to this office. Prior to construction, the Service and the LDWF recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nests during the nesting season (October through mid-May). If a bald eagle nest occurs or is discovered within 1,500 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line using the Service's guidance and determination tool, available at https://www.fws.gov/media/bald-eagle-monitoring-guidelines-southeastern-us . Any take should be reported to this office and the LDWF. Bald eagle nest (active, inactive, or seemingly abandoned) should be protected, and no large trees should be removed.
12. Avoid adverse impacts to nesting wading bird colonies through careful design of project features and timing of construction. The Service and the LDWF recommend that a qualified biologist inspect the proposed work site for the presence of nesting colonies during the nesting season (September 1 through February 15).

13. Avoid adverse impacts to alligator snapping turtle by minimizing disturbance and alteration of nesting habitat, particularly in the nesting season (April-June), including minimizing the removal of log jams in streams.
14. The Service recommends avoiding impacts to the Mandalay National Wildlife Refuge and any other National Wildlife Refuges (NWR), LDWF Wildlife Management Areas, and CWPPRA projects. If direct and indirect impacts to NWRs cannot be avoided after coordination with the Service Refuge Project Leader, impacts will need to be mitigated on site of the NWR impacted. In addition, project features on refuge land would need a special use permit. If the project features are determined not compatible with the Refuge purpose(s), land would need to be purchased and exchanged with the refuge. These exchanged lands must be within the congressionally-approved refuge acquisition boundary. The applicant would then own the lands needed to build and maintain flood control features. All project related activities on the refuge must be coordinated with Refuge Project Leader. Close coordination by the applicant must be maintained with the Refuge Project Leader.
15. To minimize impacts to fisheries, flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable. Water control structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure to enhance organism passage. Various ramp designs should be considered. Please coordinate with the NMFS, Craig Gothreaux (craig.gothreaux@noaa.gov) on this issue.
16. The impacts to Essential Fish Habitat should be discussed with the NMFS to determine if the project complies with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Magnuson-Stevens Act; P.L. 104-297, as amended) and its implementing regulations.
17. If soils must be removed prior to levee construction, those soils should be used to create or restore emergent wetlands to the greatest extent possible or be used for levee construction as suggested by USACE.
18. Material from dredging or borrow pits should not be piled outside of, or allowed to erode outside the ROW.
19. Disturbed areas should be revegetated with native plant species, including species of nectar-producing plants and milkweed endemic to the area; we recommend consultation with state botanists to determine appropriate species where possible.
20. Access roads across existing wetlands should be avoided if possible and secondary impacts to wetland hydrology should be prevented or reduced. To avoid changes to hydrology, the Service recommends appropriately sized culverts (minimum 24-inch culverts) be installed and maintained every 250 feet across access roads through wetlands with additional culverts placed at stream crossings and drainage features. Alternatively, upon completion of construction activities, access roads should be degraded to restore natural hydrology.
21. Please include this office in future considerations of any additional project features and any planned levee lifts as additional consultation will likely be necessary.

22. To avoid unplanned shortfalls in mitigation acreage, the Service recommends that the target marsh acreage be calculated to exclude any internal borrow areas used for construction of the marsh creation area containment dikes.

    a. Marsh creation projects must provide at least the required acreage within 3 years of project implementation to be considered as having achieved the intended mitigation. This will depend on achieving a settled disposal area elevation conducive to growth of marsh vegetation.

23. With the new definition of the Waters of the United States (WOTUS, published Aug 29, 2023) all enclosed (protected side) wetlands may be redefined as non-jurisdictional wetlands because of this project, thus impacting all enclosed wetlands. There is concern that this would increase developmental pressures on enclosed wetlands. The Service recommends the USACE coordinate with us once they receive guidance on how they will implement that new rule to ensure protection of enclosed wetlands. Enclosed wetlands will still be connected hydrologically, and thus will still be tidally influenced via the planned major structures (i.e., floodgates) and any additional environmental structures and/or culverts, etc. For this reason, it is the Service's and the NMFS's opinion that the enclosed wetlands in question should be exempt from redefinition implications.

24. If it becomes necessary to use borrow sources other than the previously proposed environmentally cleared sites, the Service recommends the USACE begin investigating potential borrow sources in coordination with the Service. Borrow sites to be considered should have minimal impacts to fish and wildlife resources. The Service identified a priority selection process and list for borrow sites in our November 15, 2023, Planning-aid letter to USACE (Appendix A). That prioritization process should be utilized if additional borrow sites are needed (please contact Cathy Breaux (337) 291-3122 for more information).

25. NEPA evaluations for some portions of the MTG project have occurred previously or are concurrent with the MTG SEIS (Reach A, Reach F). Please refer to the coordinating FWCA reports associated with those projects for our specific recommendations for those actions as they are also a part of the MTG project. Specifically reference our FWCA report for Reach A Recommendation #7 regarding Mandalay National Wildlife Refuge and the USACE response (copied here for your convenience):

    7. The Service recommends avoiding impacts on the Mandalay National Wildlife Refuge (NWR). If impacts cannot be avoided, impacts will need to be mitigated for on the Mandalay NWR. Please coordinate all activities with refuge staff and with Mr. Pon Dixon, Project Leader of the Bayou Sauvage Urban NWR Complex (985/882-2014).

    > *CEMVN Response: Concur. Constructible features of the Proposed Action would not impact the NWR.CEMVN will continue to look for opportunities to avoid and minimize impacts to the Mandalay NWR. At the current level of design, a portion of the programmatic levee in the Proposed Action would cross the NWR. The information we have to date is preliminary and additional engineering and design is necessary to fully inform the design of programmatic features of the*

Proposed Action its potential impacts to the NWR. Supplemental NEPA analysis would be conducted prior to impacting and constructing on the NWR. CEMVN has and will continue to coordinate with the NWR.

26. NEPA evaluation and mitigation for the MTG surveys and borings work should be completed, and all mitigation requirements for impacts described in the Service's January 5, 2024, draft FWCA report should be fulfilled.

The Service recommends that the USACE contact the Service 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 and or finalized.

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Appendix A
Borrow Protocol FWS Planning Aid Letter

D R A F T FWCA Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506

November 15, 2023

Colonel Cullen Jones
District Commander
U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans, LA 70118-3651

Dear Colonel Jones:

As you know, the U.S. Fish and Wildlife Service (Service) is assisting the U.S. Army Corps of Engineers (USACE) in assessing impacts of, and mitigation requirements for, borrow sites which are needed to complete authorized improvements, and to construct Federal and non-Federal hurricane/flood protection levees in southern Louisiana. This planning-aid letter is provided in accordance with the Endangered Species Act of 1973 (ESA, 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), Fish and Wildlife Coordination Act (FWCA, 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and the Migratory Bird Treaty Act (MBTA, 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.), but it does not constitute the final report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act.

Identification of borrow areas are needed to complete multiple flood risk reduction projects. To first avoid and then minimize impacts to wetlands and fish and wildlife resources, the Service recommends the use of a protocol that prioritizes selection of borrow sites. In previous projects, such as the Hurricane and Storm Damage Risk Reduction System (HSDRRS) a protocol for borrow was developed which prioritized site selection in the following order: (1) existing commercial pits, (2) upland sources, (3) previously disturbed/manipulated wetlands within a levee system, and (4) low-quality wetlands outside a levee system. The Service supports the use of such protocols to avoid and minimize impacts to wetlands and bottomland hardwoods within project areas. Avoidance and minimization of those impacts helps to provide consistency with restoration strategies and compliments the authorized hurricane/flood protection efforts. Such consistency is also required by Section 303(d)(1) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).

Accordingly, the Service recommends that prior to utilizing borrow sites, every effort should be made to reduce impacts by using sheet-pile and/or floodwalls to increase levee heights wherever feasible. In addition, the Service recommends that the following protocol be adopted and utilized to

identify borrow sources in descending order of priority:

1. First consider permitted commercial sources, authorized borrow sources for which environmental clearance and mitigation have been completed, or non-functional levees after newly constructed adjacent levees are providing equal protection.

2. Next consider areas under forced drainage that are protected from flooding by levees, and that are:
   a. non-forested (e.g., pastures, fallow fields, abandoned orchards, former urban areas) and non-wetlands;
   b. wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or nonforested wetlands (e.g., wet pastures), excluding marshes; or,
   c. disturbed wetlands (e.g., hydrologically altered, artificially impounded).

3. Third, consider sites that are outside a forced drainage system and levees, and that are:
   a. non-forested (e.g., pastures fallow fields, abandoned orchards, former urban areas) and non-wetlands;
   b. wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or nonforested wetlands (e.g., wet pastures), excluding marshes; or,
   c. disturbed wetlands (e.g., hydrologically altered, artificially impounded).

The Service offers the following additional recommendations for reducing borrow site impacts on fish and wildlife resources and, where feasible, enhancing those resources. However, these additional recommendations should not be implemented if they would result in the expansion of existing borrow pits or construction of new borrow pits in wetlands or bottomland hardwoods.

1. A minimum of 30 percent of the borrow pit's edge should slope no greater than 5 horizontal (H):1 vertical (V), starting from the water line down to a depth of approximately 5 feet.

2. Most of the woody vegetation removed during clearing and grubbing should be placed into the deepest parts of the borrow pits, and the remaining debris should be placed in the water along the borrow pit shorelines, excluding those areas where the 5H:1V slope, per recommendation 1, have been constructed.

3. Following construction, perimeter levees (if constructed) around each borrow pit should be gapped at 25-foot intervals with an 8-foot-wide breach, the bottom elevation of which should be level with the adjacent natural ground elevation.

When avoidance and minimization of bottomland hardwood and wetland impacts is not practicable, all unavoidable net losses of those habitats should be fully offset via compensatory mitigation. Such compensatory mitigation should be sited within the watershed and/or hydrologic unit where the impact occurred, and should be completed concurrently with borrow operations, or as soon as possible thereafter.

To assist in expediting the identification of borrow sites that potentially meet the protocol, the Service has utilized a Geographic Information System to develop a map identifying potential

borrow areas (Attached). A National Resource Conservation Service soils database was combined with a National Oceanic and Atmospheric Administration land classification database for the parishes where Federal hurricane protection projects exist. Only those soils and land use categories having the highest probability of providing soils suitable for levee construction while minimizing impacts to fish and wildlife resources were identified. The Service realizes that those databases may contain errors or that conditions could have changed since the databases were developed. Therefore, some identified sites may not meet the borrow protocol, and site inspections would be necessary. The Service also recognizes that other factors may also limit the use of the identified sites, such as prior land use and size. Nonetheless, the Service recommends that the USACE investigate all borrow areas identified on the attached map and maintain a record for each site including site conditions and reasons for rejecting a site. Prior to investigating wetlands as a potential borrow source the Service recommends that a review of those records be conducted with the Service and other natural resource agencies. However, such a review would not automatically result in the Service's agreement that due diligence to avoid wetlands has been achieved and that other areas not indicated on the map should not be investigated. The Service is willing to assist in the site assessment of the borrow areas.

The combined need for borrow necessary to complete authorized improvements to and construction of Federal and non-Federal hurricane/flood protection levees, and the potential construction of levees capable of withstanding a category 5 hurricane, will require substantial amounts of borrow. It is highly likely such amounts would exceed local availability. In the case of ongoing hurricane/flood protection projects (e.g., Morganza to the Gulf, West Shore Lake Pontchartrain, Saint Tammany Parish, Upper Barataria Basin, etc.) the search for levee-building material has been conducted primarily on project-by-project basis. In the context of such project-by-project searches for borrow material, the least-expensive and easiest sources of borrow material are usually located within wetlands and/or bottomland hardwoods, adjacent to the proposed levee. Such on-site sources, however, often involve adverse impacts to wetlands, thus exacerbating the overall wetland loss problem in all coastal basins, especially those in the deltaic plain of southeast Louisiana. In short, while such on-site sources are relatively inexpensive, they will frequently be inconsistent with coastal restoration efforts and, to the extent that wetlands will be adversely impacted, use of those sites will be counterproductive with respect to minimizing wetland impacts and attaining the goal of increasing non-structural hurricane protection within a sustainable ecosystem.

Large-scale, off-site borrow sources could have the potential to reduce environmental impacts from levees and expedite project-by-project environmental review. Such potential "programmatic" borrow sources could include uplands along the Mississippi River, beneficial use of sediments dredged for navigation purposes (including the mining of disposal sites), the Mississippi River, and offshore deposits (e.g., Ship Shoal). As part of the planning process, we recommend that the USACE begin investigating the practicability of various large-scale, off-site borrow sources and actively involve all resource agencies with the Regional Planning and Environment Division, South (RPEDS) Office's Borrow Team efforts.

Programmatic planning would be essential to identify borrow sites of acceptable quantity and quality, while avoiding and/or minimizing adverse environmental impacts. We therefore recommend that a plan be developed that integrates borrow resources, uses, and needs for various programs and activities. Guiding principles should be developed to identify borrow resources, borrow-site designs, and prioritize uses to avoid competing for resources, maximize benefits with

those resources, and avoid adverse environmental impacts.

We appreciate the opportunity to provide this planning-aid letter and would be pleased to assist your agency in further identification of potential borrow sources. Should you or your staff have any questions regarding this letter, please contact Cathy Breaux (337/291-3122) of this office.

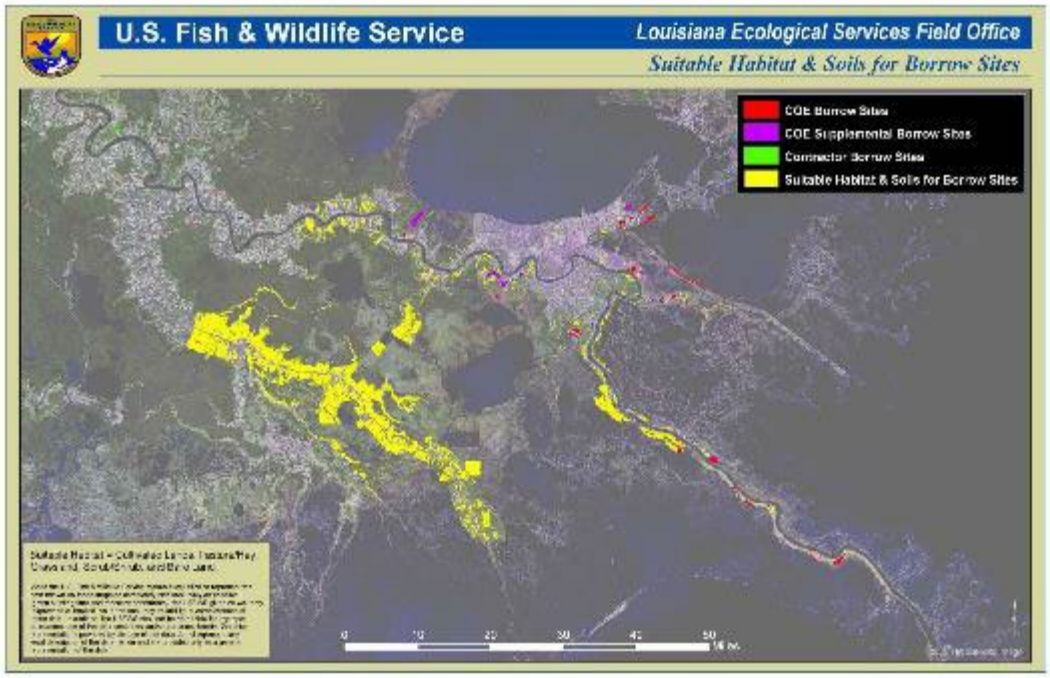
Sincerely,

Brigette D. Firmin
Field Supervisor
Louisiana Ecological Services Office

Enclosure

cc: National Marine Fisheries Service, Baton Rouge, LA EPA, Dallas, TX
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources, CMD, Baton Rouge, LA
CPRA, Baton Rouge, LA

ENCLOSURE: Map of suitable habitat and soils for borrow sites.



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Appendix B

Haul Routes, Borrow Sites, and Construction Access Roads

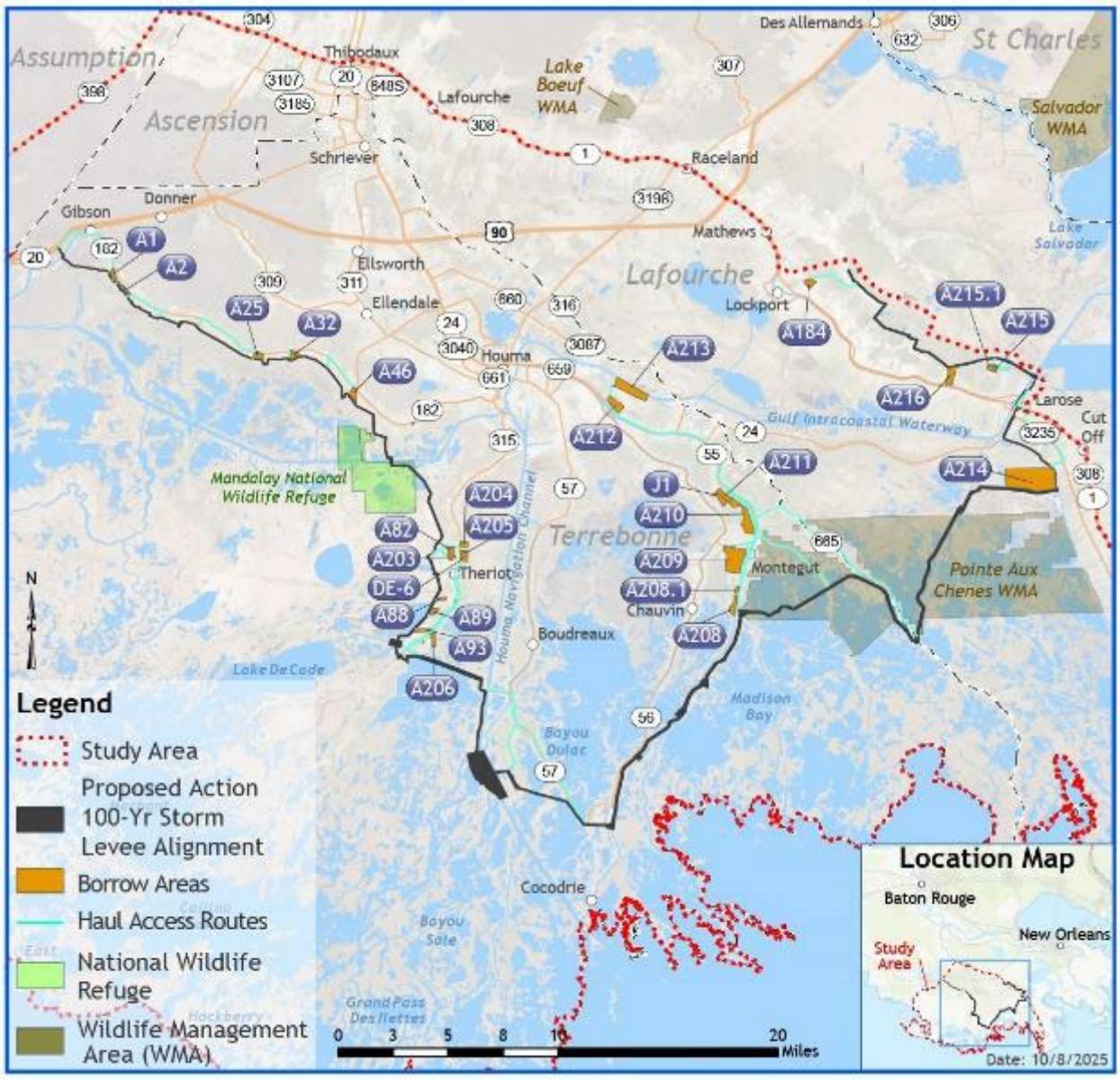

Figure 12. Borrow Sites and Construction Access Roads.

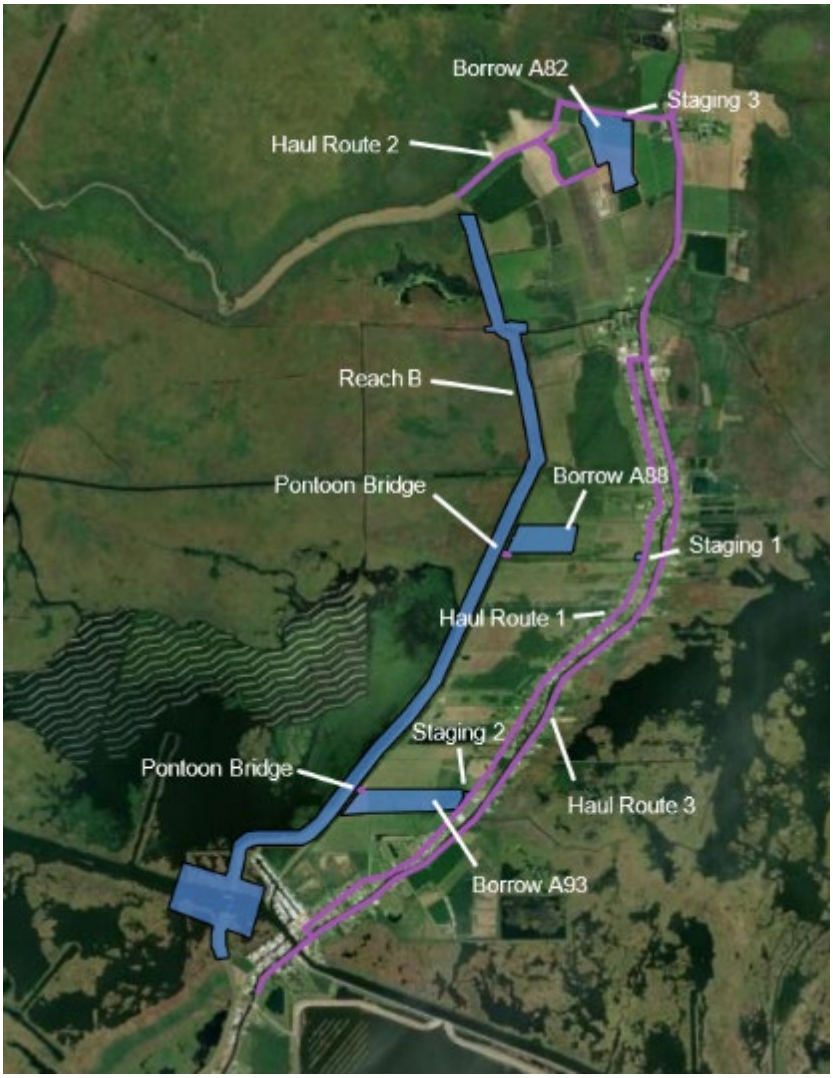

Figure 13. Reach B borrow sites, haul routes, and access roads.

Figure 14. Reach E borrow sites, haul routes, and access roads.

Figure 15. Reach G borrow sites, haul routes, and access roads.

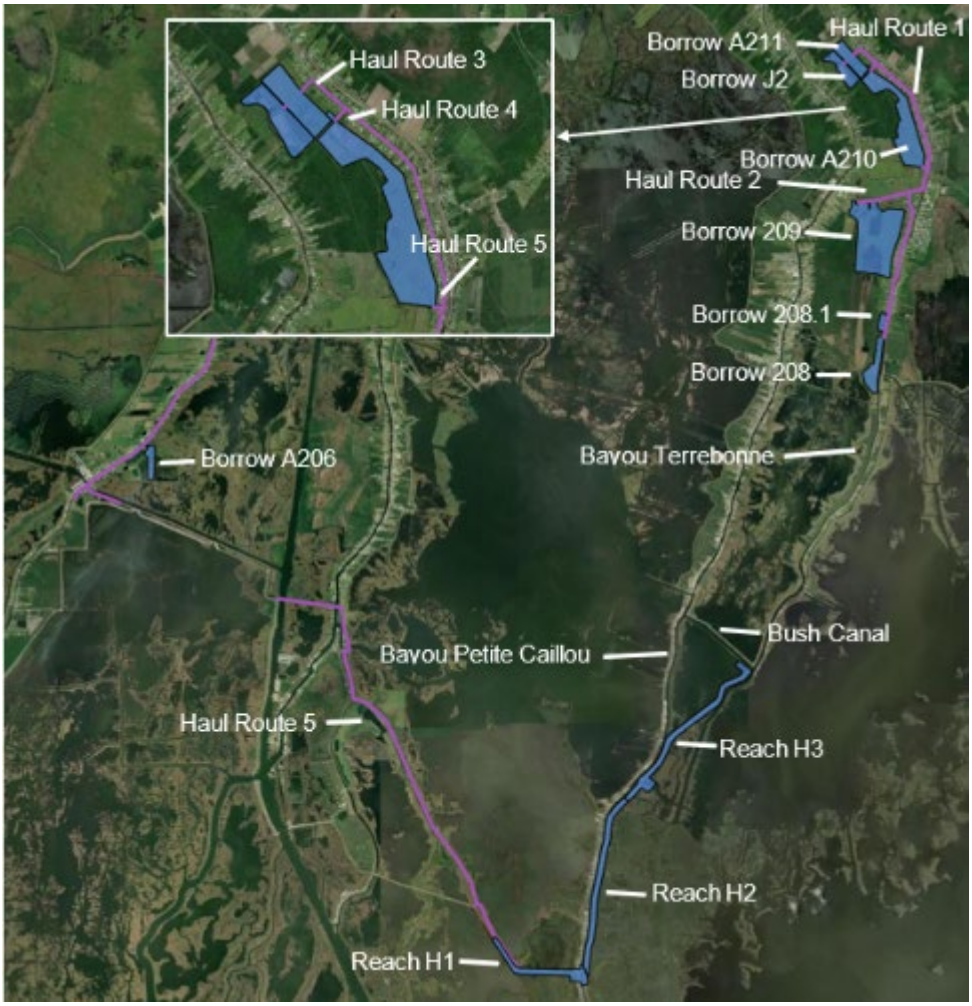

Figure 16. Reach H borrow sites, haul routes, and access roads.

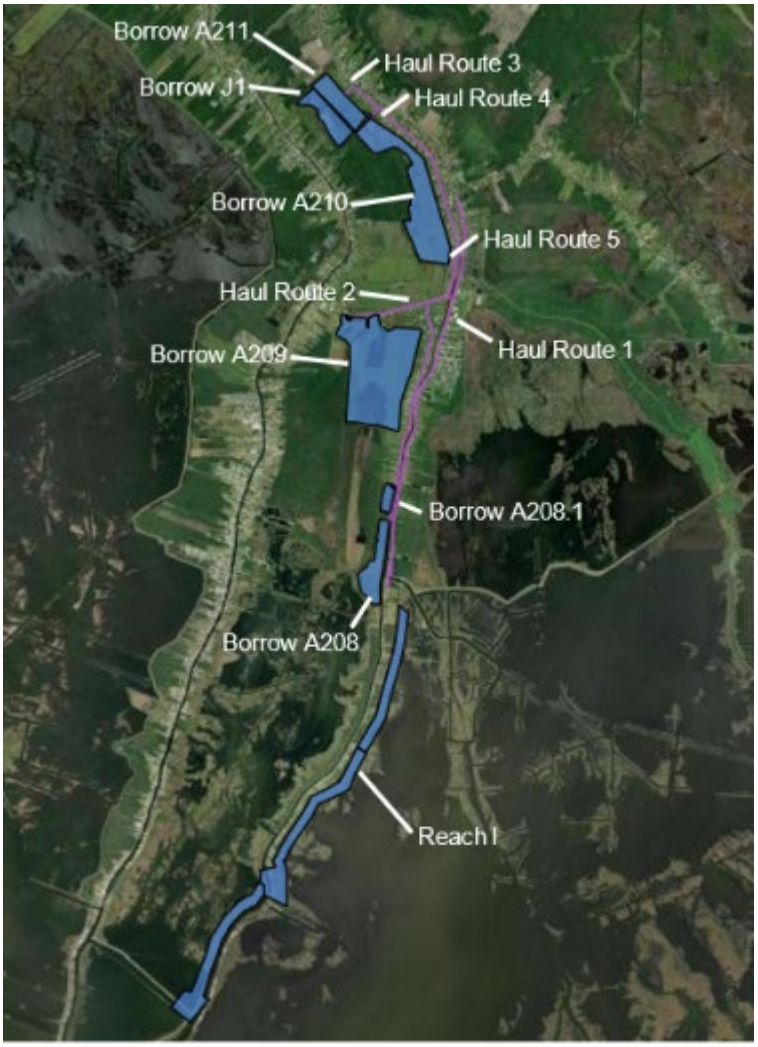

Figure 17. Reach I borrow sites, haul routes, and access roads.

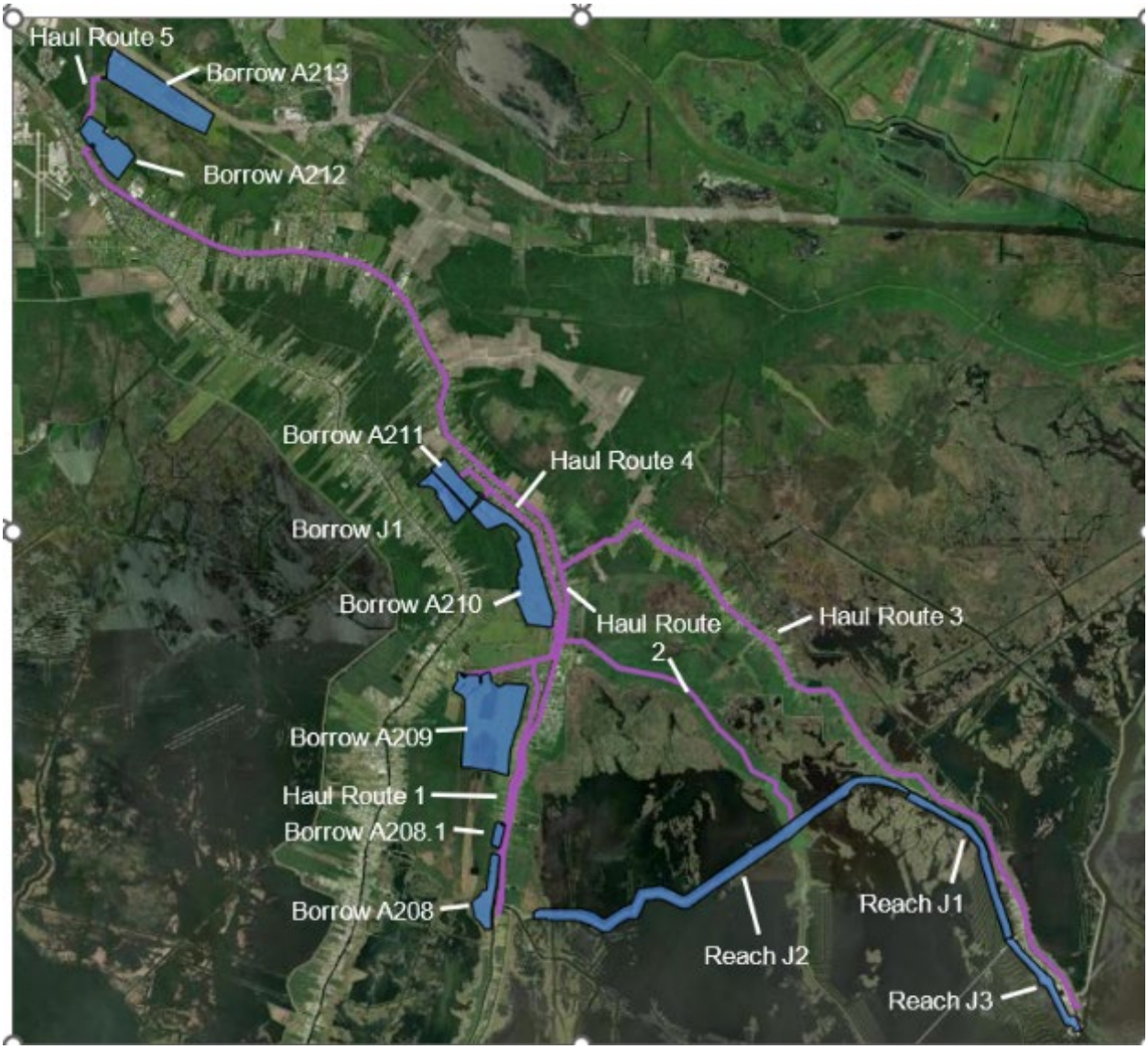

Figure 18. Reach J borrow sites, haul routes, and access roads.

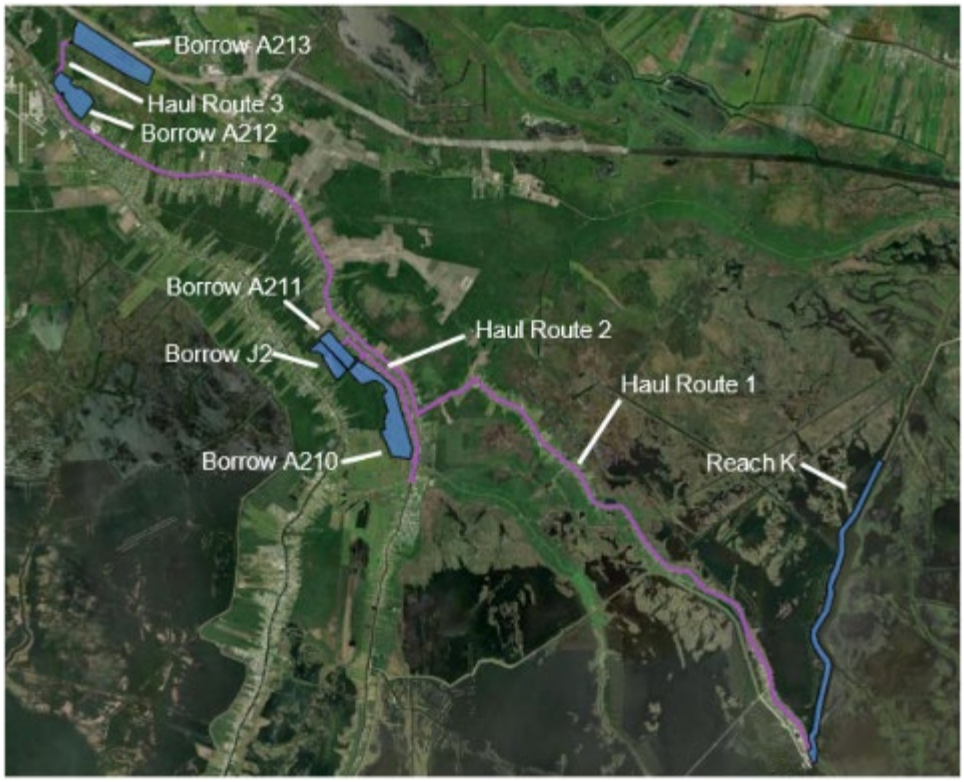

Figure 19. Reach K borrow sites, haul routes, and access roads.

Figure 20. Reach L borrow sites, haul routes, and access roads.

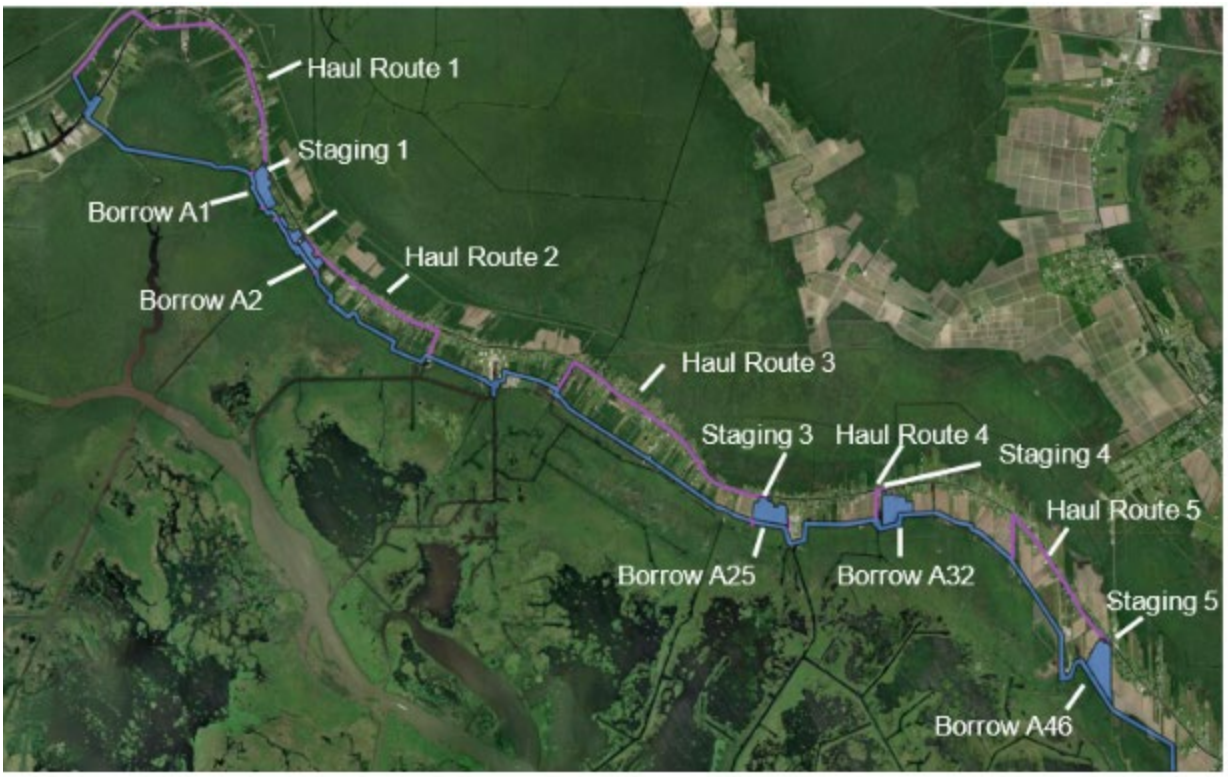

Figure 21. Barrier Reach borrow sites, haul routes, and access roads.

Figure 22. Larose C borrow sites, haul routes, and access roads.

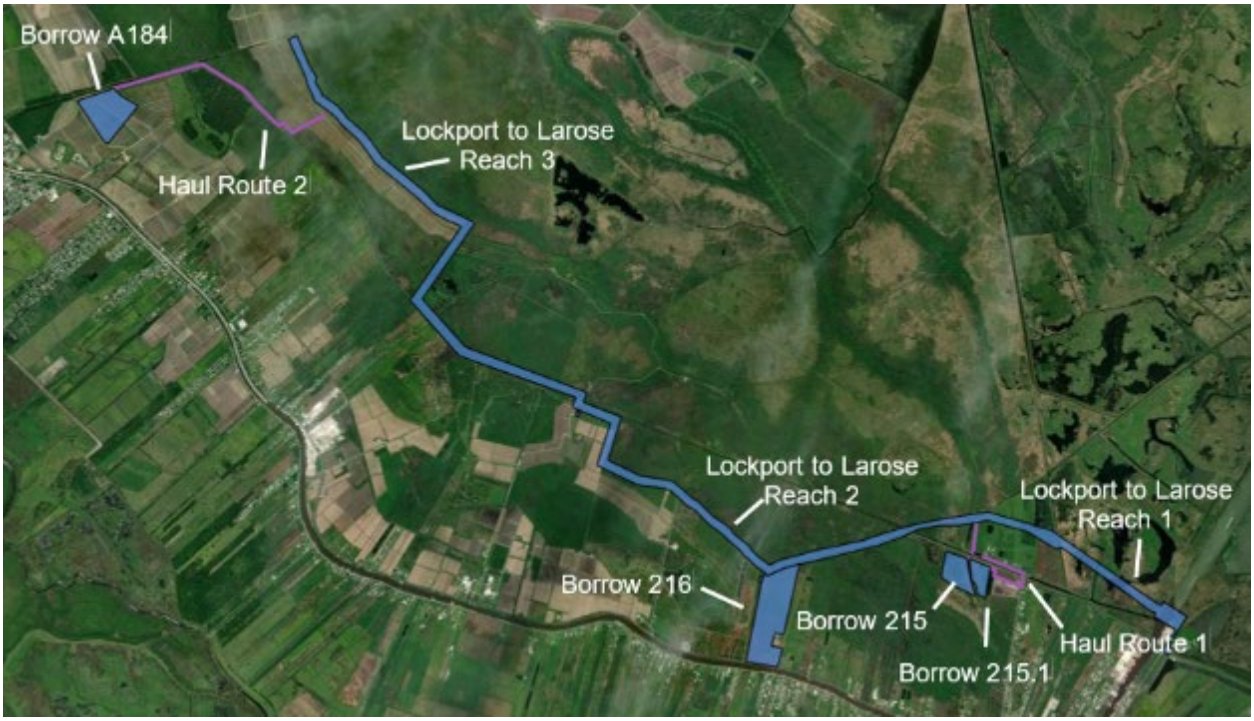

Figure 23. Lockport to Larose borrow sites, haul routes, and access roads.

Appendix C
Mitigation Sites

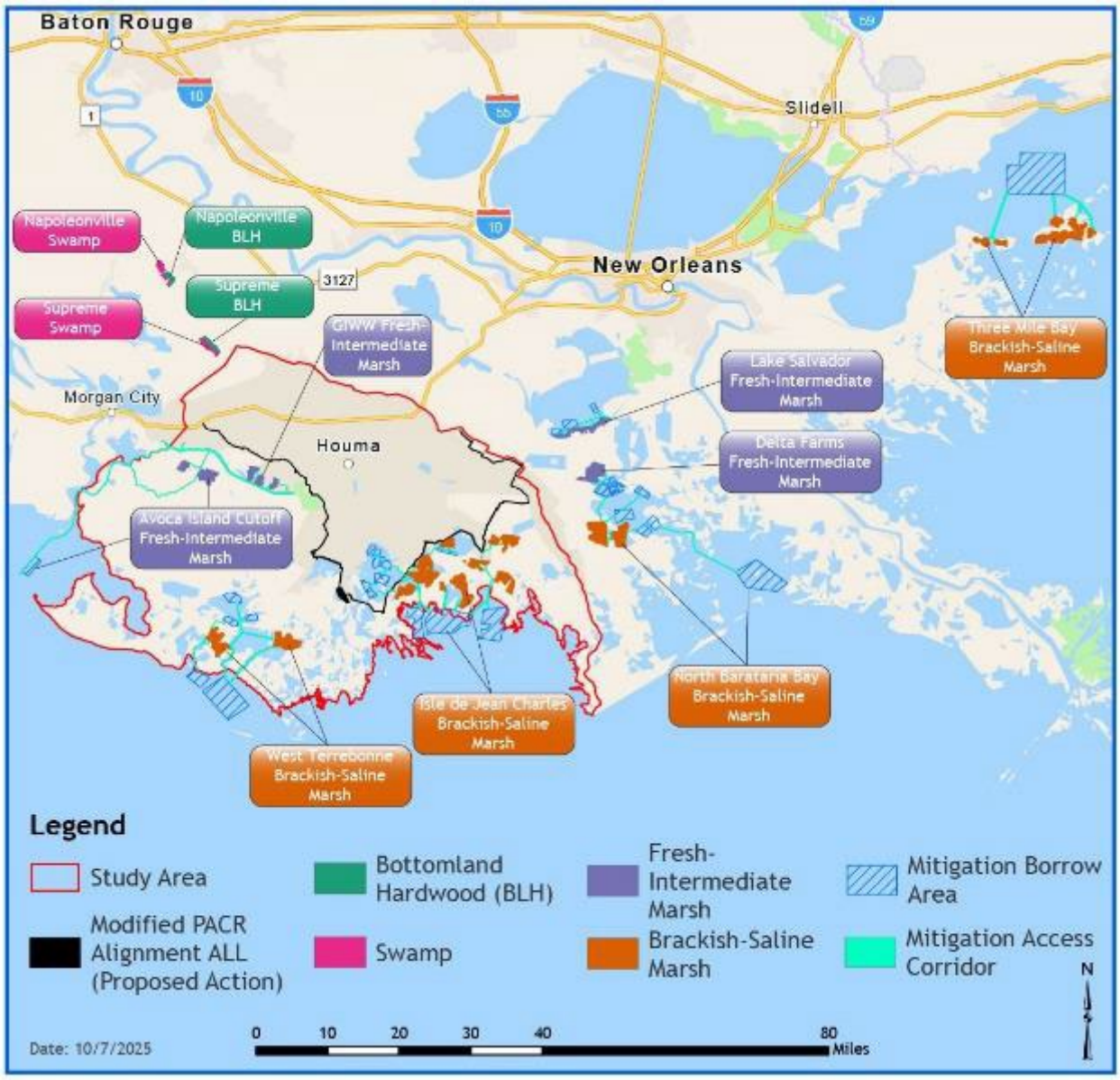

Figure 24. Final Array of Mitigation Alternatives by Habitat Type.

Figure 25. Fresh-Intermediate Marsh Mitigations Sites.

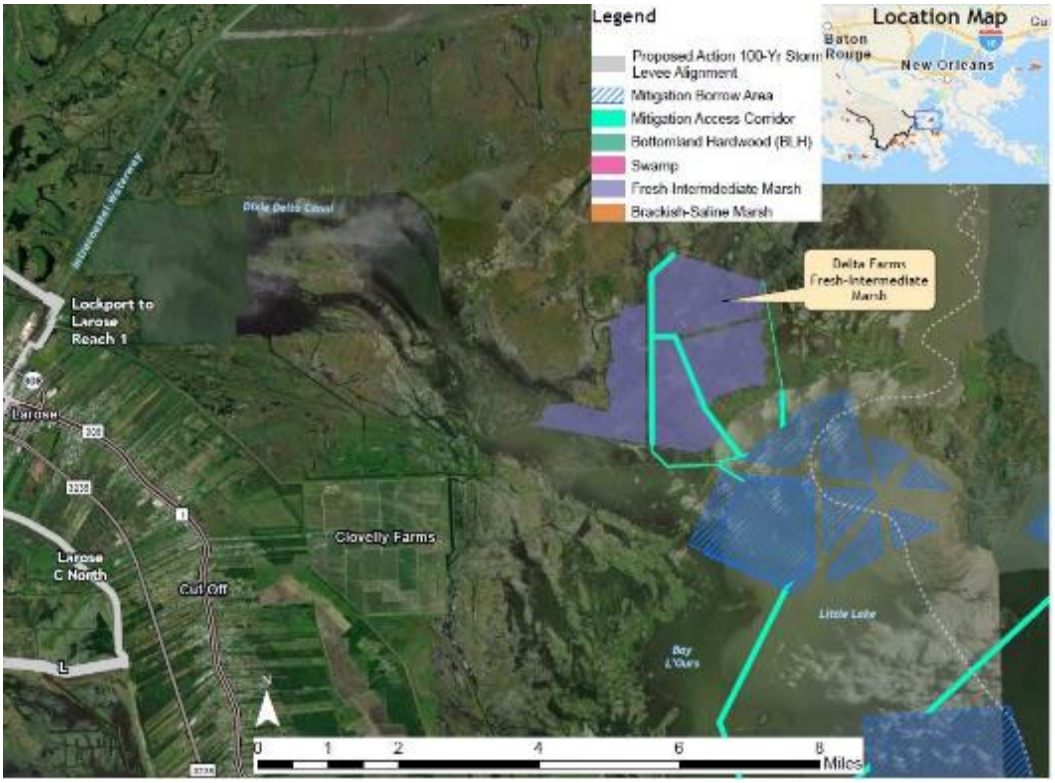

Figure 26. Fresh-Intermediate Marsh Mitigations Sites.

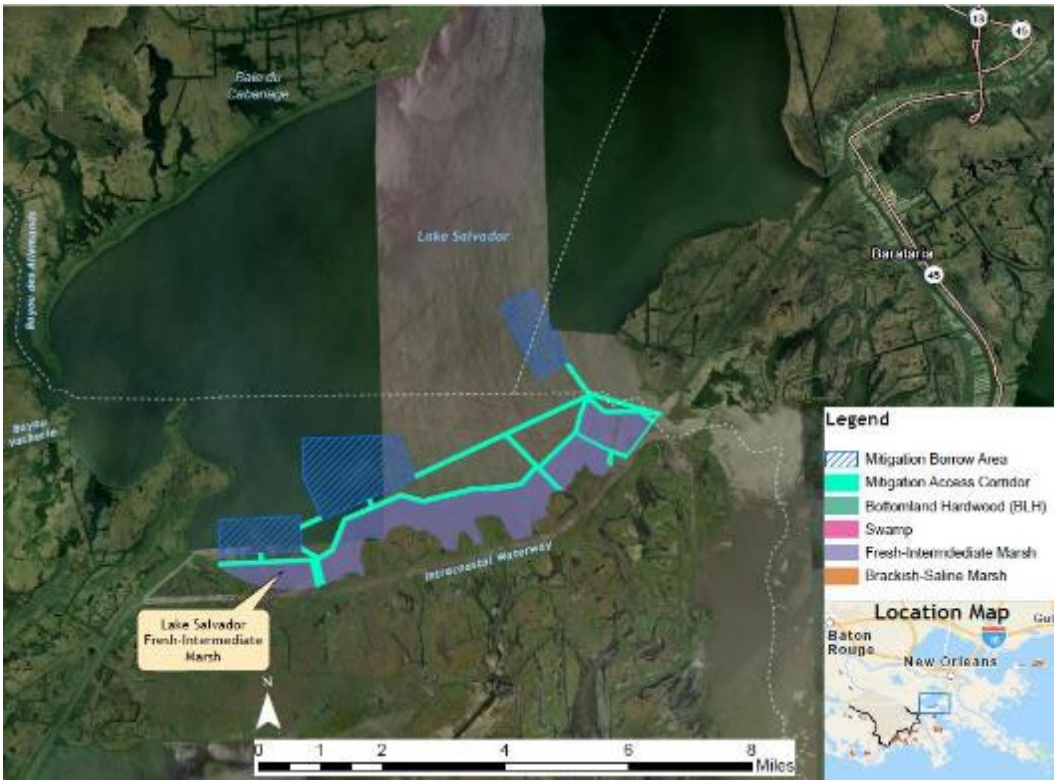

Figure 27. Fresh-Intermediate Marsh Mitigations Sites.

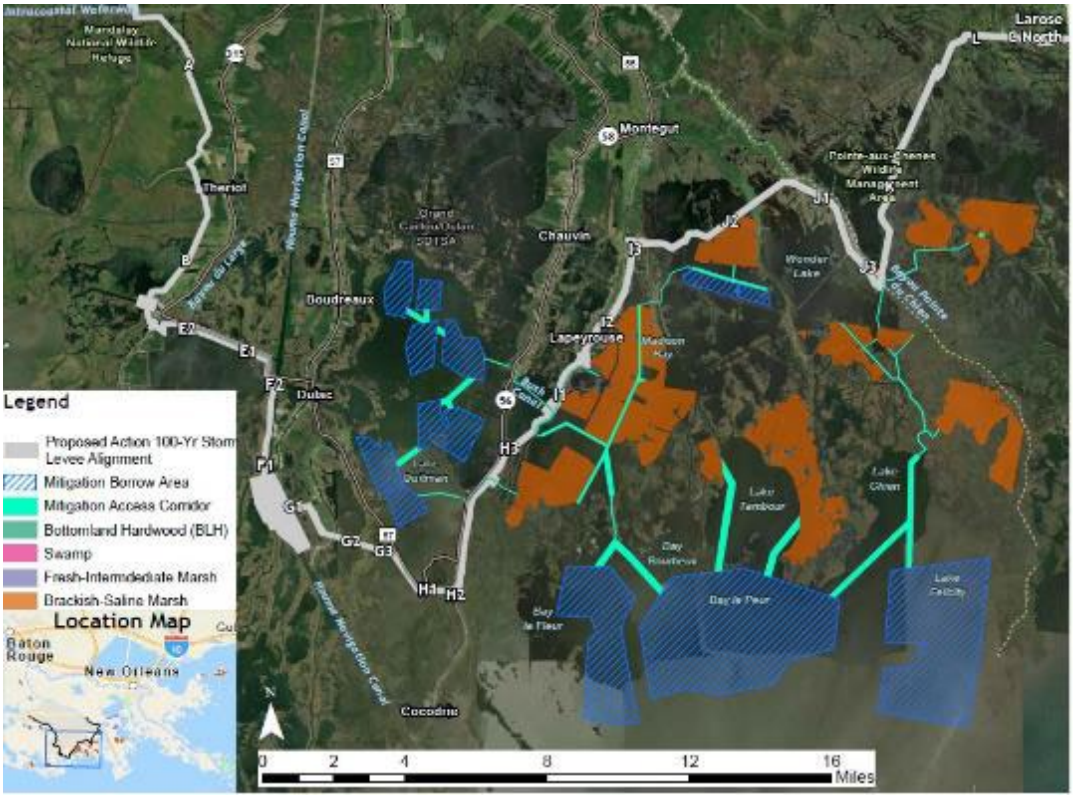

Figure 28. Brackish-Saline Mitigation Sites.

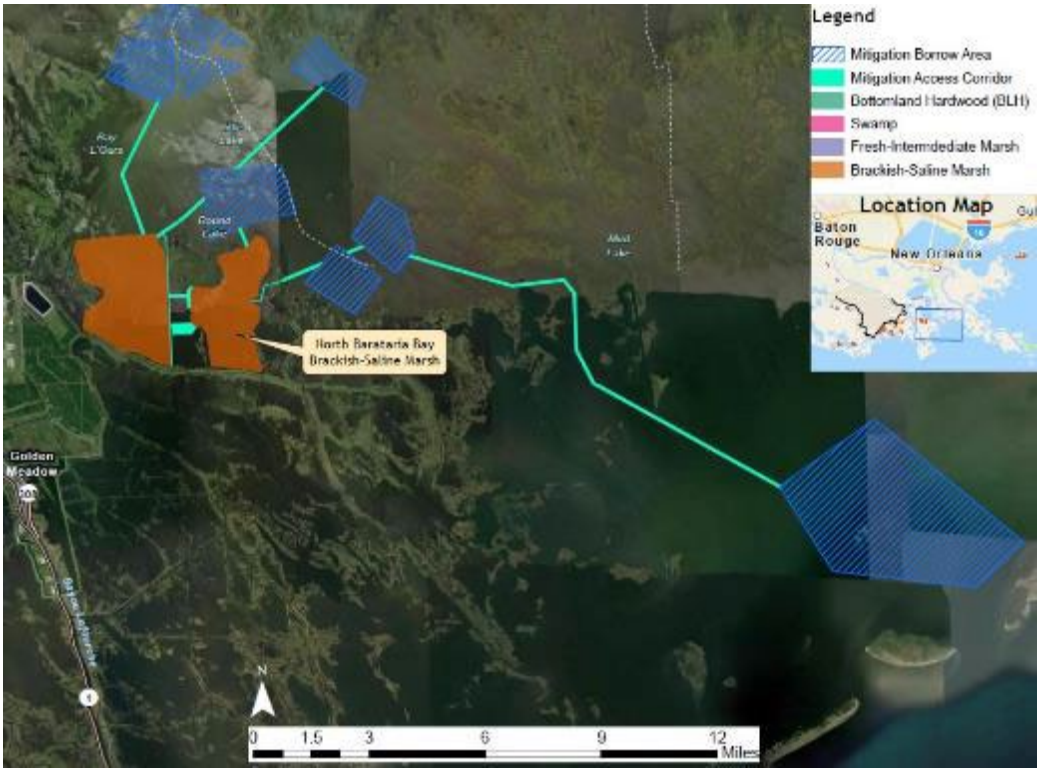

Figure 29. Brackish-Saline Mitigation Sites.

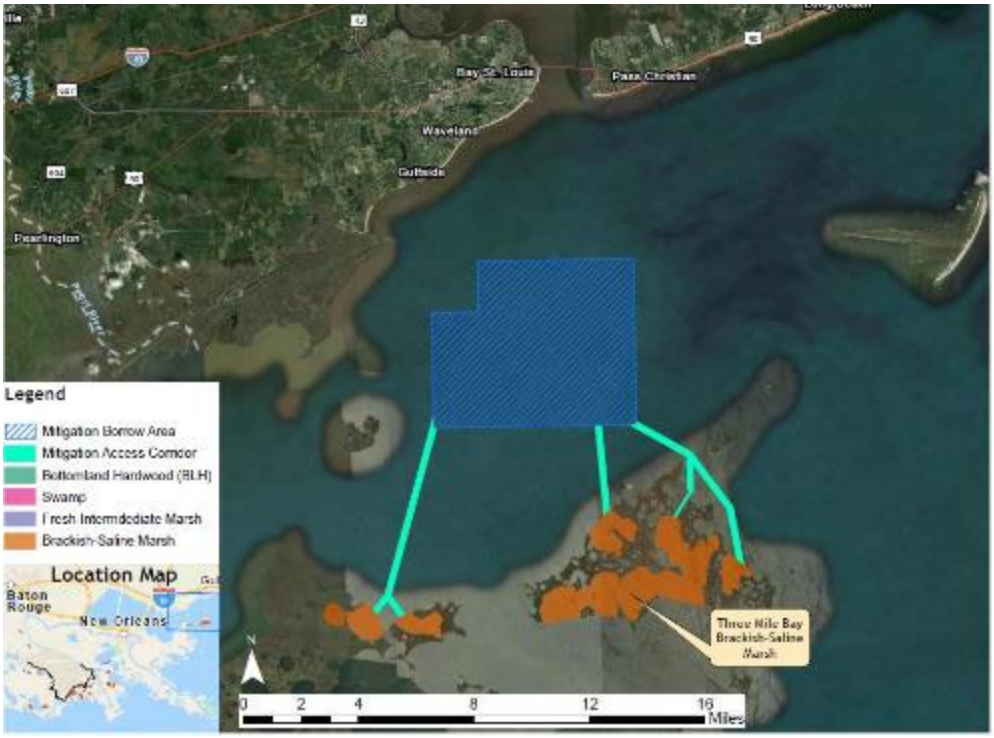

Figure 30. Brackish-Saline Mitigation Sites.

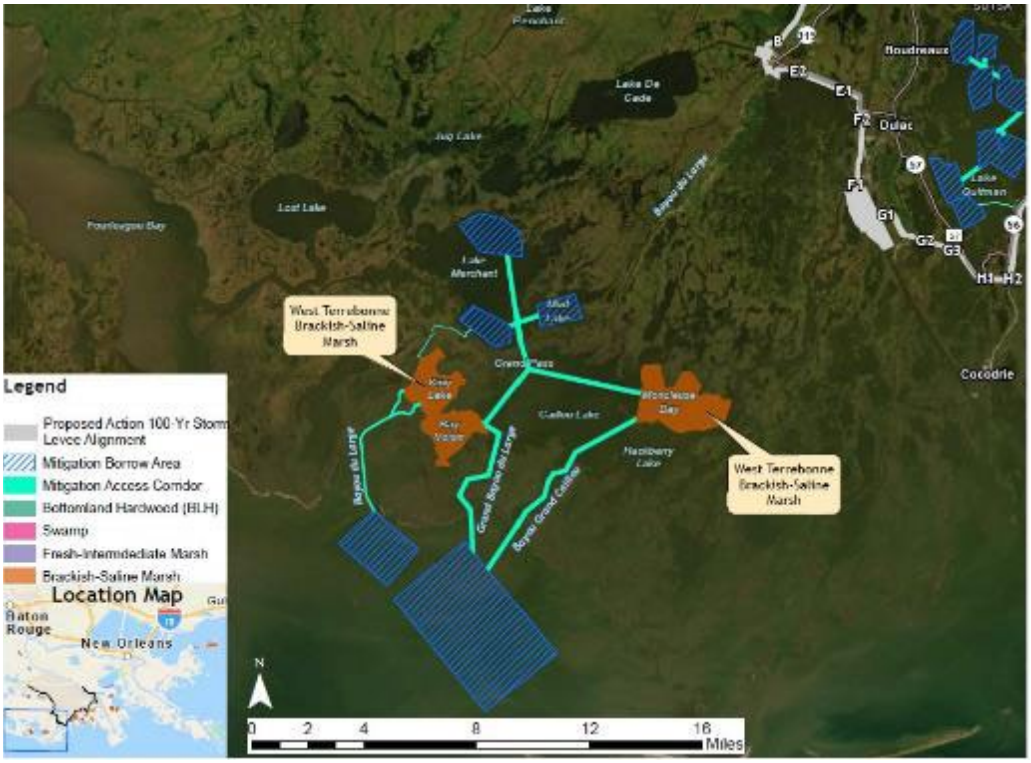

Figure 31. Brackish-Saline Mitigation Sites.

Figure 32. Bottomland Hardwood and Swamp Mitigation Sites.

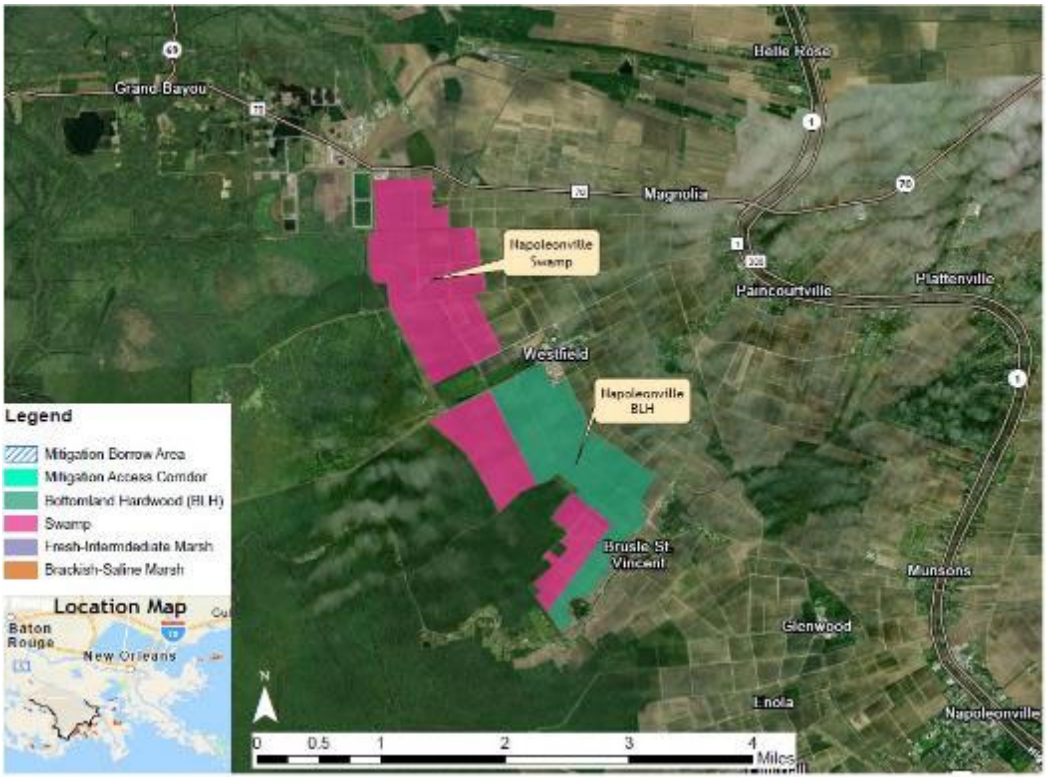

Figure 33. Bottomland Hardwood and Swamp Mitigation Sites.