



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT  
7400 LEAKE AVE  
NEW ORLEANS, LA 70118-3651

Regional Planning and Environment  
Division South  
Environmental Planning Branch

**DRAFT FINDING OF NO SIGNIFICANT IMPACT THROUGH  
IMPLEMENTATION OF COMPENSATORY MITIGATION  
(MITIGATED FONSI)**

**REACH A, MORGANZA TO THE GULF  
HURRICANE AND STORM DAMAGE RISK REDUCTION PROJECT  
TERREBONNE PARISH, LOUISIANA**

**PROGRAMMATIC ENVIRONMENTAL ASSESSMENT #598**

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (CEMVN), Regional Planning and Environment Division South (RPEDS), has prepared this Draft Programmatic Environmental Assessment (DPEA) # 598, Titled "Reach A, Hurricane and Storm Damage Risk Reduction (HSDRR) project, Morganza to the Gulf (MTG), Terrebonne Parish, Louisiana" to evaluate the potential impacts to the human and natural environment from implementing Reach A as a feature of the MTG project for a 100-year level of risk reduction (LORR) from hurricane and storm damage southwest of Houma, Terrebonne Parish, Louisiana. The term "100-year LORR," as it is used throughout this document, refers to a level of risk reduction that reduces the risk of hurricane surge and wave driven flooding that Houma and surrounding communities has a 1% Annual Exceedance Probability (AEP) experiencing each year (1% AEP). The levee designed for this system is sometimes referred to as a "100-year levee". The purpose of the Proposed Action is to construct the Reach A levee and associated structures as a feature of the MTG Project that would provide hurricane and storm damage risk reduction for the communities located within the MTG levee system in accordance with the project described in Section 7002(3) of WRRDA 2014, as updated by the 2021 Engineering and Design Report (EDR). The primary concern continues to be the flood risk associated with storm surge and waves, which is increasing due to wetland loss, sea level rise, and subsidence.

This DPEA is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] §1500-1508), as reflected in the USACE ER 200-2-2 (33 CFR §230).

This DPEA includes an impact analysis for both programmatic and constructible features for Reach A as a component of the MTG Project. The programmatic features are those features in which there is a feasibility level of design, but not sufficient design

detail and analysis to implement the features at this time. Additional design and analysis would be necessary to go to construction and those details would be assessed in supplemental NEPA documents to this DPEA. Constructible features are those features in which there is sufficient design detail and analysis to recommend construction implementation, pending approval of the findings of no significant impact (FONSI), if deemed appropriate.

Construction of the MTG Project was authorized by Section 1001 (24) of the WRDA of 2007, Public Law (PL) 110-114, at a total cost of \$886.7 million. The project was reauthorized by Section 7002(3) of the Water Resources Reform and Development Act of 2014 (WRRDA 2014)) in accordance with the Post Authorization Change Report and Revised Programmatic Environmental Impact Statement (PACR/RPEIS) dated 2013. The project is designed to provide a 100-year level of risk reduction (LORR) hurricane and storm risk reduction project in Terrebonne Parish, Louisiana, while ensuring navigational passage and tidal exchange.

**Description of the Proposed Action:** The Proposed Action is a combination of both programmatic and constructible features for Reach A of the MTG project, and it includes 7.16 miles of earthen levee and 0.22-mile floodwall designed to a +17-foot and +16.5-foot elevation North American Vertical Datum of 1988 (NAVD 88), respectively; 11 environmental control structures; two collector canals; and two floodgates. The proposed floodgates are a 56-foot-wide barge type floodgate on the Minors Canal north of the GIWW, and a 125-foot to 225-foot wide sector gate on the Gulf Intracoastal waterway (GIWW) west of Houma (GIWW-W).

Although programmatic in nature, this DPEA has sufficient details and impact analyses on 3.26 miles of earthen levee south of the GIWW between Stations 3512+00.00 and 3684+00.00 and associated drainage canals to go to construction upon signing of a FONSI, if deemed appropriate. Further project details are included in Section 2 of the DPEA, which explains the alternative formulation process. Figures showing the locations of these features are in Appendix A: Project Description. Table 2-2 provides a summary of the Programmatic and Constructible Features.

**Factors Considered in the Determination:** The CEMVN has assessed the impacts of the "no action" and the proposed action alternatives on relevant resources in the project area including aquatic/fisheries resources; essential fish habitat; wildlife; threatened, endangered, and protected species; water quality; air quality; cultural resources; recreational resources; visual resources (aesthetics), and noise. The constructible features of the proposed action are the environmentally preferred alignment. The programmatic features require further evaluation to determine an alignment that is the least environmentally damaging proposed alignment. The impacts identified for the programmatic features would be anticipated to change upon further engineering, design and NEPA analysis. Implementation of the proposed action would result in the following wetland impacts as shown in Table 1.

*Table 1. Programmatic and Constructible Features Acres of Impact and AAHU's*

Proposed Action	Wetland Habitat Type	Acres	AAHU
Programmatic Features *	Swamp	18.14	-9.69
	BLH	12.62	-3.01
	Fresh/Intermediate Marsh	155.46	-84.11
	Programmatic Features Total	186.22	-96.81
Constructible Features	Swamp	0	0
	BLH	1.76	-0.55
	Fresh/Intermediate Marsh	145.7	-72.47
	Constructible Reach A Total	147.46	-73.02
	<b>Reach A Total</b>	<b>333.68</b>	<b>-169.83</b>

\* Acres and AAHU's calculated for the programmatic features are preliminary at this level of engineering design and analysis.

### Mitigation Plan Description

A mitigation plan has been developed to offset impacts to wetland resources to less than significant impacts. Efforts were taken to avoid, minimize, rectify and or reduce habitat impacts, but there are still unavoidable impacts to fish and wildlife resources associated with the proposed action. The objectives of the mitigation plan are to satisfy the mitigation need and are defined by the results of the habitat impact assessment model using quantified units. The same habitat assessment model was used to estimate potential Morganza to the Gulf project impacts and potential mitigation project outputs. The mitigation need is identified as follows:

Fresh/Intermediate Marsh: Constructible Features of Reach A - Compensate for the loss of up to 109 AAHUs of fresh/intermediate marsh wetland habitat in the Mississippi Alluvial Plain, Deltaic Coastal Marshes and Barrier Islands ecoregion within Louisiana.

Bottomland Hardwoods: Constructible Features of Reach A-Compensate for the loss of 0.55 AAHUs of Bottomland Hardwoods in the Terrebonne Basin.

Due to the programmatic nature of this DPEA, mitigation can only be implemented for the constructible features at this time due to the uncertainties associated with the programmatic features. Table 2 list the AAHU's by habitat type that would be compensated for through implementation of the mitigation plan.

Table 2. Constructible Features Impacts

Wetland Habitat Type	AAHUs Impacted
Swamp	0
BLH	-0.55
Fresh Marsh	-72.47
Total	-73.02

The mitigation plan for the programmatic and constructible features will be a combination of USACE constructed projects and mitigation bank credit purchases.

The mitigation plan for the constructible features of Reach A include the following two measures:

**Fresh and Intermediate Marsh - Construction at Lake Salvador (109.42 AAHUs)**

The construction of marsh creation at Lake Salvador can be sized and assessed sufficiently such that the proposed mitigation could be constructed anywhere within the larger identified mitigation site.

This alternative includes construction of a 275 acre restoration site in Lafourche Parish. Measures include perimeter retention dikes, interior terraces, dredged material placement to the required elevation, 1 year after dewatering bringing down dikes, should naturally vegetate, and borrow within Lake Salvador.

**Bottomland Hardwoods - Mitigation Bank Purchase (0.55 AAHUs BLH)**

Purchase of mitigation bank credits for BLH habitat would be dependent on receipt of an acceptable proposal(s) and total purchase cost. No particular bank(s) is (are) proposed for use at this time. The bank(s) from which credits would be purchased would be selected through a solicitation process, through which any mitigation bank meeting eligibility requirements and having the appropriate resource type of credits could submit a proposal to sell credits.

A summary of the mitigation plan is in Section 3 of the DPEA, and the details of the Mitigation Plan are included in Appendix E.

## **Environmental Compliance**

### **Clean Air Act of 1970**

The Clean Air Act sets goals and standards for the quality and purity of air. It requires the Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The project area is in Terrebonne Parish, Louisiana. Terrebonne Parish is in attainment of

National ambient air quality standards (NAAQS). A general conformity determination is not required.

### **Clean Water Act of 1972 – Section 401, Section 402, and Section 404**

The Clean Water Act (CWA) sets and maintains goals and standards for water quality and purity. Section 401 requires a Water Quality Certification (WQC) from the Louisiana Department of Environmental Quality (LDEQ) that a proposed project does not violate established effluent limitations and water quality standards. The application for the State WQC was provided to the LDEQ on 1 March 2024 in accordance with LAC 33:IX. A WQC will be obtained prior to signing of a FONSI.

As required by Section 402 of the CWA, Louisiana Pollution Discharge Elimination System (LPDES) permit coverage for the proposed action would be obtained prior to construction via the General Permit for Discharges of Storm Water from Construction Activities Five Acres or More from the LDEQ.

Section 404 of the CWA requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the United States, including wetlands. A 404(b)(1) evaluation was released for a 30-day comment period on 1 March 2024.

### **Coastal Zone Management Act of 1972**

The Coastal Zone Management Act requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." The USACE is currently in the process of coordinating the proposed action with the Louisiana Department of Natural Resource (LDNR). A consistency determination will be provided to LDNR on 1 March 2024 and would be obtained prior to signing of the FONSI.

### **Endangered Species Act of 1973**

The Endangered Species Act is designed to protect and recover threatened and endangered (T&E) species of fish, wildlife, and plants. A biological assessment was prepared and submitted to the USFWS on 10 January 2024 and NMFS on 16 January 2024, as part of on-going coordination for listed T&E species, including the West Indian manatee and alligator snapping turtle, migratory shorebirds, and species of management concern (i.e. rare and very rare species) that are known to occur or are believed to occur within the area. In an email dated 22 January 2024, NMFS acknowledged receipt of the project information and assigned the project tracking number SERO-2024-0065-02587. NMFS stated they will assign a Consultation Biologist within the next 10 to 12 weeks. On 8 Feb 2024, NMFS requested a revised BA to correct missing and/or incorrect information. MVN submitted a revised BA to NOAA on

22 Feb 2024. Consultation under the Endangered Species Act is on-going and would be concluded prior to the signing of a FONSI.

**Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations dated February 11, 1994**

Executive Order 12898 directs federal agencies to: identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations to the greatest extent practicable and permitted by law. No high adverse disproportionate impacts were identified. CEMVN also assessed the potential Environmental Justice (EJ) impacts to the human environment, including impacts to access roads and to those who live along them and from noise. No impacts are expected.

**Executive Order 14008, Tackling the Climate Crisis at Home and Abroad dated 27 January 2021, Sec 219: SECURING ENVIRONMENTAL JUSTICE AND SPURRING ECONOMIC OPPORTUNITY; Office of Management and Budget Memorandum M-21-28**

Executive Order 14008, Sec 219, states that agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, and climate-related impacts as well as the accompanying economic challenges of such impacts. An EJ assessment determined that no direct adverse, disproportionate impacts are expected to occur as a result of the Proposed Action. The assessment identified minor indirect human impacts that would occur during construction; However, it was determined that these impacts are not disproportionate to minority or low-income residents. Reach A will not cause induce flooding to areas of EJ concern south of the project area; However, the 2013 PACR/RPEIS did identify potential induced flooding, but it was not caused by Reach A. Supplemental NEPA will reevaluate H&H modeling and induced flooding potential. Additionally, areas of EJ concern are shown to benefit from flood risk reduction of the Proposed Action.

**Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All**

Executive Order 14096 states that advancing environmental justice will require investing in and supporting culturally vibrant, sustainable, and resilient communities. The Proposed action, as part of a larger Flood Risk Management system, benefits areas of EJ concern by reducing flood risk to those living in vulnerable communities and this DPEA and other public involvement allows for timely opportunities for members of the public to share information or concerns and participate in the decision-making process, consistent with the EO and NEPA.

**Executive Order 11988: Floodplain Management**

Executive Order 11988 directs federal agencies to reduce flood loss risk; minimize flood impacts on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains. Agencies must consider alternatives to avoid adverse and incompatible development in the flood plain. If the only practical alternative requires action in the floodplain, agencies must design or modify their action to minimize adverse impacts. Some project features would extend into floodplains; however, the proposed action would not promote future development within the floodplain that otherwise would not occur. The study is compliant with the order.

### **Executive Order 11990: Protection of Wetlands**

Executive Order 11990 directs federal agencies to assess the likely impacts to wetlands associated with any proposed action. This is met through the following: (a) avoid long and short term adverse impacts associated with the destruction or modification of wetlands; (b) avoid direct or indirect support of new construction in wetlands; (c) minimize the destruction, loss or degradation of wetlands; (d) preserve and enhance the natural and beneficial values served by wetlands; and (e) involve the public throughout the wetlands protection decision-making process. The proposed action was developed to avoid and minimize impacts to wetlands where practicable within the constructible reach. The programmatic features will be further refined through additional engineering and design in the future. Project designs would be developed with consideration of ways to avoid and minimize impacts to wetlands to the maximum extent possible and still meet the intended project purpose. The additional analysis would be assessed in subsequent NEPA documents and released to the public for comment. A mitigation plan has been developed to offset the impacts resulting from implementation of the constructible features. Reference Section 3 and Appendix E of this DPEA. Upon further engineering, design and analysis on the programmatic features, all unavoidable impacts would be mitigated as well.

### **Fish and Wildlife Coordination Act of 1934**

The Fish and Wildlife Coordination Act provides authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It requires federal agencies that construct, license or permit water resource development projects to first consult with the USFWS, NMFS and state resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that details existing fish and wildlife resources in a project area, potential impacts due to a proposed project and recommendations for a project. A draft CAR (DCAR) with 22 recommendations were received on January 5, 2024. CEMVN has evaluated USFWS recommendations and provided specific responses in Section 7 of the DPEA. The USFWS DCAR is available in Appendix G.

### **Magnuson-Stevens Fisheries Conservation and Management Act**

The Magnuson-Stevens Fishery Conservation and Management Act, as amended, Public Law 104-208, addresses the authorized responsibilities for the protection of EFH by NMFS in association with regional fishery management councils. The NMFS has a “findings “with the CEMVN on the fulfillment of coordination requirements under provisions of the Magnuson-Stevens Fishery Conservation and Management Act. In those findings, the CEMVN and NMFS have agreed to complete EFH coordination requirements for federal civil works projects through the review and comment on NEPA documents prepared for those projects. See 50 CFR 600.920(f) (allowing use of existing environmental review procedures). This DPEA is being provided to NMFS on March 1, 2024 at the start of the 30-day public review. Consultation with NMFS is on-going and would be concluded prior to the signing of a FONSI.

### **Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act**

The MBTA is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing of migratory birds unless permitted by regulations promulgated by the Secretary of the Interior. The USFWS and the Department of Justice are the federal agencies responsible for administering and enforcing the statute. The study area is known to support colonial nesting wading/water birds (e.g., herons, egrets, ibis, night-herons and roseate spoonbills) and shorebirds (terns and gulls). USFWS and USACE biologists would survey the Proposed Action areas before construction to confirm no nesting activity as suitable habitat and the potential for nesting exist within the area. If active nesting exists within 1,000 feet (water birds) or 1,300 feet (shorebirds) of construction activities then USACE, in coordination with USFWS, would develop specific measures to avoid adverse impacts to those species. A detailed nesting prevention plan may be necessary in order to deter birds from nesting within the aforementioned buffer zones of the area footprints in order to avoid adverse impacts to these species. If a nesting prevention plan is necessary, it would be prepared in coordination with USFWS.

The bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA. USFWS developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute “disturbance,” which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

<https://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf>.

These guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. During construction of the Optimized TSP, 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



the USACE. If a bald eagle nest occurs or is discovered within 660 feet of the project footprint, then an evaluation must be performed to determine whether the construction and/or operation of the project is likely to disturb nesting bald eagles. An evaluation would be conducted in accordance with the procedures outlined by the USFWS at: <http://www.fws.gov/southeast/es/baldeagle>.

Following completion of the evaluation, a determination would be made as to whether additional consultation is necessary or not. During nesting season, construction must take place outside of FWS/LDWF buffer zones. A USACE Biologist and an USFWS Biologist would survey for nesting birds prior to the start of construction.

### **National Historic Preservation Act of 1966**

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The procedures in 36 CFR Part 800 define how Federal agencies meet these statutory responsibilities. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, including the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) and any Tribe that attaches religious or cultural significance to historic properties that may be affected by an undertaking. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. NHPA consultation letters pursuant to Section 106 were mailed to SHPO on 15 December 2023 for 30-day review. These consultation letters reference earlier consultation that phasing of cultural resources survey would be utilized for some components of Reach A, including swamp mitigation (Lake Salvador). 15 December 2023 for 30-day review. In an email dated 4 January 2024, SHPO concurred that the actions of this DPEA are determined as having no effect on historic properties. As per obligations stated in consultation, Phase I cultural resources survey of the Lake Salvador swamp mitigation site must be completed and any historic properties that may be discovered during that survey must be avoided or protected, before use of the mitigation site can begin. Sufficient acres of boundary for the Lake Salvador site exist, that avoidance can be easily undertaken. See Appendix D for documentation of National Historic Preservation Act Coordination.

### **Tribal Consultation**

It is the policy of the federal government to consult with Federally recognized Tribal Governments on a Government-to-Government basis as required in E.O. 13175 ("Consultation and Coordination with Indian Tribal Governments;" U.S. President 2000). The requirement to conduct coordination and consultation with Federally recognized Tribes on and off of Tribal lands for "any activity that has the potential to significantly

affect protected tribal resources, tribal rights (including treaty rights), and Indian lands” finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws. The USACE Tribal Consultation Policy, 5 December 2023, specifically implemented this E.O. and later Presidential guidance. Table 3 lists the 2023 USACE Tribal Consultation Policy and Related Documents provide definitions for key terms, such as tribal resources, tribal rights, Indian lands, consultation, as well as guidance on the specific trigger for consultation.

*Table 3. 2023 USACE Tribal Consultation Policy Definitions*

Category	Definition
Tribal rights:	Those rights legally accruing to a Federally recognized Tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaties, statutes, judicial decisions, executive orders or agreement and that give rise to legally enforceable remedies.
Tribal lands:	Any lands title to which is: either held in trust by the United States for the benefit of any Federally recognized Indian tribe or individual or held by any Federally recognized Indian tribe or individual subject to restrictions by the United States against alienation.
Protected tribal resources	Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Tribal lands, retained by, or reserved by or for, Federally recognized Tribes through treaties, statutes, judicial decisions or executive orders.

While Terrebonne Parish has a long history of occupation by Native American communities, prior to its establishment and throughout its history, there are currently no protected tribal resources, trial rights, or Indian lands that have the potential to be significantly affected by the Proposed Actions within in the watershed. However, in accordance with CEMVN’s responsibilities under the NHPA Section 106 process and E.O. 13175, CEMVN has offered the following Federally recognized Indian tribes the opportunity to review and comment on the Proposed Action: 1) the Chitimacha Tribe of Louisiana, 2) the Coushatta Tribe of Louisiana, 3) the Jena Band of Choctaw Indians, 4) the Mississippi Band of Choctaw Indians, and, 5) the Tunica-Biloxi Tribe of Louisiana. See Appendix H: NHPA Coordination for consultation letter date and response received from Seminole Nation of Oklahoma dated 15 June 2021 and the Choctaw Nation of Oklahoma dated 8 July 2021.

**Environmental Commitments:** The following commitments are an integral part of the proposed action:

1. As project planning continues on the programmatic features , the CEMVN will look for ways to avoid and minimize impacts to high-value habitats. Through continued engineering and design, CEMVN will consider shifting the alignment as engineering and design evolves off high quality bald cypress swamp forest, swamp, bottomland hardwood forest and wetlands to the greatest extent possible

that maintains the project purpose. Unavoidable losses of such habitats will be fully compensated by replacement in-kind. The USFWS will be consulted in the development of plans and specifications for project features including compensatory mitigation.

2. CEMVN will avoid impacts to bald eagles and their nesting habitat. Prior to construction, a qualified biologist will inspect the proposed work site for the presence of undocumented nests during the nesting season (October through mid-May). If an active or inactive eagle nest is discovered within 1,500 feet of the project footprint, the bald and golden eagle guidelines would be followed to determine whether disturbance will occur and/or an incidental take permit is needed. Any take would be reported to the USFWS and the LDWF. Bald eagle nest (active, inactive, or seemingly abandoned) would be protected.
3. During in-water work in areas that potentially support manatees all personnel associated with the project will be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. The CEMVN will contact the USFWS if inadvertently the proposed action directly or indirectly affects the West Indian manatee.
4. CEMVN will avoid adverse impacts to nesting wading bird colonies through careful design of project features and timing of construction. A qualified biologist will inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season (September 1 through February 15) prior to construction. If nesting colonies are identified, CEMVN will notify the USFWS and LDWF regarding recommendations for avoiding impacts to nesting colonies.
5. CEMVN will 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.
6. CEMVN will operate the water control structures and floodgates according to the draft MTG Water Control Structure Operations Plan in Appendix I. If a need is identified to change the conditions for closure and opening of Reach A water control structures in the draft MTG Water Control Structure Operations Plan, this would be coordinated closely with Resource Agencies as part of a supplemental NEPA document to DPEA #598.
7. NHPA Design Commitments. CEMVN has phased the identification and evaluation of historic properties following the guidelines in 36 CFR § 800.4(b)(2). CEMVN shall complete Phase I cultural resources survey and applicable consultation following the procedures of 36 CFR § 800 for the programmatic features and mitigation features before construction begins on any of these features (examples include the Lake Salvador swamp mitigation site and the

Reach A alignment north of the GIWW). All, non-mitigation constructible features have been subjected to Phase I cultural resources Survey.

**Public Involvement:** The proposed action has been coordinated with appropriate federal, state, and local agencies and businesses, organizations, and individuals through distribution of DPEA #598 for a 30-day public review and comment period beginning 1 March 2024 through 31 March 2024.

**DECISION:**

The Proposed Action consists of a combination of both programmatic and constructible features. As a whole, the Proposed Action consists of an approximately 7.16 miles earthen levee and 0.22 miles of floodwall designed to a +16.5-foot and +17 foot elevation (NAVD88), respectively ; eleven environmental control structures; two collector canals; and two floodgates. The floodgates proposed are a 125-foot to 225-foot sector gate on the Gulf Intracoastal waterway west of Houma (GIWW-W) and a 56 foot-wide barge type floodgate on the Minors Canal, north of the GIWW.

I have reviewed the PEA #598 and have considered public and agency comments and recommendations. Based on the assessment conducted in PEA #598, which is attached hereto and made a part hereof, and the implementation of the environmental commitments listed above, I have determined that the proposed construction activities would have no significant impact on the human environment.

The Proposed Action is justified and is in accordance with environmental statutes.

---

Date

**DRAFT**

---

Cullen Jones  
Colonel, US Army  
District Commander

# DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

DPEA #598

Reach A, Hurricane and Storm Damage Risk Reduction Project  
Morganza to the Gulf of Mexico, Terrebonne Parish, Louisiana



February 2024

# CONTENTS

## Section 1 1

### Introduction 1

1.1	Study and Project Area .....	2
1.2	Non-Federal Sponsor .....	2
1.3	Purpose and Need .....	2
1.4	Project Scope .....	4
1.5	Authority .....	5
1.6	Authorized Project .....	6
1.7	Background and History .....	7
1.7.1	Relevant Studies, Reports, and Projects .....	7
1.8	Wetland Value Assessment .....	10

## Section 2 12

### Alternatives 12

2.1	Alternative Formulation .....	12
2.2	Problems and Objectives .....	12
2.3	Alternatives Developed .....	13
2.4	Proposed Action .....	17
2.4.1	No Action Alternative (PACR Alignment) .....	17
2.4.2	Modified PACR Alignment (Proposed Action) .....	18
2.4.3	Mitigation Plan .....	19
2.5	Plan Components .....	20
2.5.1	Programmatic Features .....	21
2.5.2	Constructible Features .....	33
2.5.3	Design and Construction .....	37
2.5.4	Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) .....	37

## Section 3 38

Mitigation Planning .....	38
---------------------------	----

## Section 4 42

Affected Environment .....	42
----------------------------	----

4.1	General Setting .....	42
4.1.1	Description of the Watershed .....	42
4.1.2	Land Use/Land Cover .....	42
4.1.3	Climate Change .....	43

4.1.4	Hydrology and Hydraulics .....	44
4.2	Relevant Resources .....	46
4.2.1	Wetland Resources .....	51
4.2.2	Fisheries and Aquatic Resources .....	53
4.2.3	Essential Fish Habitat (EFH) .....	54
4.2.4	Wildlife .....	55
4.2.5	Threatened, Endangered, and Protected Species .....	56
4.2.6	Soils and Prime and Unique Farmlands .....	60
4.2.7	Water Quality .....	62
4.2.8	Air Quality .....	63
4.2.9	Greenhouse Gasses .....	66
4.2.10	Noise and Vibration .....	66
4.2.11	Aesthetics .....	70
4.2.12	Recreation.....	71
4.2.13	Socioeconomics.....	72
4.2.14	Environmental Justice.....	79
4.2.15	Cultural, Historic, and Tribal Trust Resources .....	84
<b>Section 5</b>	<b>87</b>	
<b>Future Without Project Conditions .....</b>	<b>87</b>	
5.1	Wetlands Resources .....	87
5.2	Aquatic and Fisheries Resources.....	89
5.3	Essential Fish Habitat.....	90
5.4	Wildlife .....	90
5.5	Threatened, Endangered, and Protected Species .....	91
5.6	Soils .....	91
5.7	Water Quality.....	92
5.8	Air Quality .....	92
5.9	Greenhouse Gasses.....	92
5.10	Noise and Vibration .....	93
5.11	Aesthetics .....	93
5.12	Recreation .....	94
5.13	Socioeconomics .....	94
5.13.1	Population and Households.....	94
5.13.2	Labor and Employment.....	95
5.13.3	Public Facilities and Services .....	96

5.13.4	Transportation .....	96
5.13.5	Regional and Community Growth .....	96
5.13.6	Community Cohesion .....	97
5.14	Environmental Justice .....	98
5.15	Cultural, Historic, and Tribal Trust Resources .....	98
<b>Section 6 99</b>		
<b>Environmental Consequences.....</b>		<b>99</b>
6.1	Wetland Resources .....	100
6.1.1	No Action (PACR Alignment for Reach A) .....	100
6.1.2	Proposed Action - Modified PACR Alignment for Reach A.....	102
6.1.3	Mitigation Plans .....	107
6.2	Aquatic and Fisheries Resources .....	110
6.2.1	No Action (PACR Alignment for Reach A) .....	110
6.2.2	Proposed Action - Modified PACR Alignment for Reach A.....	110
6.2.3	Mitigation Plans .....	112
6.3	Essential Fish Habitat .....	114
6.3.1	No Action (PACR Alignment for Reach A) .....	114
6.3.2	Proposed Action - Modified PACR Alignment for Reach A.....	114
6.3.3	Mitigation Plans .....	116
6.4	Wildlife .....	118
6.4.1	No Action (PACR Alignment for Reach A) .....	118
6.4.2	Proposed Action - Modified PACR Alignment for Reach A.....	119
6.4.3	Mitigation Plans .....	120
6.5	Threatened, Endangered, and Protected Species.....	122
6.5.1	No Action (PACR Alignment for Reach A) .....	122
6.5.2	Proposed Action - Modified PACR Alignment for Reach A.....	122
6.5.3	Mitigation Plans .....	124
6.6	Soils .....	126
6.6.1	No Action (PACR Alignment for Reach A) .....	126
6.6.2	Proposed Action - Modified PACR Alignment for Reach A.....	127
6.6.3	Mitigation Plans .....	128
6.7	Water Quality .....	129
6.7.1	No Action (PACR Alignment for Reach A) .....	129
6.7.2	Proposed Action - Modified PACR Alignment for Reach A.....	130
6.7.3	Mitigation Plans .....	132



6.8	Air Quality .....	134
6.8.1	No Action (PACR Alignment for Reach A).....	134
6.8.2	Proposed Action - Modified PACR Alignment for Reach A .....	134
6.8.3	Mitigation Plans.....	135
6.9	Greenhouse Gasses.....	136
6.9.1	No Action (PACR Alignment for Reach A).....	136
6.9.2	Proposed Action - Modified PACR Alignment for Reach A .....	137
6.9.3	Mitigation Plans.....	140
6.9.4	Comparison of the Baseline Condition, the No Action Alternative, the Proposed Action.....	140
6.9.5	Data Gaps and Uncertainties Associated with GHG Emission Estimates .....	142
6.10	Noise and Vibration .....	143
6.10.1	No Action (PACR Alignment for Reach A).....	143
6.10.2	Proposed Action - Modified PACR Alignment for Reach A .....	143
6.10.3	Mitigation Plans.....	146
6.11	Aesthetics .....	148
6.11.1	No Action (PACR Alignment for Reach A).....	148
6.11.2	Proposed Action - Modified PACR Alignment for Reach A .....	148
6.11.3	Mitigation Plans.....	148
6.12	Recreation .....	149
6.12.1	No Action - PACR Alignment for Reach A.....	149
6.12.2	Proposed Action - Modified PACR Alignment for Reach A .....	149
6.12.3	Mitigation Plans.....	150
6.13	Socioeconomics .....	150
6.13.1	Population and Housing.....	150
6.13.2	Employment, Business, and Industrial Activity .....	152
6.13.3	Public Facilities and Services .....	152
6.13.4	Transportation and Navigation.....	153
6.13.5	Community and Regional Growth.....	154
6.13.6	Tax Revenues and Property Values .....	155
6.13.7	Community Cohesion .....	156
6.13.8	Mitigation Plan .....	157
6.14	Environmental Justice .....	158
6.14.1	No Action (PACR Alignment for Reach A).....	159
6.14.2	Proposed Action - Modified PACR Alignment for Reach A .....	160
6.14.3	Mitigation Plans.....	166

6.15 Cultural, Historic, and Tribal Trust Resources .....166

6.15.1 No Action (PACR Alignment for Reach A) .....166

6.15.2 Proposed Action - Modified PACR Alignment for Reach A.....166

6.15.3 Mitigation Plans .....167

6.16 Cumulative Effects Analysis.....169

**Section 7 171**

**Compliance With Environmental Laws and Regulations.....171**

7.1 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations dated February 11, 1994;.....171

7.2 Executive Order 14008, Tackling the Climate Crisis at Home and Abroad dated 27 January 2021, Sec 219: SECURING ENVIRONMENTAL JUSTICE AND SPURRING ECONOMIC OPPORTUNITY; Office of Management and Budget Memorandum M-21-28; .....172

7.3 Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All ....172

7.4 Executive Order 11988: Floodplain Management .....172

7.5 Executive Order 11990: Protection of Wetlands .....173

7.6 Clean Air Act of 1970, As Amended .....173

7.7 Clean Water Act of 1972, As Amended – Sections 401, 402 and 404 .....173

7.8 Coastal Zone Management Act .....174

7.9 Magnuson-Stevens Fishery Conservation and Management Act .....174

7.10 Endangered Species Act of 1973 .....174

7.11 Farmland Protection Policy Act.....174

7.12 Fish and Wildlife Coordination Act.....175

7.13 Hazardous, Toxic, and Radioactive Waste .....181

7.14 Migratory Bird Treaty Act, As Amended.....182

7.15 National Historic Preservation Act of 1966, As Amended.....182

7.16 Wild and Scenic Rivers Act.....184

**Section 8 185**

**Agency Coordination and Public Involvement .....185**

**Section 9 186**

**Conclusion 186**

9.1 View of the Non-Federal Sponsor .....186

**Section 10 188**

**List of Preparers.....188**

**Section 11 190**

**References and Resources .....190**

**Section 12 192**

<b>List of Acronyms and Abbreviations.....</b>	<b>192</b>
--	------------

## LIST OF TABLES

Table 1-1. Summary of the New Hydraulic Design Elevations in Feet (NAVD 88) Based on the Site Adaptive Criteria. ....	4
Table 1-3. TLCD Regulatory Permits .....	10
Table 2-1. Summary of Plan Formulation for Reach A.....	14
Table 2-2. Programmatic and Constructible Features for Reach A .....	21
Table 3-1. Summary of Selected Mitigation Plan for Habitat Mitigation of the Entire MTG Mitigation Plan and the Constructible feature of Reach A.....	41
Table 4-1. Frequency Run Scenarios .....	45
Table 4-2. Relevant Resources and Their Institutional, Technical, and Public Importance .....	48
Table 4-3. Relevant Resource Impacted by the Proposed Action.....	51
Table 4-4. EFH Species Found in the MTG Watershed .....	54
Table 4-5. Highly Migratory Species EFH Found in the MTG Watershed.....	55
Table 4-6. T&E Species Occurring in Terrebonne Parish .....	58
Table 4-7. National Ambient Air Quality Standards .....	65
Table 4-8. Weighted (dBa) Sound Levels of Construction Equipment Modeled Attenuation at Various Distances .....	70
Table 4-9. Fishing Licenses Sold in the Vicinity of Project Area - Fiscal Year 2019.....	72
Table 4-10. Active Boat Registrations in the Vicinity of the Project Area - Fiscal Year 2019 .....	72
Table 4-11. Hunting Licenses Sold in the Vicinity of the Project Area - Fiscal Year 2019.....	72
Table 4-12. Populations and Households.....	73
Table 4-13. Labor and Employment .....	74
Table 4-14. Employment by Industry (Ths.) .....	77
Table 4-15. Income Per Capita (\$) .....	78
Table 4-16. EJI Models.....	81
Table 4-17. Census Tracts and Criteria Met for Areas of EJ Concern .....	83
Table 5-1. Direct Impacts to Wetlands (acres) from Implementation of the 1% Annual Exceedance Probability Storm Surge Risk Reduction System described in the PEIS. Impacts were Evaluated Based on Low, Intermediate, and High RSLR Scenarios.....	89
Table 5-2. Populations and Households.....	95
Table 5-3. Labor and Employment .....	96
Table 5-4. Income Per Capita (\$) .....	97
Table 6-1. Summary of Environmental Consequences by Resource .....	100
Table 6-2. Estimated Wetland Impacts of the Authorized MTG Reach A Footprint (No Action).....	101
Table 6-3. Wetland Impacts of the Proposed Action (Programmatic and Constructible Features).....	103

Table 6-4. Acres of Wetland Impacts Avoided by the Proposed Action .....	103
Table 6-5. Direct Impacts of Programmatic Features .....	105
Table 6-6. Direct Impacts of Constructible Features.....	107
Table 6-7. GHG Emission Estimates Associated with Construction of the No Action Alternative (Includes Borrow Excavation).....	137
Table 6-8. GHG Emissions Estimates Associated with 50 years of O/M of the Proposed Levee System. O/M Efforts Include Operation of Tractors and String Trimmers to Maintain Levees .....	137
Table 6-9. GHG Emission Estimates Associated with Construction of Programmatic Features of the Proposed Action Alternative (Includes Borrow Excavation, does not Include O/M).....	137
Table 6-10. GHG Emission Estimates Associated with O/M and Construction of Programmatic Features of the Proposed Action Alternative (Includes Borrow) .....	137
Table 6-11. GHG Emission Estimates Associated with Construction of the Constructible Features of the Proposed Action (Includes Borrow Excavation, does not Include O/M, Hauling, Burning, or Mitigation).....	139
Table 6-12. GHG Emission Estimates Associated with Construction and O/M of the Constructible Features of the Proposed Action (Includes Borrow Excavation, does not Include Construction, Hauling, Burning, Mitigation).139	
Table 6-13. GHG Emission Estimates Associated Burning (does not Include Construction, Hauling, Mitigation, or O/M) .....	139
Table 6-14. GHG Emission Estimates Associated with Hauling (does not Include Construction, Burning, Mitigation, or O/M).....	140
Table 6-15. Net GHG Sequestration Estimates Associated with Mitigation (does not Include Construction, Borrow, Hauling, Burning, or O/M).....	140
Table 6-16. Comparison of the Total GHG emissions for the No Action Alternative and the Proposed Action (Constructible + Programmatic) with a Baseline Condition where No Flood Risk Reduction Project would be Constructed .....	141
Table 6-17. Comparison of Total Social Cost of GHG emissions for the No Action Alternative and the Proposed Action (Constructible + Programmatic) with a Baseline Condition where No Flood Risk Reduction Project would be Constructed .....	142
Table 7-1. 2023 USACE Tribal Consultation Policy Definitions .....	183
Table 10-1. List of Preparers.....	188

## LIST OF FIGURES

Figure 1-1. Reach A Project Area, Terrebonne Parish, LA.....	5
Figure 1-2. Morganza to Gulf Project, Terrebonne and Lafourche Parishes, LA .....	7
Figure 2-1. Alignments North of the GIWW .....	16
Figure 2-2. Alignments South of the GIWW.....	17
Figure 2-3. Limits of the No Action PACR Alignment for Reach A and Locations of Floodgates and Environmental Control Structure .....	18
Figure 2-4. Limits of Proposed Action for Reach A and Locations of Floodgates and Environmental Control Structures .....	19
Figure 2-5. Typical Levee Section for 2035 Design Elevation .....	22

Figure 2-6. Typical Levee Section for 2085 Design Elevation.....	23
Figure 2-7. Borrow Areas and Access for Reach A North.....	28
Figure 2-8. Borrow Areas and Access for Reach A South. ....	28
Figure 2-9. Southern End Floodwall Cross-section .....	29
Figure 2-10. Approximate Location of Environmental Control Structures in Levee North (Left) and South (Right) of the GIWW .....	30
Figure 2-11. Typical Environmental Control Structure and Associated Project Features .....	31
Figure 2-12. Conceptual Sketch of Sector Gate Complex .....	32
Figure 2-13. Barge Gate Example .....	33
Figure 2-14. Limits of constructible Levee Features .....	34
Figure 2-15. Areas of Soil Bank Degradation (Shown in Green) and Culvert Placement (Show with Yellow Pins) .....	35
Figure 2-16. Borrow Pit and Access Roads for Constructible Features .....	37
Figure 4-1. Total U.S. Emissions of GHG.....	66
Figure 4-2. Areas of EJ Concern .....	82
Figure 6-1. Areas of EJ Concern and Structures Benefiting .....	162

## APPENDICES

Appendix A: Project Description

Appendix B: Figures

Appendix C: Tables

Appendix D: Agency Coordination

Appendix E: Compensatory Mitigation Plan

Appendix F: 404(b)(1) Short Form Evaluation Final

Appendix G: USFWS Coordination Act Report (CAR)

Appendix H: WVA Model Results and Summary of Assumptions

Appendix I: Morganza to the Gulf HEC-RAS Hydraulic Modeling Analysis Report (2023)

Appendix J: Best Management Practices for Protection of the Environment

PAGE INTENTIONALLY LEFT BLANK

# SECTION 1

## Introduction

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (CEMVN), Regional Planning and Environment Division South (RPEDS), has prepared this Draft Programmatic Environmental Assessment (DPEA) # 598 Titled “Reach A, Hurricane and Storm Damage Risk Reduction (HSDRR) Project, Morganza to the Gulf (MTG), Terrebonne Parish, Louisiana” to evaluate the potential impacts to the human and natural environment resulting from the construction of Reach A.

This DPEA is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality’s (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] §1500-1508), as reflected in the USACE ER 200-2-2 (33 CFR §230). This DPEA includes an impact analysis for both programmatic and constructible features for Reach A as a component of the MTG Project. The programmatic features are those features in which there is a feasibility level of design, but not sufficient design detail and analysis to implement the features at this time. Additional design and analysis would be necessary to go to construction and those details would be assessed in supplemental NEPA documents to this DPEA. Constructible features are those features in which there is sufficient design detail and analysis to recommend construction implementation, pending approval of the findings of no significant impacts (FONSI), if deemed appropriate.

Construction of the MTG Project is authorized by Section 1001 (24) of the WRDA of 2007, Public Law (PL) 110-114, at a total cost of \$886.7 million. The project was reauthorized by Section 7002(3) of the Water Resources Reform and Development Act of 2014 (WRRDA 2014)) in accordance with the Post Authorization Change Report and Revised Programmatic Environmental Impact Statement (PACR/RPEIS) dated 2013. The project is designed to provide a 100-year level of risk reduction (LORR) hurricane and storm risk reduction project in Terrebonne Parish, Louisiana, while ensuring navigational passage and tidal exchange. The term “100-year LORR,” as it is used throughout this document, refers to a level of risk reduction that reduces the risk of hurricane surge and wave driven flooding that Houma and surrounding communities has a 1 percent Annual Exceedance Probability (AEP) experiencing each year (1 percent AEP). The levee designed for this system is sometimes referred to as a “100-year levee”.

The Proposed Action is a combination of both programmatic and constructible features for Reach A of the MTG project, and it includes 7.16 miles of earthen levee and 0.22-mile floodwall designed to a +17-foot and +16.5-foot elevation North American Vertical Datum of 1988 (NAVD 88), respectively; 11 environmental control structures; two collector canals; and two floodgates. The proposed floodgates are a 56-foot-wide barge type floodgate on the Minors Canal north of the GIWW, and a 125-foot to 225-foot-wide sector gate on the Gulf Intracoastal waterway (GIWW) west of Houma (GIWW-W).

Although programmatic in nature, this DPEA has sufficient details and impact analyses on 3.26 miles of the Reach A alignment south of the GIWW between Stations 3512+00.00 and

3684+00.00 to go to construction upon signing of a FONSI, if deemed appropriate. Further project details are included in Section 2, which explains the alternative formulation process.

This DPEA #598 provides sufficient information on the potential adverse and beneficial environmental effects of implementing the Proposed Action to allow the Commander to make an informed decision on the appropriateness of drafting an Environmental Impact Statement (EIS) or approving a FONSI.

## **1.1 STUDY AND PROJECT AREA**

*Project Name:* Reach A, Hurricane and Storm Damage Risk Reduction Project, Morganza to the Gulf, Terrebonne Parish, LA.

*Study Area:* The study area is situated within the Barataria-Terrebonne estuary, which includes the Barataria and Terrebonne Basins. The estuary extends from the west bank levees of the Mississippi River (east) to the East Guide Levee of the Atchafalaya River (west), to the Gulf of Mexico (south), and to the town of Morganza (north). The Barataria Basin covers about 1,551,800 acres while the Terrebonne Basin covers an area of about 2,063,500 acres. The study area is more fully detailed in Section 4.

*Project Area:* Reach A is located in Terrebonne Parish, southwest of Houma and begins approximately 0.5 miles southwest of the intersection of Highway 182 and Sportsman's Court. It continues south to intersect with the GIWW, and proceeds southeast, parallel with Highway 315. It terminates approximately 1.4 miles northwest of the town of Theriot.

## **1.2 NON-FEDERAL SPONSOR**

The non-Federal sponsors (NFS) for the MTG Project are the State of Louisiana, as represented by Coastal Protection and Restoration Authority Board of Louisiana (CPRAB), and the Terrebonne Levee and Conservation District (TLCD). On 28 December 2021, a Project Partnership Agreement (PPA) signed by the Department of the Army and the NFS.

To date, TLCD has constructed over 80 miles of levees in the vicinity of the authorized MTG levee system.. However, in the area of Reach A, a levee has not been constructed, and so; therefore, the city of Houma and surrounding communities remain are vulnerable to flooding, storm surge, and sea level rise. TLCD recognized the urgency of the construction of the Reach A levee as noted in the "Declaration of a State of Emergency—Imminent Threat of Flooding Due to the Reach A Gap in the Morganza to the Gulf Flood Risk Reduction System" that was signed on May 17, 2023."

## **1.3 PURPOSE AND NEED**

The purpose of the Proposed Action is to construct the Reach A levee and associated structures as a feature of the MTG Project that would provide hurricane and storm damage risk reduction for the communities located within the MTG levee system in accordance with the project described in Section 7002(3) of WRRDA 2014, as updated by the 2021 Engineering and Design Report (EDR). The EDR can be accessed online at the following location: <https://www.mvn.usace.army.mil/About/Projects/Morganza-to-the-Gulf/>. Reach A specifically would provide risk reduction to people and property in the vicinity of Houma,



Louisiana. All project benefits are related to hurricane and storm damage risk reduction. The primary concern continues to be the flood risk associated with storm surge and waves, which is increasing due to wetland loss, sea level rise, and subsidence.

As stated in Section 1.2, TLCD has constructed over 80 miles of levees in the vicinity of the authorized MTG levee system. Construction of Reach A would close an existing gap within the existing levee system. The “constructible features” of Reach A were selected in consideration of the flood risk to the vulnerable communities within the area while avoiding the planning constraints of reducing risk as quickly as possible within budget and avoiding impacts to the US Fish and Wildlife Service (USFWS) managed Mandalay National Wildlife Refuge (NWR).

The Proposed Action would advance the greatest amount of risk reduction within Reach A as possible, while working within the budgetary constraints imposed on the project and avoiding impacts to high quality wetland habitats within the project area. The ‘constructible’ segment would provide flood risk reduction to vulnerable communities while other important design and impact considerations are developed and assessed. Factors of the programmatic features of Reach A that would require extensive coordination include the numerous oil and gas pipelines impacted by the levee as well as coordination and consideration of potential impacts to the Mandalay NWR. As the programmatic levee and floodgate designs are further developed, which would include consideration of avoidance and minimization of impacts to significant resources, supplemental NEPA documents would be prepared. The constructible features of the Proposed Action would not impact the Mandalay NWR.

In terms of flood risk, in the approved 2021 EDR for the entire MTG levee system, Table 7-2 titled “Summary of the New Hydraulic Design Elevations (feet NAVD 88) based on the site adaptive criteria” lists the required levee heights in order to reduce the risk of the 1 percent AEP storm surge. Table 1-1 below shows those design heights, as reflected in the EDR for Reach A. Within Reach A, as funding is received, priority has been placed on the southern-most section of this 7.16-mile gap in the system. The portion of Reach A south of the GIWW is at a higher risk of impacts from storm surge due to its closer proximity to the Gulf of Mexico than the levee segment north of the GIWW. Constructing the segment of Reach A considered ‘constructible’ at this time would provide some initial flood risk reduction for the populated areas along Bayou Dularge, which are not currently afforded risk reduction by the TLCD Reach B levee.

*Table 1-1. Summary of the New Hydraulic Design Elevations in Feet (NAVD 88) Based on the Site Adaptive Criteria.*

Hydraulic Reach*	Current Design 1% Design Elevations		PACR 1% Design Elevations**	
	(NAVD 88 epoch 2004.65)			
	2035***	2085	2035	2085
A			15.5	20.5
A - North of GIWW	10	16.5	15.5	20.5
A - South of GIWW	11	16.5	-	-

\*Hydraulic reaches were subdivided into segments. The PACR A is also referred to as A North of GIWW and A-South of GIWW. The PACR Larose C-North is C-North and GIWW and PACR Lockport to Larose is Lockport to Larose A and B.

\*\*The PACR levees were designed with wave berms; the design in this report does not include wave berms.

## 1.4 PROJECT SCOPE

The 2013 PACR/RPEIS identifies both programmatic and constructible features for the MTG Project. Reach A was a programmatic feature that would require additional design and analysis before construction could be initiated. Preconstruction engineering and design (PED) has been advanced for Reach A. This included hydrologic modeling to establish baseline conditions, inform the design and placement of environmental control structures, and evaluate the independent utility of Reach A (See Section 4.1.4). This also included consideration of avoidance and minimization of impacts to significant resources. This DPEA is an assessment of the direct, indirect, and cumulative impacts associated with the current design of the Reach A levee and floodwall alignment, GIWW-W floodgate, and the Minors Canal floodgate of the authorized MTG Project (Figure 1-1).

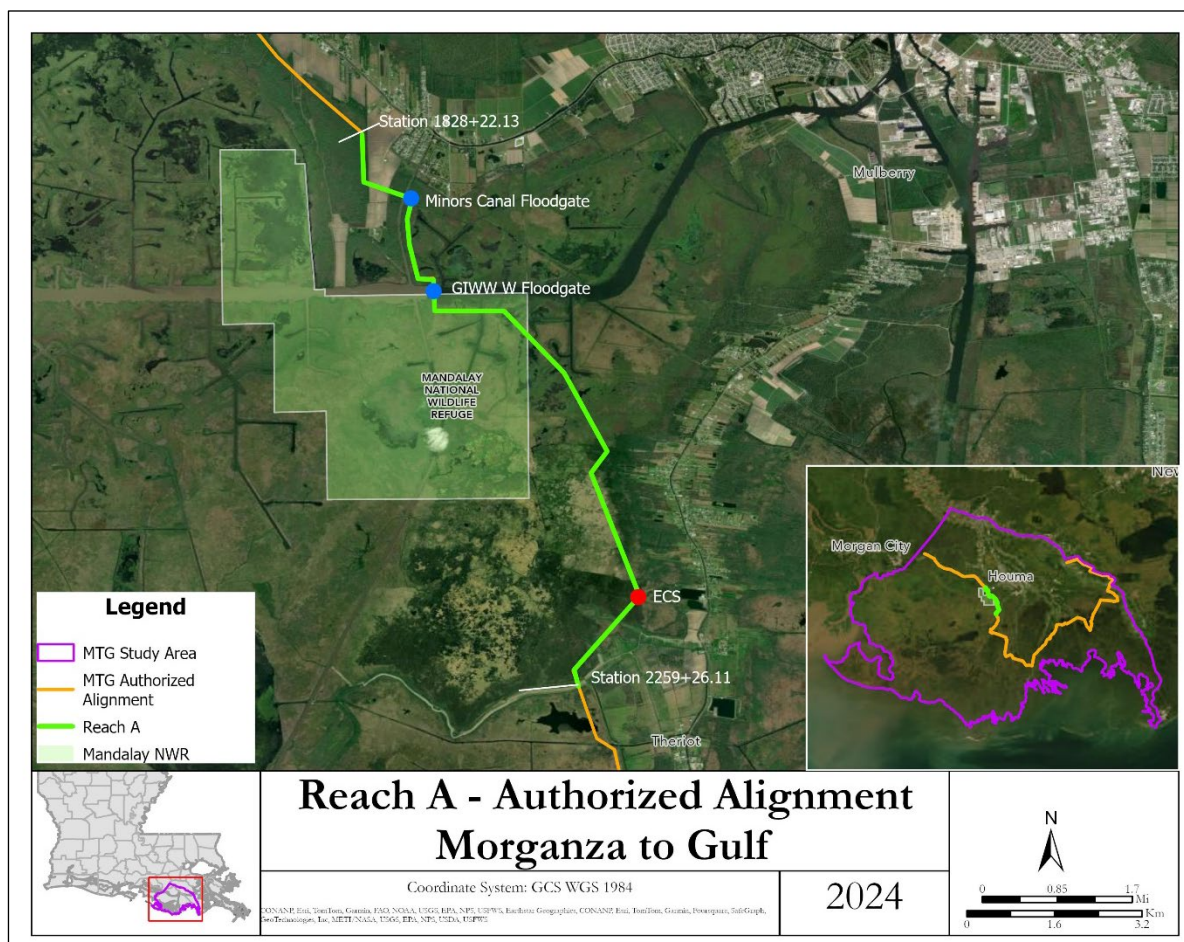


Figure 1-1. Reach A Project Area, Terrebonne Parish, LA

## 1.5 AUTHORITY

In accordance with the 2002, 2003, and 2013 reports of the Chief of Engineers, the MTG Project is authorized as a feature of the Mississippi River and Tributaries (MRT). The MTG Project was initially authorized for Federal construction by Section 1001(24) of the Water Resources Development Act (WRDA) of 2007, Public Law 110-114, in accordance with the Reports of the Chief of Engineers dated 23 August 2002 and 22 July 2003, at a total cost of \$886.7 million as follows:

*“(24) MORGANZA TO THE GULF OF MEXICO, LOUISIANA —*

*(A) IN GENERAL —The project for hurricane and storm damage reduction, Morganza to the Gulf of Mexico, Louisiana: Reports of the Chief of Engineers dated August 23, 2002, and July 22, 2003, at a total cost of \$886,700,000, with an estimated Federal cost of \$576,355,000 and an estimated non-Federal cost of \$310,345,000.*

*(B) OPERATION AND MAINTENANCE —The operation, maintenance, repair, rehabilitation, and replacement of the Houma Navigation Canal lock complex and the Gulf Intracoastal Waterway floodgate features of the project described in subparagraph (A) that provide for inland waterway transportation shall be a Federal responsibility in accordance with section 102 of the Water Resources Development Act of 1986 (33 U.S.C. 2212)."*

The project was redesigned in the 2013 PACR/RPEIS, both to address the limitations of Section 902 of the WRDA of 1986, as amended, and to meet updated post-Hurricane Katrina design guidelines. The MTG Project was subsequently re-authorized by Section 7002(3)5 of the WRRDA of 2014, Public Law (PL) 113-121, in accordance with the 2013 PACR/RPEIS and Report of the Chief of Engineers dated 8 July 2013, at an updated total cost of \$10.3 billion as follows:

*SEC. 7002. AUTHORIZATION OF FINAL FEASIBILITY STUDIES. The following final feasibility studies for water resources development and conservation and other purposes are authorized to be carried out by the Secretary substantially in accordance with the plan, and subject to the conditions, described in the respective reports designated in this section.*

**(3) HURRICANE AND STORM DAMAGE RISK REDUCTION. ---**

State	Name	Date of Report of Chief of Engineers	Estimated Initial Costs and Estimated Renourishment Costs
LA	Morganza to the Gulf	July 8, 2013	Federal: 6,695,400,000 Non-Federal: 3,604,600,000 Total: \$10,300,000,000

An EDR was developed to document the refinements, that include adaptive design criteria, to the MTG Project that make up the current design. In addition, the EDR incorporated the increased NFS construction cost share as proposed by the NFSSs, to limit Federal participation to initial construction, as defined in the EDR. The EDR was approved on 15 December 2021 that updates the design and cost share of the project.

## **1.6 AUTHORIZED PROJECT**

The MTG project area is located about 60 miles southwest of New Orleans, LA, and includes most of Terrebonne Parish, excluding the barrier islands, and the portion of Lafourche Parish between the Terrebonne Parish eastern boundary and Bayou Lafourche (Figure 1-2). The project consists of the construction of 98 miles of levees, approximately 85 miles of which would overlay existing hydrologic barriers such as natural ridges, roadbeds, and existing levees. The remaining levee alignment would be constructed in unprotected coastal wetlands. Construction would include 22 floodgates on navigable waterways, including the Houma Navigation Canal (HNC) lock complex, and 23 environmental water control



structures designed to allow tidal exchange through the levee. The structural features identified in the PACR/RPEIS would be integrated into the levee alignment to provide hurricane and storm damage risk reduction, drainage, and navigational passage. The PACR/RPEIS report along with the approved Chiefs Report dated 8 July 2013 and the signed Record of Decision dated 9 December 2013 are incorporated herein by reference.

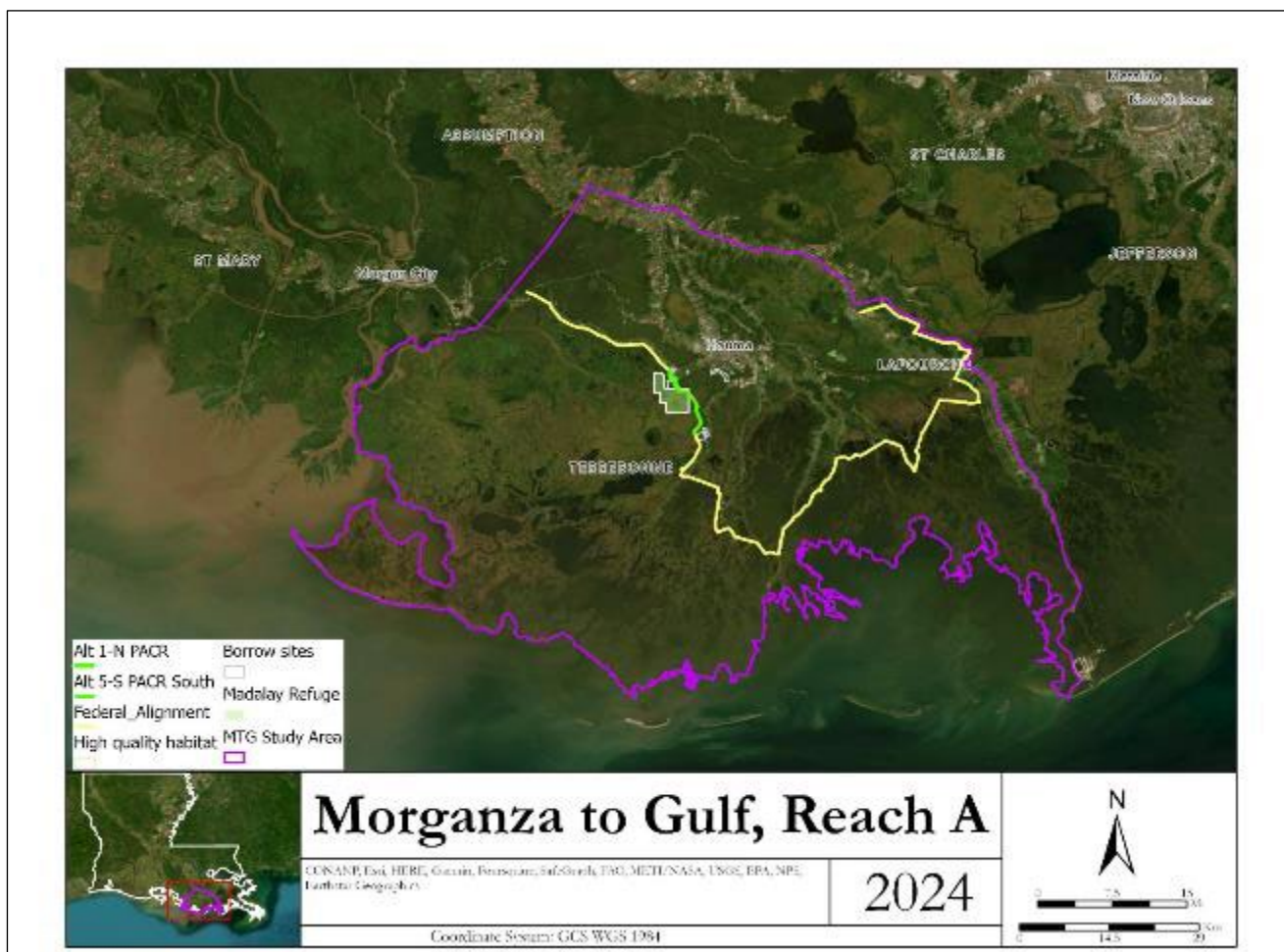


Figure 1-2. Morganza to Gulf Project, Terrebonne and Lafourche Parishes, LA

## 1.7 BACKGROUND AND HISTORY

### 1.7.1 Relevant Studies, Reports, and Projects

The Morganza, Louisiana, to the Gulf of Mexico Reconnaissance Study was authorized by resolution Docket 2376 and WRDA 96 (PL 104-303, Sec 425) adopted 30 April 1992, by the Committee on Public Works and Transportation of the U.S. House of Representatives. Following completion of an April 1994 Reconnaissance Report, the Energy and Water Development Appropriation Act of 1995 (PL 103-316) authorized the Morganza, Louisiana, to the Gulf of Mexico feasibility study. The Act directed USACE to give particular attention to

the interrelationships of the various ongoing studies in the area and consider improvements for the HNC.

In accordance with the 2002 and 2003 reports of the Chief of Engineers, the MTG Project is authorized as a feature of the MR&T. Section 1001 of WRDA 2007 (Public Law 110-114) authorized construction for the project.

The 2013 MTG Project Final PACR, as approved by the Chief of Engineers Report dated 8 July 2013, recommended site adaptation of the post-Katrina design criteria to reduce project cost without significantly increasing risk to be considered during the next phase of implementation, preconstruction, engineering, and design.

Section 7002(3) of WRRDA 2014 authorized the MTG Project at \$10.3 billion, in accordance with the Chief of Engineers Report dated 8 July 2013.

In 2021, an Engineering Design Report (EDR) was prepared and authorized by the MVD Commander to document the incorporation of the adaptive design criteria and other design refinements in the MTG Project, as directed in Engineer Regulation (ER) 1110-2-1150 (dated 31 Aug 99), based on the current MTG design. The EDR also approved the increased NFS(s) construction cost share, as proposed by the CPRAB in a letter of intent, dated 27 March 2019 (and updated 17 November 2021), supporting the option that limits Federal participation to initial construction.

On 28 December 2021, a Project Partnership Agreement for the MTG Project was signed by the Department of the Army and the two NFS, i.e., the State of Louisiana, and the TLCD.

Relevant studies, reports, and projects in the study area are listed in Table 1-2.

Project Year	Study/Report/Environmental Document Title	Document Type
1992	Reconnaissance study authorized by resolution adopted April 1992 by the Committee of Public Works and Transportation of the U.S. House of Representatives. In August, Hurricane Andrew caused extensive flooding in Terrebonne and Lafourche parishes.	Reconnaissance Report
1994	USACE completed the Morganza to the Gulf reconnaissance report.	Reconnaissance Report
1997	US Army Corps of Engineers, Morganza, Louisiana to the Gulf of Mexico Houma Navigation Canal Lock Study, April 1997.	N/A
2002	The Morganza to the Gulf feasibility study and PEIS were completed in March 2002 (USACE, 3/2002). The PED Agreement for the overall project was signed in May 2002. In August 2002, the USACE issued a Chief of Engineers report (USACE, 9/2002). In September and October, Tropical Storm Isidore and Hurricane Lili impacted the study area.	Feasibility Report and Environmental Impact Statement
2003	In July 2003, the USACE issued a supplemental Chief of Engineers report (USACE, 2003), which made changes to the non-Federal sponsor's in-kind services.	Chiefs Report
2005	Morganza to the Gulf Reach J1 Levee. Terrebonne Parish, Louisiana. FONSI: EA #406 29 July 2005.	Environmental Assessment
2013	Morganza to the Gulf of Mexico, Louisiana Final Post Authorization Change Report and Programmatic Environmental Impact Statement. ROD: 9 December 2013.	Post Authorization Change Report and Environmental Impact Statement
2021	Engineering Documentation Report	Engineering Documentation Report
2022	Morganza to the Gulf, Humble Canal Pre-load constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site. FONSI: EA #583 03 April 2022.	Environmental Assessment
2022	Mississippi River and Tributaries Morganza to the Gulf of Mexico, Louisiana (MRT-MTG) Mitigation for the Humble Canal Gate Site Preparation and Initial Levee Preload Terrebonne Parish, Louisiana. FONSI: SEA #583A 21 December 2022.	Environmental Assessment

TLCD has undertaken some work within the vicinity of the MTG Project, for which regulatory permits have been obtained. Coordination between TLCD and MVN Regulatory Division has continued to ensure that TLCD satisfies permit requirements. A summary of the status of permits can be found in Table 1-2.

Table 1-2. TLCD Regulatory Permits

TLCD-Constructed Features	Permit Issued	Status
Bayou Black Barrier Levee Project	NA	After-the-fact application received. Permit in processing.
Marmande Ridge	NA	Levee was constructed while permit application was still under review and had not been issued. Once the unauthorized activity was discovered, application was transferred to the Jurisdiction and Enforcement Branch (JEB) This application. This application will not be processed, as it is in proximity to the Federally authorized Reach A alignment, which is currently being evaluated by RPEDS in an environmental assessment.
Reach B	NA	The Reach B levee was previously constructed without a permit; A permit application was being processed for future lift and improvements of the existing levee. Permit was withdrawn on 1/7/23 and is with JEB for review of the unauthorized activity.
Falgout Canal Levee & Structures	Issued 1/10/17	Complete
Reach E	Issued 12/12/14 Extension granted 6/7/23	Working with Regulatory to resolve mitigation compliance issues.
Reach F, G-1 Levee	Issued 12/15/10	Working with Regulatory to resolve mitigation compliance issues.
Reach G-2, H-1 Levee & Mitigation	Issued 4/30/13	Working with Regulatory to resolve mitigation compliance issues.
Reach H-2, H-3	Issued 11/13/08	Working with Regulatory to resolve mitigation compliance issues.
Reach J-2 Levee & Mitigation	Levee permit issued 8/13/12 Mitigation permit issued 4/26/13	Working with Regulatory to resolve mitigation compliance issues.
Reach J-3 Levee & Mitigation	Levee permit issued 10/10/12 Mitigation permit issued 5/17/12	Working with Regulatory to resolve mitigation compliance issues.
Reach K & L	Issued 2/24/16 Extension granted 7/15/19	Mitigation partially constructed. Working with Regulatory to reassess mitigation requirements.
HNC Lock	Issued 8/11/20.	Working with Regulatory to resolve mitigation compliance issues.

## 1.8 WETLAND VALUE ASSESSMENT

Wetland impacts associated with the Proposed Action were estimated using the Wetland Value Assessment (WVA) Swamp Community Model for Civil Works Version 2.0 (Swamp WVA), the WVA Bottomland Hardwoods Community Model for Civil Works Version 1.2 (BLH WVA), and the WVA Coastal Fresh/Intermediate Marsh Model for Civil Works Version 2.0



(Marsh WVA). These models calculate average annual habitat units (AAHUs), which is based on habitat quality and quantity, for both the future with project (FWP) and future without project (FWOP) conditions. These same models were used for both the levee system and mitigation planning. These models are approved for regional use on USACE Civil Works projects.

All three WVA models utilize an assemblage of variables considered important to the suitability of each habitat type for supporting a diversity of fish and wildlife species. The WVAs allow for a numeric comparison of each future condition and provide a quantitative estimate of impacts to fish and wildlife resources from the Proposed Action.

The assumptions for these WVAs were evaluated and updated upon completion of extensive fieldwork and updated hydrologic modeling and the currently certified version of the WVAs were utilized. The total impacts of AAHUs by habitat type associated with the Reach A levee system were found to be -9.69 AAHUs to swamp habitat, -3.56 AAHUs to BLH habitat, and -156.83 AAHUs to fresh and intermediate marsh habitats. These impacts would be fully mitigated for in compliance with all appropriate laws and policies. See Appendix H for more information on WVA analyses. See Section 3 and 0 for mitigation planning. See Section 6 for more information on the Proposed Action's impacts to wetland habitats.

Version 1.0 of the Marsh WVA models were used to calculate impacts for constructible features of the 2013 PACR. Reach A is not a constructible feature in the PACR.

## SECTION 2

# Alternatives

### 2.1 ALTERNATIVE FORMULATION

Plan formulation is the process of building alternative plans that meet the project purpose and address the identified problem(s) or need(s), while looking for opportunities that address the problems and avoiding identified constraints. A *constraint* is a limitation or restriction that limits plan formulation or that requires a work around and are things to be avoided during plan formulation.

A systematic and repeatable planning approach is used to ensure that sound decisions are made in accordance with the processes laid out in the Planning Guidance Notebook (ER 1105-2-100). This DPEA describes the iterative process of evaluating the authorized PACR alignment, reevaluating the alternatives, screening of alternatives, and ultimately identifying the Proposed Action. The plan formulation process is consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders (EOs), and other Federal planning requirements.

The alternative evaluation process is a data driven process, building upon previous data and analysis, and developing more detail as necessary, including refinement of the alternatives. Each review and screening iteration identifies informational needs necessary to inform planning decisions. In the initial phases, existing information and alternatives from the Federally authorized plan are utilized with consideration of input from the NFS and resource agencies. Through this iterative process, new information is incorporated to identify the differences between the alternative plans. Risk-informed decisions are incorporated into the planning process to balance the level of study detail necessary to make informed decisions and uncertainty that is acceptable in accordance with USACE policy, such as ER 1105-2-101 "Risk Assessment for Flood Risk Management Studies." The *Objective* of the evaluation process is to achieve positive changes to future conditions within the study area during the 50-year period of analysis from 2035 to 2085. The 50-year period of analysis begins once the project has been fully implemented.

### 2.2 PROBLEMS AND OBJECTIVES

The evaluation process begins with identifying the problems in the study area and looking for opportunities to address the identified problems. The same problems and opportunities exist today that were documented in the 2013 PACR/RPEIS for this DPEA. It is important to understand the flooding issues and what is driving those issues. Once there was an understanding of the problems in the watershed, study objectives were defined describing the potential results that a Federal project could achieve and the constraints that could limit achieving potential solutions.

The primary problem in the study area continues to be the flood risk associated with hurricane and tropical storm surges, which is increasing due to sea level rise, subsidence,

and wetland loss. Flood events cause major disruptions, damages, and economic impacts within the parish.

## **2.3 ALTERNATIVES DEVELOPED**

Alternatives to the authorized PACR alignment included an alignment proposed by the NFS as well as other alignments developed by the team to avoid and/or minimize impacts to sensitive habitats. In the development of the initial array of alternatives, Reach A was divided into a North and a South section utilizing the GIWW as the dividing line. The authorized PACR alignment and the proposed modifications to the alignment were evaluated and compared to determine which alignment would move forward as the Proposed Action. Table 2-1 provides a summary of the alternatives developed for Reach A.

Table 2-1. Summary of Plan Formulation for Reach A

Alignment	Array of Alignments Evaluation
<b>Alignment 1: No Action PACR Alignment North of GIWW</b>	Alignment 1 is the authorized 2013 PACR/RPEIS alignment, which includes sidecast borrow adjacent to the levee, the Minors Canal Floodgate, and the GIWW West Floodgate. No environmental control structures are present in the design north of the GIWW as authorized in the 2013 PACR/RPEIS. This alternative meets the planning objectives to address the identified problems.
<b>Alignment 2: Modified PACR Alignment North of GIWW</b>	Alignment 2 would follow the PACR Alignment north of the GIWW (Figure 2-1), which includes 2.2 miles (11,616 linear feet) of earthen levee running north to south. In lieu of sidecast borrow adjacent to the levee, as planned in the 2013 PACR, the borrow would be excavated from other designated sites as government furnished borrow. Additionally, four environmental control structures were added to the alignment, as informed by the hydrologic modeling summarized in Section 4.1.4.  <b>Alignment 2 was carried forward to the Final Array of Alternatives as a programmatic part of the Proposed Action. Further modifications of this part of the alignment to avoid critical habitat areas identified by USFWS will be considered in future detailed designs and supplemental NEPA analysis.</b>
Alignment 3: NFS (Bayou Black) North of the GIWW	The Bayou Black alignment as shown in Figure 2-1 includes 2.8 miles (14,784 linear feet) of earthen levee running north to south. The NFS (TLCD) has an after-the-fact permit application filed for consideration with the CEMVN Regulatory Division, which is currently being evaluated.  The NFS alignment was considered but eliminated due to unauthorized activities at the time of the evaluation and does not meet the acceptability criteria. A portion of the constructed levee impacted a conservation easement adjacent to the Mandalay NWR. This was an unauthorized action and is being evaluated by the CEMVN Regulatory Division; Therefore, USACE cannot consider the alignment unless and until unauthorized activities are resolved. In addition, the team noted stability issues and constructibility concerns along the GIWW which would lead to increases in costs and does not meet the efficiency criteria. The team decided to screen this from the Initial Array of Alternatives. However, if the unauthorized activities are resolved, the team may consider this alignment in future supplemental NEPA analysis.
Alignment 4: Least Environmentally Damaging Practicable Alternative (LEDPA) North of the GIWW	The LEDPA alignment (Figure 2-1) includes 3 miles (15,840 linear feet) of earthen levee running north to south.  The LEDPA was evaluated and screened as the team noted stability issues along the GIWW and constructability concerns which would lead to an increase in costs and would not meet the efficiency criteria. This alternative was screened from the Initial Array of Alternatives and not carried forward to the Final Array of Alternatives.
Alignment 5: PACR Alignment South of GIWW	Alignment 5 is the authorized 2013 PACR/RPEIS alignment south of the GIWW (Figure 2-2). Features include 5.9 miles (31,152 linear feet) of earthen levee, sidecast borrow adjacent to the levee, and one environmental control structure.

Alignment	Array of Alignments Evaluation
<b>Alignment 5a: Modified PACR Alignment South of the GIWW(LEDPA)</b>	<p>Alignment 5a (Figure 2-2) largely follows the PACR alignment but has several modifications. Two shifts in the alignment were included in the design, one of which incorporated a floodwall, based on input from the USFWS and Mandalay NWR. High quality habitat areas were identified for avoidance/minimization considerations as alternative alignments were developed to avoid/minimize habitat impacts. In lieu of sidecast borrow adjacent to the levee, as planned in the 2013 PACR, the borrow would be excavated from other designated sites as government furnished borrow. Additionally, seven environmental control structures were added to the alignment, as informed by the hydrologic modeling summarized in Section 4.1.4.</p> <p><b>Alignment 5a, PACR Alignment South of the GIWW with modifications to reduce avoid/minimize impacts to high quality habitat was carried forward to the Final Array of Alternatives. 5.8 miles (30,624 linear feet)</b></p>
Alignment 6: NFS Alignment South of GIWW	<p>NFS Alignment (Figure 2-2) includes 7.8 miles (41,184 linear feet) of earthen levee running north to south parallel to the minor canal and then along the existing Marmande Ridge.</p> <p>During the evaluation, the team learned the NFS had constructed on top of the Marmande Ridge without a permit and the unauthorized work was under enforcement action by the U.S. Environmental Protection Agency. As a result of the permit violations, it was determined that this alignment would not meet the acceptability criteria. Due to the enforcement action, USACE cannot consider the alignment unless and until permit issues are resolved. In addition to the unauthorized activities, the team also noted stability issues along the GIWW and constructibility concerns which would lead to an increase in costs and would not meet the efficiency criteria. The PDT decided to screen this alignment from the Initial Array of Alternatives but if violation and permit issues are resolved, the team may consider in supplemental NEPA evaluations.</p>

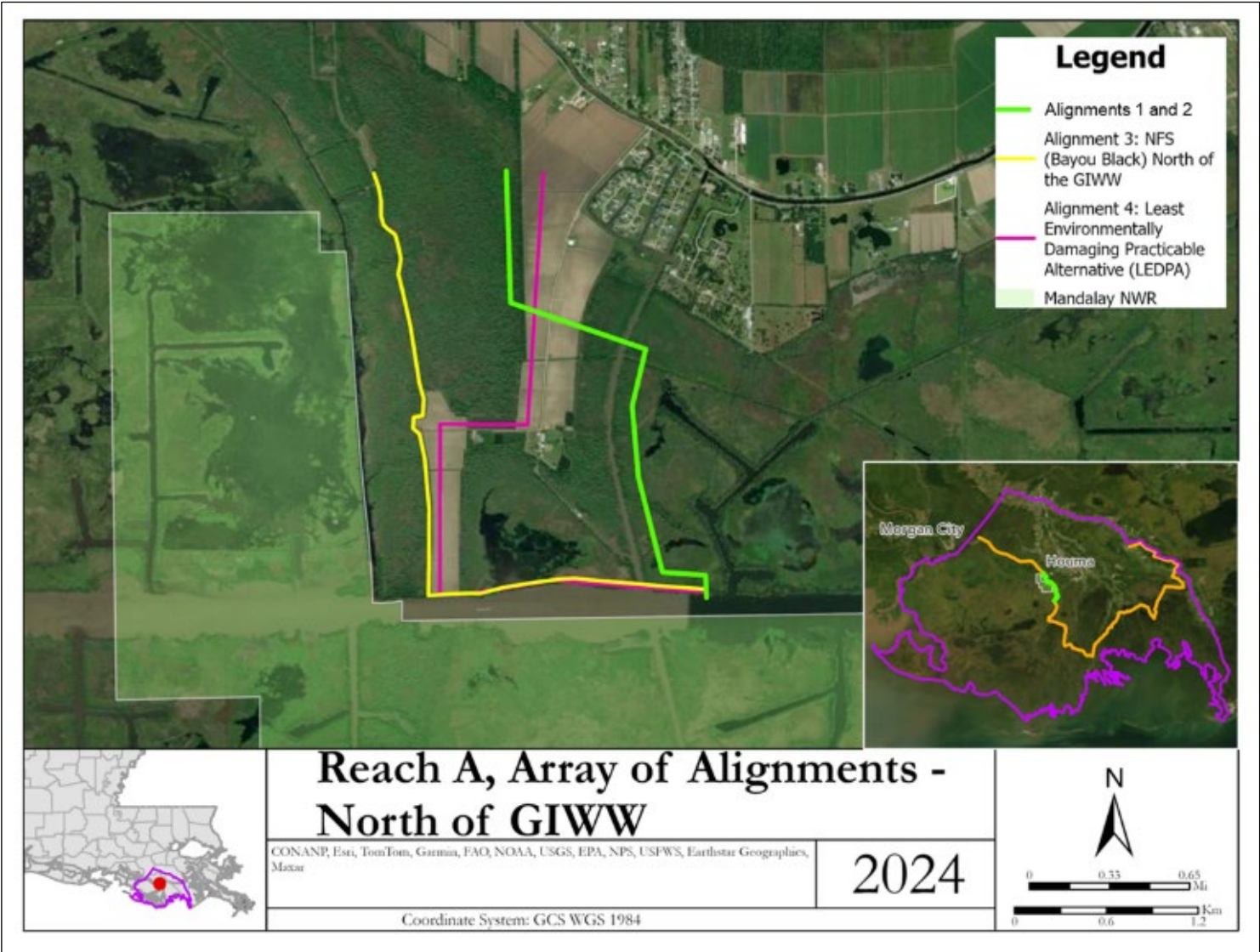
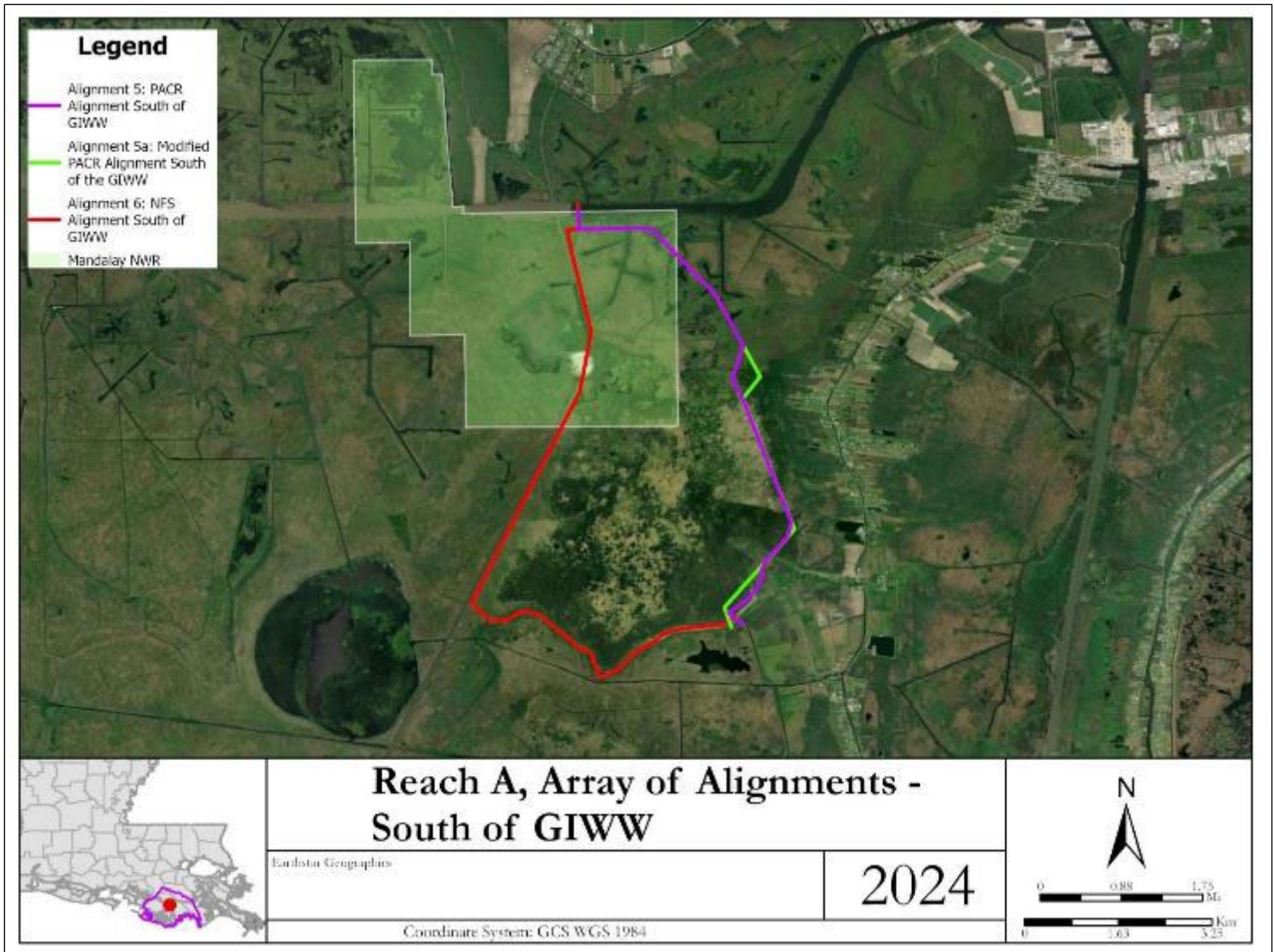


Figure 2-1. Alignments North of the GIWW





*Figure 2-2. Alignments South of the GIWW*

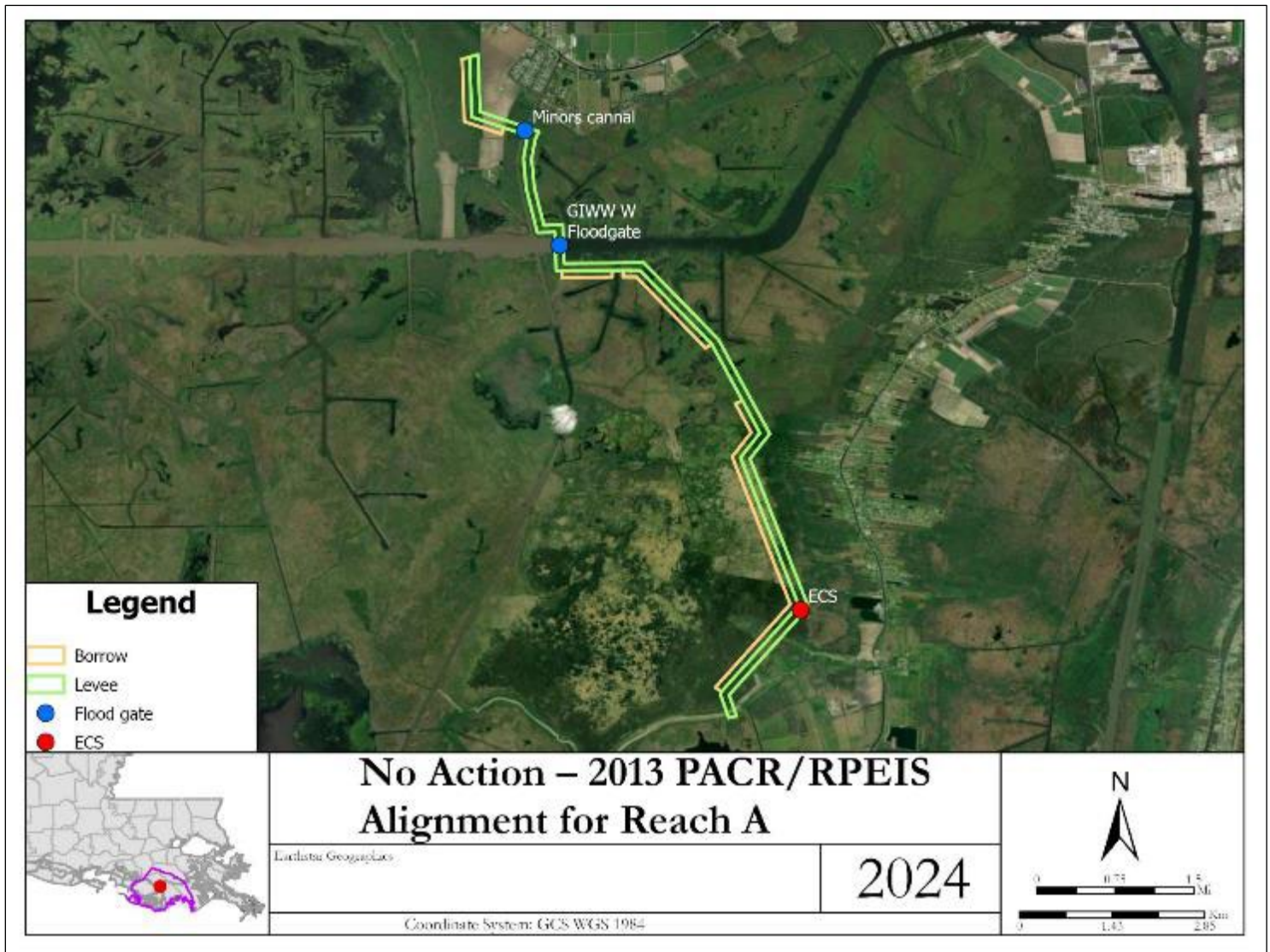
## 2.4 PROPOSED ACTION

Alignment 2 (Modified PACR Alignment North of GIWW) and Alignment 5a (Modified PACR Alignment South of GIWW) shown in bold and italics in Table 2-1 previously, were combined to be the Proposed Action. Section 6 presents the comparative analysis of the No Action (PACR Alignment for Reach A) and Proposed Action (Modified PACR Alignment) alternatives. Below is a description of the No Action Alternative and the Proposed Action Alternative assessed in this DPEA.

### 2.4.1 No Action Alternative (PACR Alignment For Reach A)

NEPA requires that in analyzing alternatives to a Proposed Action, a Federal agency must consider an alternative of taking “No Action.” In the 2013 PACR/RPEIS, Reach A was assessed as a programmatic feature at a feasibility level of design. As such,

additional engineering design, hydraulic modeling, and NEPA analysis would be required before that alignment could be constructed. As part of PED, there were significant design changes from the feasibility level of design that suggested modifications to the authorized alignment would be warranted. These design changes necessitate the definition of the 2013 PACR/RPEIS alignment for Reach A as the “No Action Alternative”, as a comparison must be made to determine if the Proposed Action is environmentally preferable to remaining within the limitations of the 2013 PACR/RPEIS footprint (Figure 2-3).



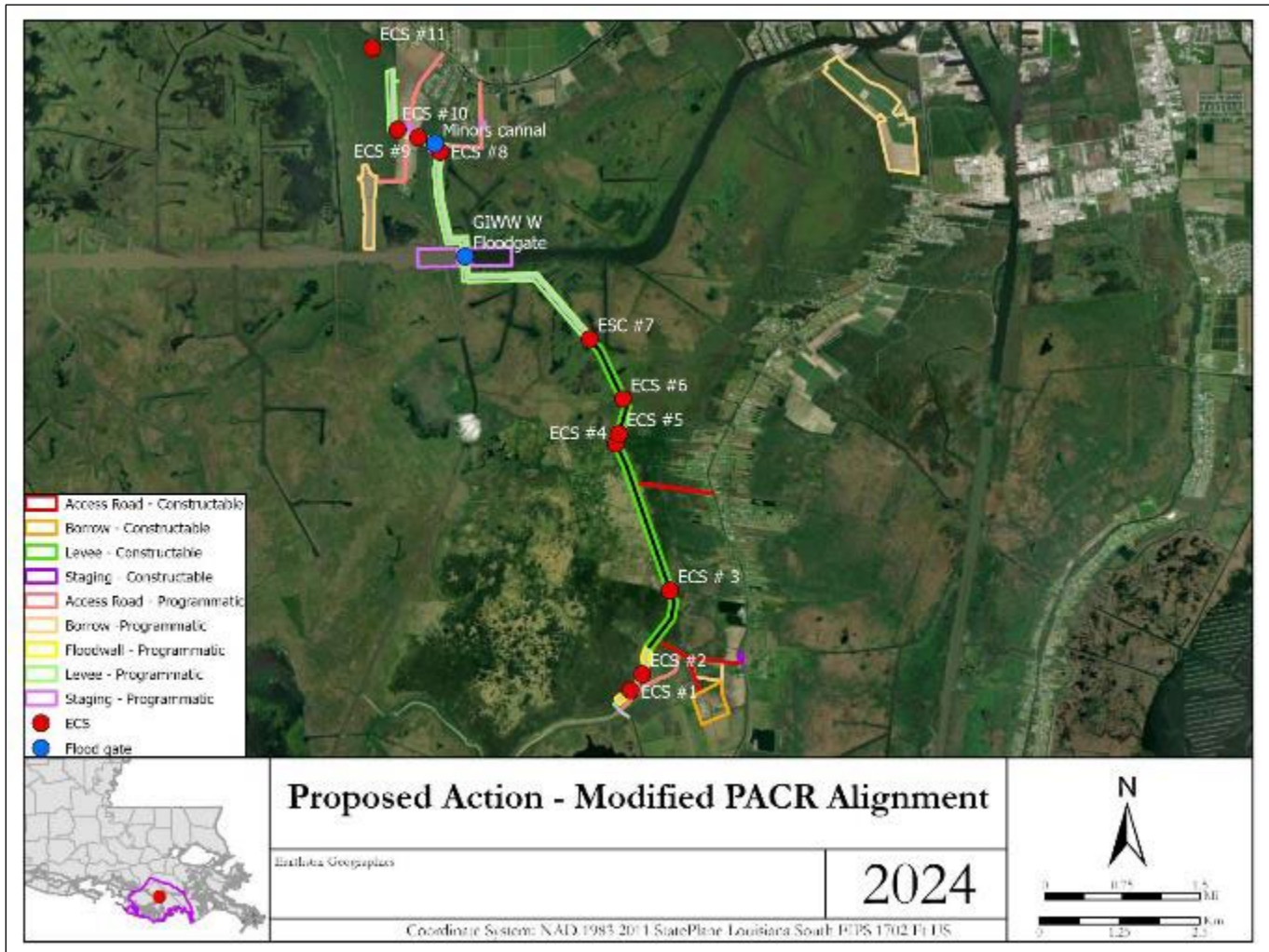
*Figure 2-3. Limits of the No Action PACR Alignment for Reach A and Locations of Floodgates and Environmental Control Structure*

#### 2.4.2 Modified PACR Alignment (Proposed Action)

The Proposed Action would be a modified PACR alignment for Reach A that reduces and minimizes impacts to high quality habitats in two locations. This DPEA includes



both programmatic and constructible features of the Proposed Action. The programmatic features are those features in which there is a feasibility level of design, but not sufficient design detail to construct at this time. Constructible features are those features in which there is sufficient detail and analysis to recommend construction pending approval of the FONSI. Figure 2-4 provides an overview of the proposed modified PACR alignment.



*Figure 2-4. Limits of Proposed Action for Reach A and Locations of Floodgates and Environmental Control Structures*

### 2.4.3 Mitigation Plan

This DPEA includes an assessment of impacts to relevant resources that could result from construction of the proposed Corps-constructed mitigation sites and purchase of mitigation bank credits. Proposed mitigation sites identified in the mitigation plan and assessed in this DPEA include the following, with the tentatively selected plan (TSP) for the Corps-constructed component of MTG mitigation in bold:

- **Amelia (BLH and Swamp)**
- Gibson (BLH and Swamp)
- **Lake Salvador (Fresh and Intermediate Marsh)**
- Delta Farms (Fresh and Intermediate Marsh)
- Avoca Island Cutoff (Fresh and Intermediate Marsh)
- GIWW (Fresh and Intermediate Marsh)

The proposed Lake Salvador mitigation site, which is the TSP for Reach A fresh/intermediate marsh impacts, was assessed to a sufficient level of detail to be implemented concurrently with construction of the Reach A constructible features. The remaining proposed Corps-constructed sites were assessed programmatically and would require supplemental NEPA before construction could occur. For Reach A BLH impacts, the TSP is to purchase mitigation credits from a USACE-approved mitigation bank. If approved under the DPEA #598 FONSI, the compensatory mitigation plan in Appendix E of this document would replace the 2013 PACR/RPEIS mitigation plan for fresh/intermediate marsh for the entire MTG Project and has identified mitigation sites for impacts to BLH and swamp in the Terrebonne Basin.

Mitigation planning is discussed in more detail in Section 3 and the proposed mitigation plan is available in Appendix E: Compensatory Mitigation Plan.

## 2.5 PLAN COMPONENTS

The Proposed Action for Reach A programmatic and constructible components include approximately 7.16 miles earthen levee and 0.22 miles of floodwall designed to a +16.5-foot and +17-foot elevation (NAVD88), respectively; 11 environmental control structures (ECS); 2 collector canals; and 2 floodgates. The floodgates proposed are a 56-foot-wide barge type floodgate on the Minors Canal, north of the GIWW, and a 125-foot to 225-foot sector gate on the GIWW west of Houma. Although programmatic in nature, this DPEA has sufficient details and impact analyses on the constructible features of the Proposed Action to go to construction upon signing of a FONSI, if appropriate. Programmatic features include both floodgates, all 11 ECS, and the floodwall as described in Section 2.5.1. Programmatic features would be assessed in supplemental NEPA documents once a sufficiently detailed design has been developed. The constructible features of the Proposed Action are located along 3.26 miles of the Reach A alignment south of the GIWW between Stations 3512+00.00 and 3684+00.00 and includes construction of 2.77 miles of earthen levee, installation of culverts to maintain drainage where ECS would be installed in future phases of construction and installation of a temporary timber mat for crossing over pipelines during construction activities. For programmatic construction activities, the pipelines may require permanent protection and/or relocation. Constructible features are discussed in further detail in Section 2.5.2.

Table 2-2 provides a summary of the Programmatic and Constructible Features for Reach A.

**Table 2-2. Programmatic and Constructible Features for Reach A**

<b>Programmatic Features</b>	
Total Length of Alignment	7.16 miles (37,832 feet)
Length of Floodwall	1,160 feet (0.22 miles)
Length of Earthen Levee	6.94 miles (36,663 linear feet)
Levee Design Elevation	2035 Elevation*: 12.5 feet (1.5 ft overbuild ) 2085 Elevation*: 17 feet (0.5 foot overbuild
Floodwall Design Elevation	2085 Elevation*: 16.5 feet
Floodgates	2
Environmental Control Structure (Sluice Gates/Flap Gates)	11
Collector Canals	2 (1,060 linear feet and 1,042 linear feet)
2035 Levee Fill (Borrow Material)	3,528,000 mcy
2085 Levee Fill (Borrow Material)	1,655,000 mcy
<b>Constructible Features</b>	
Total Length of alignment	3.26 miles (17,200 feet)
Length of Earthen Levee	2.77 miles (14,650 feet)
Levee Design Elevation	6 feet*
Number of Culverts	5
Number of Temporary Timber Mat Pipeline Crossings	1
Levee Fill (Borrow Material) Required	392,000 cy

\* Elevation is NAVD 88

## 2.5.1 Programmatic Features

### 2.5.1.1 Levee

The portion of the reach north of the GIWW includes 2.14 miles (11,318 linear feet) of earthen levee running north to south beginning at Station 1828+22.13 located approximately 2,740 feet west-southwest of the intersection of Bayou Black Drive (Parish Road 182) and Sportsman's Court, to Station 1941+40.00 immediately north of the proposed GIWW West Floodgate. The levee would be constructed to a design elevation of +17.0 feet NAVD 88 (which includes 0.5 foot of overbuild). The base width (levee toe to levee toe) would be approximately 265 feet, with 4:1 side slopes above the levee berm, and a crown width of 10 feet. Total permanent right-of-way (ROW) for this portion of the reach would be 369 feet wide. The levee maintenance road would be located within this ROW beyond the protected side levee toe.

The levee would be constructed in multiple lifts with the first lift being constructed to elevation +6.0 feet (NAVD88), the second lift bring the levee up to the 2035 design

elevation of +12.5 feet (which includes 1.5 foot of overbuild). Thereafter, the NFS would bear the costs to construct future lifts to bring the levee up to the 2085 design elevation of +17.0 feet (which includes 0.5 foot of overbuild). During construction of the first lift, the foundation for the full levee section would be constructed.

South of the GIWW, the reach includes approximately 4.8 miles (25,345 linear feet) of earthen levee generally running north to south between Station 1941+40.00 immediately north of the GIWW to Station 2259+26.11 located approximately 7,090 feet west-southwest of the intersection of Bayou Dularge Rd. (LA 315) and Seven Oaks Court. The levee would be constructed to a design elevation of 17.0 feet (which includes 0.5 foot of overbuild), a base width (levee toe to levee toe) of 265 feet, with 4:1 side slopes above the levee berm, and a crown width of 10 feet (Figure 2-5). Total permanent ROW for this portion of the reach would be 369 feet wide. The levee maintenance road would be located within this ROW beyond the protected side levee toe.

The levee would be constructed in multiple lifts with the first lift being constructed to elevation +6.0 feet, the second lift bring the levee up to the 2035 design elevation of +12.5 feet (which includes 1.5 foot of overbuild). Thereafter, the NFS would bear the costs to construct future lifts to bring the levee up to the 2085 design elevation of +17.0 feet (which includes 0.5 foot of overbuild). During construction of the first lift, the foundation for the full levee section would be constructed. This would be constructed in lifts with hauled borrow material then compacted. Geofabric would be installed when a suitable base is established then filled with additional lifts.

Figure 2-5 and Figure 2-6 provide a typical cross-section for the 2035 and 2085 design elevations.

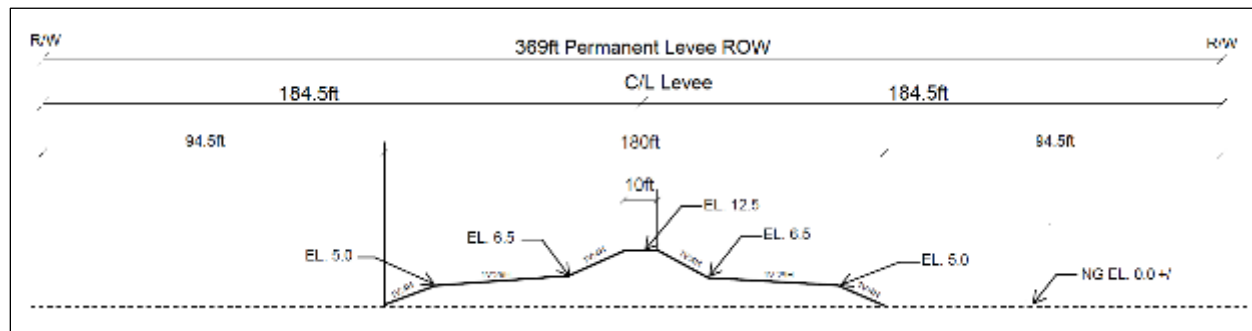


Figure 2-5. Typical Levee Section for 2035 Design Elevation

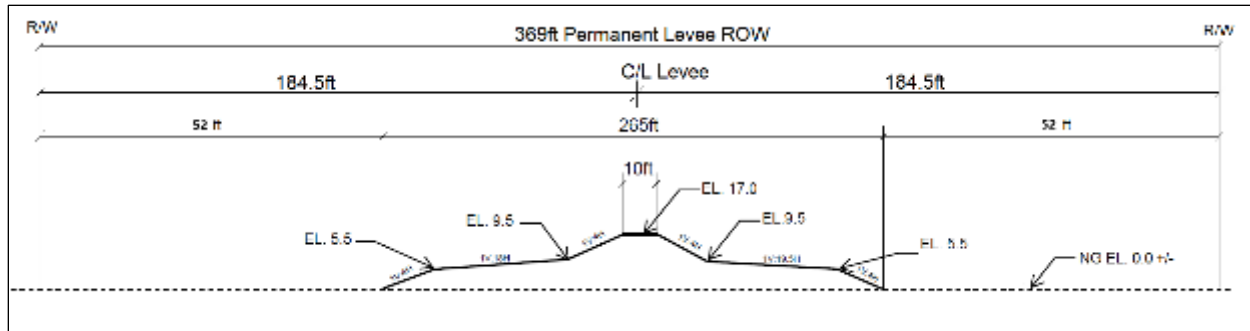


Figure 2-6. Typical Levee Section for 2085 Design Elevation

### 2.5.1.2 Borrow, Access, and Staging

Figure 2-7 and Figure 2-8 show the locations of the borrow pits that would be excavated for use in future construction of programmatic features, along with access routes to the construction ROW. To construct the portion of Reach A north of the GIWW to the 2035 design elevation, approximately 1,150,00 cubic yards of borrow material would be excavated from borrow sites NFS-A1 and A60. Approximately 520,000 cubic yards of borrow would be hauled via dump trucks to the levee site from A60 via the portion of Access Road 2 south of the levee ROW to construct the portion of the levee east of Minors Canal (Figure 2-7). Access Road 2 (36 feet wide requiring 60 feet of permanent ROW) would follow an existing route (Sportsman's Ct.) for 5,500 feet north of the levee ROW and 3,745 feet south of the levee ROW. Access Road 1 would be approximately 20 feet wide (requiring 60 feet of ROW) by 4,560 feet in length and would utilize the northern section of an existing route (Rue De La Manson) and would be used to bring trucks and equipment from US Highway 90 to the levee ROW. The northern portion of Access Route 2 would also be used to bring trucks and equipment from US Highway 90 to the levee ROW. The portion of Access Road 1 that crosses wetland habitat would include installation of culverts under the road to allow unimpeded water flow. These culverts are estimated to be 24 inches in diameter and placed every 250 feet along the portion of road crossing wetland habitat. The size, spacing, and bottom elevation of these culverts would be such that natural pre-project flow conditions within the area would be maintained.

There would be two temporary 1.25-acre staging areas for equipment and construction trailers adjacent to Access Roads 1 and 2. The existing land for these staging areas is agricultural and approximately 6 inches of temporary stone would be placed to provide a dry area as needed within the staging area limits. Once the project is complete, the area would be restored to original conditions.

Borrow site NFS-A1 is located approximately 5.5 miles east of the project alignment parallel to the GIWW where 640,000 cubic yards of borrow would be barged in to construct the portion of the levee between Minors Canal and the GIWW. Borrow material would be hauled from the borrow pit via an internal haul road to an existing bulkhead where it would be loaded onto barges for transport to the levee ROW north of the GIWW and south of Minors Canal.

To bring the portion of the reach south of the GIWW to the 2035 design elevation, approximately 2,378,000 cubic yards of borrow material would be excavated from borrow pits A82 and NFS-A1. A82 is located less than a mile from the southern end of the south Reach A alignment. Dump trucks would haul approximately 713,400 cubic yards of borrow from A82 to the levee using Access Road 4a.





Figure 2-8). Borrow site NFS-A1 is located approximately 2.25 miles east of the project alignment on the GIWW. Approximately 832,300 cubic yards of borrow material would be delivered via barge to construct the northern section of the South Reach A Levee beginning at the GIWW. Approximately 832,300 cubic yards of borrow material would be hauled via truck from NFS-A1 via an internal haul road to Highway 315 South and Access Road 3.





Figure 2-8). Access Roads 3 and 4a would also be used to bring trucks and equipment to the levee ROW.

The portion of Access Road 3 that crosses wetland habitat would include installation of culverts under the road to allow unimpeded water flow. These culverts are estimated to be 24 inches in diameter and placed every 250 feet along the portion of road crossing wetland habitat. The size, spacing, and bottom elevation of these culverts would be such that natural pre-project flow conditions within the area would be maintained.

There would be one 1.50-acre staging area adjacent to Access Route 4a. The existing land is agricultural and approximately 6 inches of temporary stone would be placed to provide a dry area as needed within the staging area limits. The staging area would be used for construction equipment and construction trailers. See Appendix A, Section 3.2 for cross-sectional details of access roads and staging areas.



Figure 2-7. Borrow Areas and Access for Reach A North





*Figure 2-8. Borrow Areas and Access for Reach A South.*

Note that some material would also come from NFS-A1 in Figure 2-7 via Hwy 315

### 2.5.1.3 Structures

#### 2.5.1.3.1 Southern End Floodwall

At the southern end of the alignment there is both environmentally sensitive habitat and potential active petroleum wells. As a result, a floodwall would be constructed in this area. The approximate length of the floodwall would be 1,160 feet. The T-wall would be constructed on pile foundations with concrete base slabs and stems to the 2085 elevation +16.5 feet (Figure 2-9). It is anticipated that this floodwall would be constructed at grade minimizing the requirement for any significant excavation. It is anticipated any required staging for this floodwall would be within the staging areas already defined for the levee construction. In addition, the access points being used to construct the levee would also be used to construct floodwall.

At both ends of the floodwall that ties into the typical levee section, 6-inch concrete scour protection or grouted riprap would be used at the levee/T-wall transition. The concrete scour protection would wrap around the T-wall stem that extends into the full levee section and extend down both levee slopes. The scour protection would continue for a distance of 30 linear feet past the end of the T-wall. Uncapped cut-off sheet piling would extend horizontally 30 feet into the full levee section for erosion and seepage control (Figure 2-7).



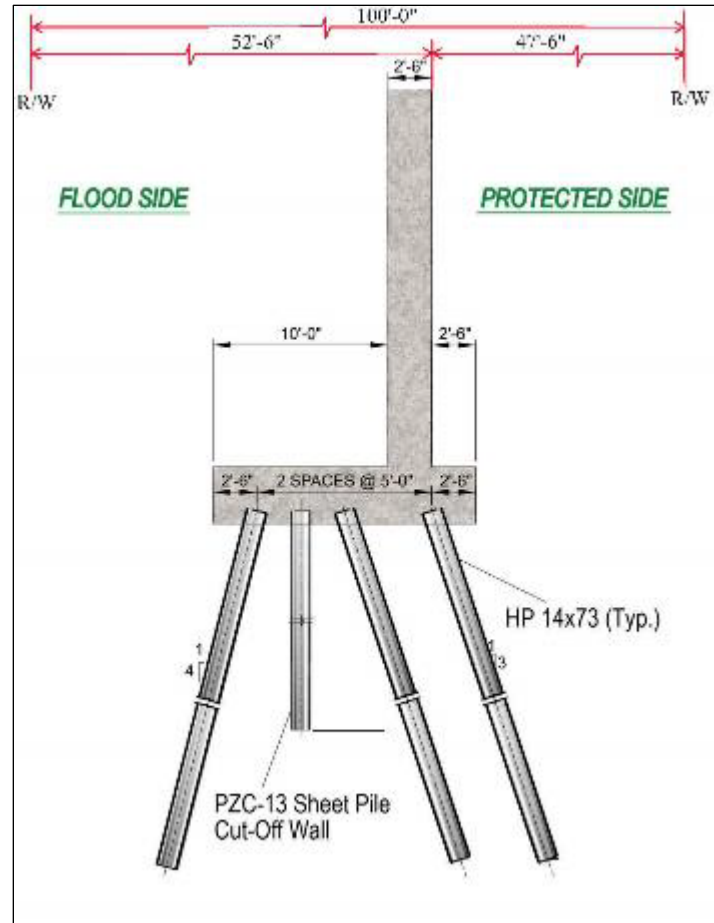
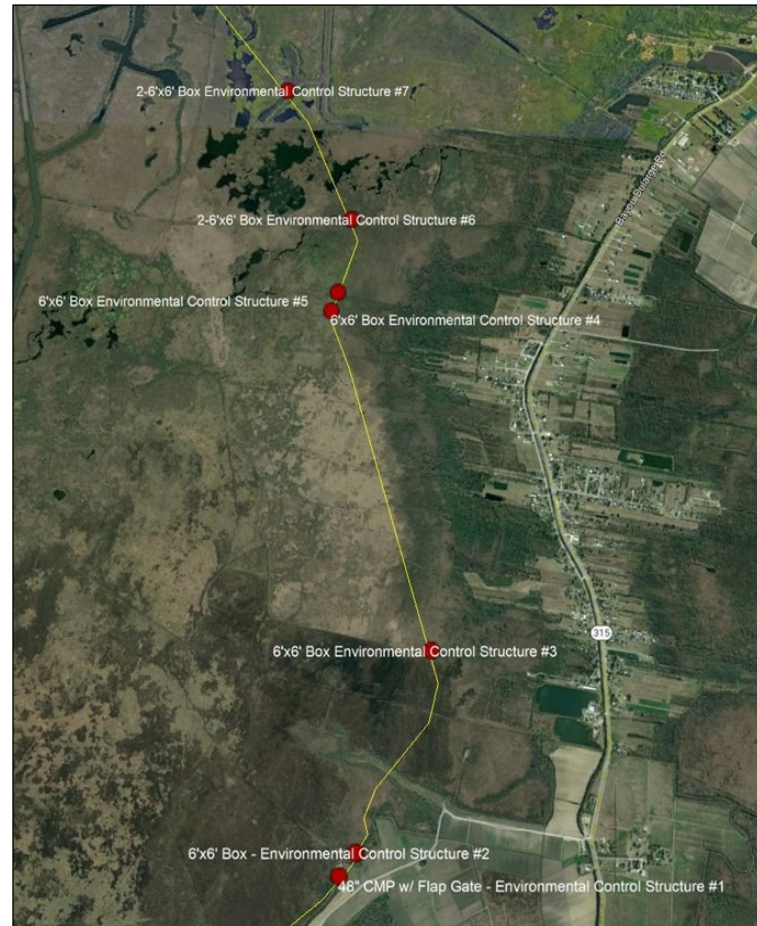
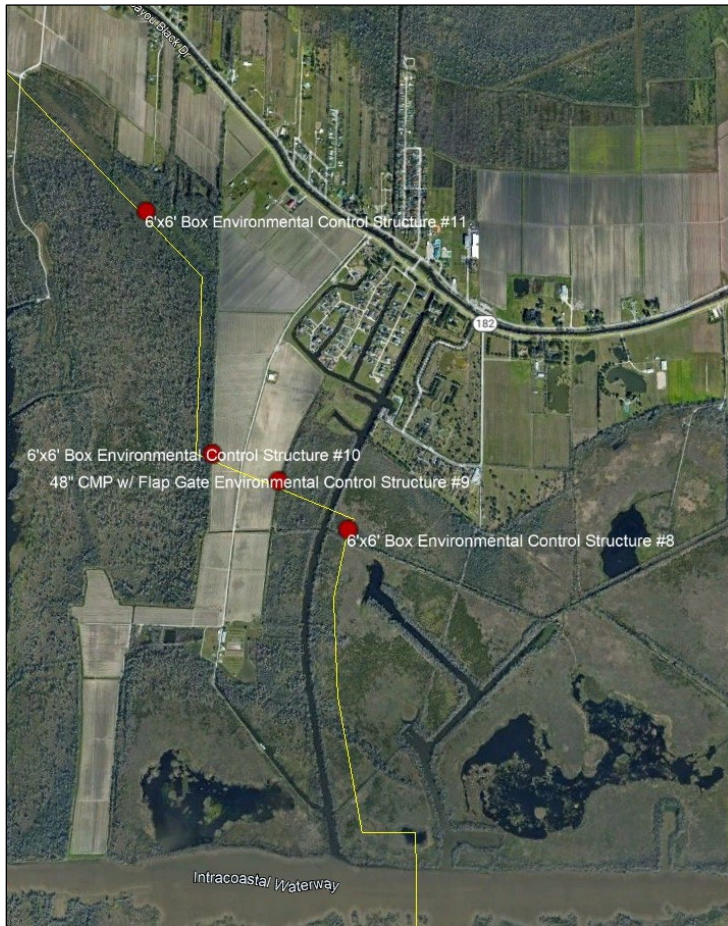


Figure 2-9. Southern End Floodwall Cross-section

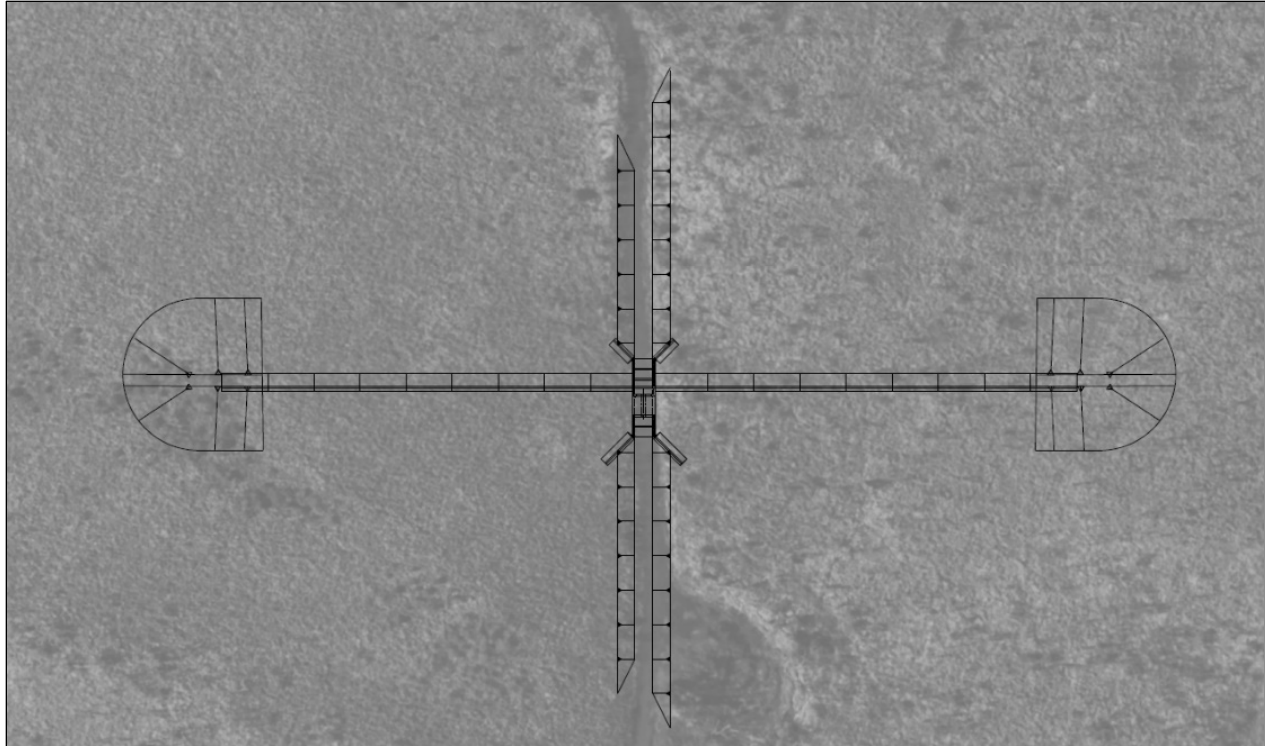
### 2.5.1.3.2 Environmental Control Structures

Eleven ECS would be installed within the Reach A levee at the locations shown in Figure 2-10. Locations, sizing, and number of ECS were determined through hydrologic modeling, which is discussed in greater detail in Section 4.1.4.2. All ECS would be constructed approximately in the center of the existing channels and are necessary to maintain the pre-project hydrologic conditions.



*Figure 2-10. Approximate Location of Environmental Control Structures in Levee North (Left) and South (Right) of the GIWW*

The channel width, directly upstream and downstream of the environmental control structure gate, would be excavated to a width matching the box culvert size for any given ECS and gradually transition back to the existing channel width. The average cross-sectional flow area would be limited at the floodgate area to the width of the floodgate opening. It is assumed that minimal material would be removed from the channel. Only the material required to construct the structure foundation would be excavated and it is assumed that this material would not be suitable for use in the project. The material would be hauled off site and disposed of in accordance with all state and Federal laws. Construction site access for the environmental control structures would follow the same access routes as previously discussed in Section 2.5.1.2. See Figure 2-11 for a sketch of an ECS. See Appendix A, Section 4.4 for more details on conceptual ECS configurations.



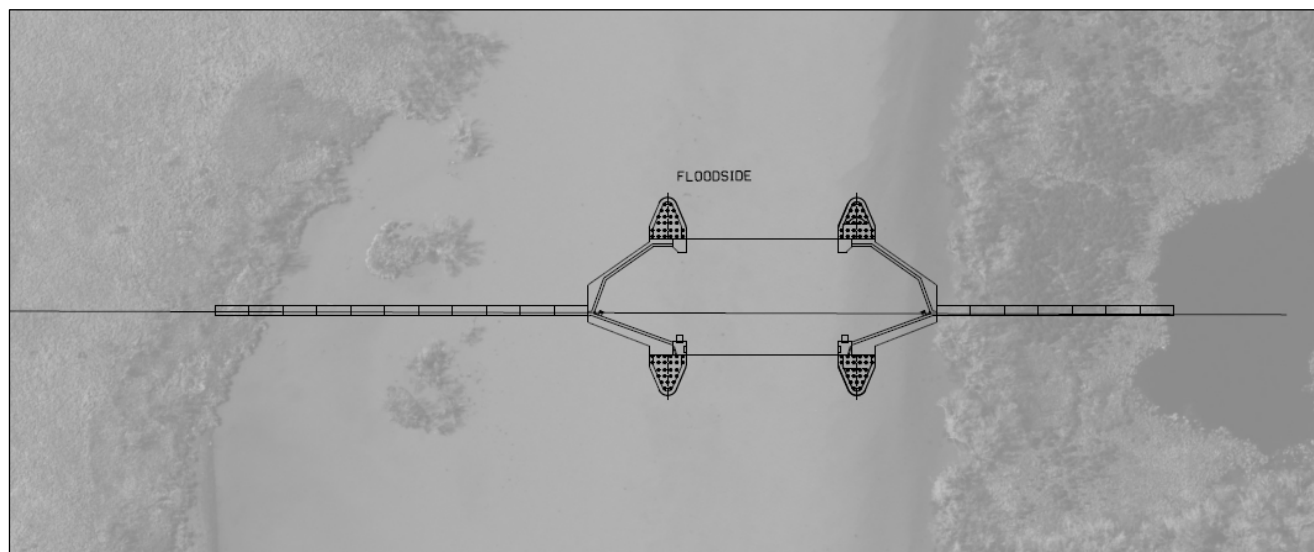
*Figure 2-11. Typical Environmental Control Structure and Associated Project Features*

### **2.5.1.3.3 GIWW West Floodgate**

The GIWW-West floodgate is a sector gate along the Reach A levee of the MTG Project, located approximately at the GIWW mile 48. Design of the floodgate could range from the authorized width of 125' up to 225'. A sector gate is a pie-slice structure that allows navigation to pass when the gate is in the open position within the gate bay recess of the structure. The floodgate would provide an opening in the system to allow unimpeded navigation, except when a tropical system approaches the Gulf of Mexico in which the gate would be closed. T-walls extend from the gate and tie into the adjacent levees with 650 total linear feet of T-walls. The floodwalls would have a top elevation of 16.5 feet (NAVD88). Figure 2-12 is a sketch of a sector gate complex. See Appendix A, Section 4.2 for more details on conceptual sector gate and T-wall configurations. Detailed design of the GIWW West floodgate would be evaluated in supplemental



NEPA documents, as critical design details (i.e., width of the floodgate) have not yet been determined and/or finalized.



*Figure 2-12. Conceptual Sketch of Sector Gate Complex*

#### **2.5.1.3.4 Minors Canal Floodgate**

This floodgate would be a 56-foot-wide barge type floodgate gate with a top elevation of 16.5 feet (NAVD 88), and a slab invert elevation of -9.0 feet. The floodgate would provide an opening in the system to allow unimpeded navigation, except when a tropical system approaches the Gulf of Mexico in which the gate would be closed. T-walls extend from the gate and tie into the adjacent levees with 510 total linear feet of T-walls (255 linear feet on either side of the floodgate). The floodwalls would have a top elevation of 16.5 feet.



A barge gate is a gate constructed in the shape of a barge and would consist of various structural shapes and plates in a hollow box configuration. See Figure 2-13 for an example barge gate. See Appendix A, Section 4.3 for more details on conceptual barge gate configurations.



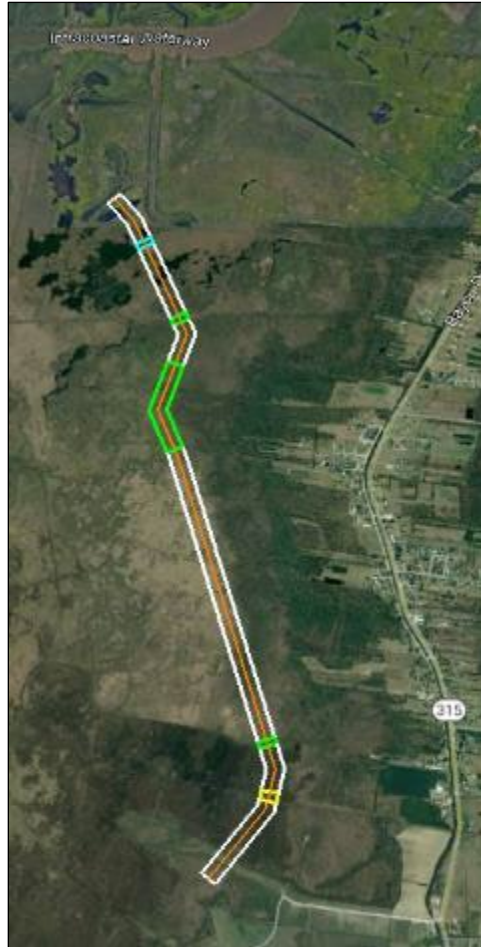
*Figure 2-13. Barge Gate Example*

## **2.5.2 Constructible Features**

### **2.5.2.1 Levee**

The segment of the levee that includes sufficient design to begin construction is located between Stations 3512+00.00 and 3684+00.00.

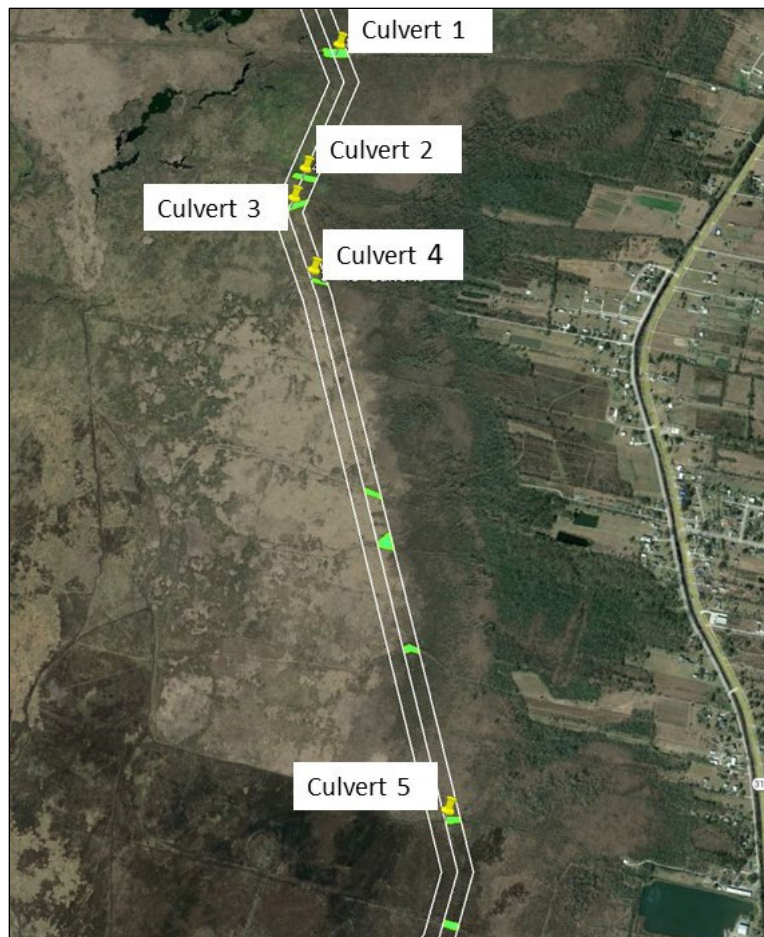
The first lift of the levee would be constructed to an elevation of 6-ft (NAVD 88) with the levee a foundation necessary for the full height of the levee at start of the period of analysis year 2035. Figure 2-14 illustrates the segment of the levee to be constructed first (with the levee centerline shown in orange). The levee cross-section is shown in Appendix A, Figure 8. This would be constructed in lifts with hauled borrow material then compacted. Geofabric would be installed when a suitable base is established then filled with additional lifts.



*Figure 2-14. Limits of constructible Levee Features*

Within the areas outlined in green, yellow, and light blue in Figure 2-14, no levee would be constructed at this time. Instead, within the green and light blue sections, roads would be built to allow construction equipment to move between levee construction segments. These roads would be 40 feet wide and constructed with compacted fill material placed to elevation 3 feet and topped with geotextile fabric and 7 inches of crushed stone and would be a foundation necessary for the full height of the levee at start of the period of analysis year 2035. See Appendix A, Figure 7 for typical cross-sectional dimensions of roads between levee sections.

Where existing canals intersect these roads, culverts would be constructed under the temporary roads (Figure 2-15) to allow water flow between the landside and floodside of the levee through existing canals. The northernmost culvert complex (Culvert 1) would be constructed with eight 48-inch diameter culverts. Moving south along the levee ROW, the next two culvert complexes (Culverts 2 and 3) would be constructed with four 48-inch diameter culverts, and the two southernmost culvert complexes (Culverts 4 and 5) would be constructed with three 48-inch diameter culverts. In the 2035 levee lift, Culverts 5, 3, 2, and 1 would be removed and replaced with box culverts as part of ECS 3, 4, 5, and 6 (Figure 2-10), respectively, as described in Section 2.5.1.3.2.



*Figure 2-15. Areas of Soil Bank Degradation (Shown in Green) and Culvert Placement (Show with Yellow Pins)*

Figure 2-15 shows locations where existing canal spoil banks would be degraded to adjacent ground elevation within the levee ROW to allow water within the canal to flow over canal banks rather than stack against the levee or culverts. See Appendix A, Section 3.1 for more details on culvert construction methods.

Within the area outlined in yellow in Figure 2-14, a temporary timber mat bridge would be used to cross an existing pipeline corridor and allow construction equipment to reach



the southernmost portion of the levee to be built. Appendix A, Figure 10 for details regarding timber mat bridge.

### 2.5.2.2 Borrow, Access, and Staging

Approximately 392,000 cubic yards of borrow material would be excavated from borrow pit NFS-A100 to build the constructible levee features described above. Dump trucks would haul approximately 196,000 cubic yards of borrow material using Access Road 4a (Figure 2-16), and another 196,000 cubic yards of borrow material using Access Road 4a to Hwy 315 North to Access Road 3 (previously shown in



Figure 2-8). Access Road 4a would be improved as discussed in previous section. Access Road 4c would include improvement of approximately 1,900 feet of an existing 24-foot road by placement of surfacing material such as 4 inches of crushed stone. A 1.50-acre staging area for equipment and construction trailers is adjacent to Access Roads 4a and 4c. The existing uses of the land for this staging area is agricultural and approximately 6 inches of stone would be placed to provide a dry area as needed within the staging area limits.

*Figure 2-16. Borrow Pit and Access Roads for Constructible Features*

### **2.5.3 Design and Construction**

Project construction is expected to take place in a series of sequential construction contracts, the first of which includes construction of a 6-foot levee embankment (less than the 2035 1 percent AEP design height of elevation +12.5 feet) within the constructible portion of Reach A between Station 3512+00.00 and 3684+00.00. All work included in this first construction contract is described below to a sufficiently detailed level of design to be fully assessed in this DPEA. This work is referred to herein as “constructible features.” The remaining components of the project are considered “programmatic features” and are described to a feasibility level of detail, such that additional NEPA analysis would be required prior to their construction. These programmatic features include all work for the entirety of the Reach A levee to the design height to meet the 2085 1 percent AEP requirement, including the GIWW-West and Minors Canal Floodgates.

After the construction of the Constructible Features, and completion of additional NEPA analysis for the features of Reach A that are programmatically evaluated in this PEA, CEMVN anticipates the execution of a series of construction contracts to bring the entirety of Reach A to the 2035 1 percent AEP elevation. This construction is anticipated to begin in 2029 and be complete in 2035. Levee lifts to bring Reach A up to the 2085 1 percent AEP elevation is anticipated to occur around 2050 and 2070.

Construction of the Minors Canal floodgate is anticipated to begin in 2026 and be complete in 2029. Construction of the GIWW-West Floodgate is anticipated to begin in 2027 and be complete in 2031.

### **2.5.4 Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R)**

The NFS shall conduct their OMRR&R responsibilities in a manner compatible with the authorized purpose of the project and in accordance with applicable Federal laws and specific directions prescribed by the Government in the OMRR&R Manual. The Non-Federal Sponsors’ OMRR&R activities would generally consist of operating the structures to assure proper working order, painting, lubrication, corrosion prevention, removing debris and shoaled sediment from the interior ponding areas, cutting grass, repairing levee slides, placing gravel on the levee crown, or other repair activities, and performing regular inspections of the levees, floodwalls, and structures.

## SECTION 3

# Mitigation Planning

Though efforts were taken to avoid and minimize habitat impacts, the Proposed Action would still result in unavoidable impacts to wetland habitats that required development of a compensatory habitat mitigation plan. Compensatory habitat mitigation is defined as “the restoration (re-establishment or rehabilitation), establishment, enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved” (see 40 CFR 230.92). Implementation guidance for Section 1163 of the WRDA of 2016 requires functional assessments be performed to define habitat impacts and to set mitigation requirements for impacted habitats.

The 2013 PACR/RPEIS contained a mitigation plan to compensate for the impacts to intermediate, brackish, and saline marsh habitats that would be incurred from implementation of the constructible features of the project identified at that time. A mitigation plan to address impacts to BLH, swamp, fresh/intermediate marsh, and brackish/saline marsh habitats from construction of the overall MTG project is under development that would include revisions to the mitigation plan found in the 2013 PACR/RPEIS. The mitigation plan in DPEA #598, Appendix E addresses satisfaction of the mitigation need for Reach A constructible features only and presents the overall plan to mitigate all currently estimated fresh/intermediate and BLH-Wet impacts for the whole alignment (including the programmatic portion of Reach A). Reach A construction would only build a segment of the overall mitigation plan for BLH-Wet and Fresh/Intermediate marsh to concurrently satisfy its mitigation requirement for the constructible features. This mitigation plan includes the purchase of mitigation bank credits as well as the construction of Corps-constructed (USACE-constructed) mitigation projects. The mitigation plan in Appendix E of DPEA #598, as well as any other mitigation that occurs in apportioned NEPA documents for MTG, would be included in the overall mitigation plan to be released in supplemental NEPA for the MTG Project. Analysis of impacts from implementing portions of the overall mitigation plan would be addressed in the documents recommending execution of constructible actions requiring mitigation, as needed.

The overarching goal for site identification for this mitigation planning effort is to identify target areas with enough acreage to meet the full mitigation need at watershed scale (for the entire MTG project footprint) with the intent to design specific projects by habitat type within a selected target area to address impacts for Reach A constructible features. A proposed Corps-constructed mitigation project site for fresh/intermediate marsh has been selected to compensate direct impacts that would be incurred from the constructible features of the Proposed Action for Reach A, as assessed in this DPEA #598. BLH direct impacts from constructible features of the Proposed Action for Reach A would be offset through the purchase of credits from an approved mitigation bank. Mitigation planning for the remainder of the project, including the programmatic features of the Proposed Action that have been

programmatically evaluated in this document, would continue to be updated as the other reaches of the levee project move through detailed design and into construction.

The objectives of the mitigation plan are defined by the results of the habitat impact assessment model using quantified units. The same habitat assessment model was used to estimate potential study impacts and potential mitigation project outputs.

The identification and evaluation of mitigation measures, sites, and the Final Array of mitigation alternatives for each habitat type are detailed in the Compensatory Mitigation Plan (Appendix E). Factors considered include compliance with laws, regulations and policies, watershed and ecological site considerations, implementation timing, risk and reliability, environmental impacts, and cost effectiveness/incremental cost analysis (CE/ICA).

The Selected Mitigation Plan for the constructible feature of Reach A would be a combination of mitigation bank credit purchases and Corps-constructed projects. Constructed projects were selected for fresh/intermediate marsh and mitigation banks were selected for BLH. The proposed ecological success criteria, monitoring and adaptive management for the mitigation plan is included in Appendix E: Compensatory Mitigation Plan

*Tentatively Selected Plan for Constructible feature of Reach A Fresh/Intermediate Marsh Mitigation – “Alternative 4 M3 Fresh/Intermediate Marsh - Lake Salvador”.* This alternative includes construction of a 275-acre restoration site in Lafourche Parish. Measures include perimeter retention dikes, interior terraces, dredged material placement to the required elevation, 1 year after dewatering bringing down dikes, should naturally vegetate, and borrow within Lake Salvador. This site provides 108.57 AAHUs.

*Tentatively Selected Plan for Reach A BLH Mitigation - the “No Action Alternative BLH MB”.* Mitigation bank credits purchased would be selected through a solicitation process, through which any mitigation bank meeting eligibility requirements and having the appropriate resource type of credits could submit a proposal to sell credits. If appropriate and cost-effective, the Corps may choose to purchase mitigation bank credits from more than one bank to fulfill the compensatory mitigation requirements for a particular habitat type. This site provides 0.55 AAHUs.

This is only for the constructible segment of Reach A. The entire MTG Project F/I Marsh and BLH TSP is included in Appendix E: Compensatory Mitigation Plan.

The mitigation plan only addresses compensatory habitat mitigation and does not discuss the MTG Project planning to avoid, minimize, reduce, or rectify habitat impacts from each MTG Project alternative. See Appendix E: Compensatory Mitigation Plan for further details on mitigation planning and Section 6 of this DPEA for an assessment of impacts to relevant resources from construction of proposed Corps-constructed mitigation sites.

The mitigation plan provides documentation of the mitigation assessment performed, including coordination, and plan formulation to develop the compensatory habitat mitigation plan. The authority and requirements for compensatory habitat mitigation are found in Federal laws and regulations. The legal foundation for habitat mitigation to offset

unavoidable habitat losses cause by USACE water resources projects includes the Clean Water Act, the Water Resources Development Act (WRDA) of 1986, Section 906, as amended by subsequent WRDAs, the Fish and Wildlife Coordination Act and other environmental laws. The specific procedures followed to develop this compensatory habitat mitigation plan are found in Engineer Regulation 1105-2-103. Mitigation for other types of impacts, such as for cultural resources, or noise may also be part of a project. Efforts to avoid, minimize, or rectify impacts, not directly related to fish and wildlife habitat impacts are not covered in this Mitigation Plan and are found elsewhere in DPEA #598.

The Tentatively Selected Mitigation Plan is outlined in Table 3-1.



**Table 3-1. Summary of Selected Mitigation Plan for Habitat Mitigation of the Entire MTG Mitigation Plan and the Constructible feature of Reach A**

Habitat Type	Mitigation Site	AAHUs Needed – Entire MTG Project	Programmatic Cost – Entire MTG Project (Construction and Real Estate Cost)	Programmatic Monitoring and Adaptive Management – Entire MTG Project	<b>Total Mitigation Cost –Entire MTG Project (includes RE, Construction and Monitoring and Adaptive Management)</b>	AAHUs Needed - Constructible Feature of Reach A	Constructible Cost - Reach A (construction and real estate costs)	Monitoring and Adaptive Management – Constructible Reach A	<b>Total Mitigation Cost – Constructible Reach A (includes RE, Construction and Monitoring and Adaptive Management)</b>
Marsh	Lake Salvador	8598 AAHUs	\$604,658,078.00	\$12,508,470*	<b>\$617,166,548</b>	109.4242 AAHU	\$77,541,671.71	\$3,825,000	<b>\$81,366,671.71</b>
BLH	Combination Amelia/ Mitigation Bank	117.1 AAHUs	\$12,664,644.05	\$3,601,000**	<b>\$16,265,644.05</b>	0.5555 AAHUs	\$164,000	Not needed since going to bank, included in mitigation bank costs	<b>\$164,000</b>

\*The estimated Monitoring and Adaptive Management (MAM) costs for the entire 1,406,406-acre Lake Salvador site is \$12,058,470 if all 1,406,406 acres were to be constructed. Since the tentatively selected plan includes the combination of construction at Lake Salvador and mitigation bank purchases the MAM cost are expected to be less. The estimated MAM costs for the fresh/intermediate marsh site is \$3,825,000 at the 27-acre Lake Salvador site part of the constructible Reach A segment.

\*\*The estimated MAM costs for the entire 277-acre Amelia site is \$3,601,000 if all 277 acres were to be constructed. Since the tentatively selected plan includes the combination of construction at Amelia and mitigation bank purchases the MAM cost are expected to be less. There are no separate monitoring and adaptive management costs for the constructible reach A segments since a mitigation bank purchase is the tentatively selected plan for this increment.

## SECTION 4

# Affected Environment

The CEQ regulations (40 CFR Part 1500 et seq.), promulgated to implement NEPA; provides guidance for the preparation of NEPA documents. Section 1502.15 of the CEQ regulations provides direction for preparing the Affected Environment section and states that it shall contain data and analysis “commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced.”

This section describes the existing conditions of the affected environment within the study area as well as the project area. Described are the relevant resources that may be affected by the project such as wetlands, fisheries, essential fish habitat, threatened and endangered species, social-economic environment, and environmental justice among others. Below is a summary of the 2013 PACR/RPEIS, which is incorporated herein by reference, with relevant updates. See the PACR/RPEIS for additional details (<https://www.mvn.usace.army.mil/About/Projects/Morganza-to-the-Gulf/>).

### 4.1 GENERAL SETTING

#### 4.1.1 Description of the Watershed

The study area is situated within the Barataria-Terrebonne estuary, which includes the Barataria and Terrebonne Basins (“the watershed”). The estuary extends from the west bank levees of the Mississippi River (east) to the East Guide Levee of the Atchafalaya River (west), to the Gulf of Mexico (south), and to the town of Morganza (north). The Barataria Basin covers about 1,551,800 acres while the Terrebonne Basin covers an area of about 2,063,500 acres. It includes all of Terrebonne Parish and parts of Lafourche, Assumption, St. Martin, St. Mary, Iberville, and Ascension Parishes. The watershed is part of an abandoned delta complex, characterized by a thick section of unconsolidated sediments that are undergoing dewatering and compaction, contributing to high subsidence, and a network of old distributary ridges extending southward from Houma (CWPPRA 2021). The southern end of the watershed is defined by a series of narrow, low-lying barrier islands (Isles Dernieres and Timbalier chains), separated from the mainland marshes by a series of wide, shallow lakes and bays (e.g., Lake Pelto, Terrebonne Bay, Timbalier Bay).

#### 4.1.2 Land Use/Land Cover

Data from the U.S. Geological Survey (USGS) National Land Cover Database (2006) for the study area reveal that 50 percent of the study area is emergent herbaceous wetlands. The marsh habitat in the study area transitions from fresh marsh in the more northerly portions to intermediate and brackish marshes, and to saline marsh near the coast. The remaining wetlands consist mainly of woody wetlands (primarily bald cypress/tupelo swamps and bottomland hardwood forest), which comprise about 14 percent of the study area.

Open water comprises a majority of the remaining land use (about 23 percent) and includes the Atchafalaya River and numerous bayous and drainage canals. Navigation canals include the GIWW and the HNC.

Only about 12 percent of the study area has been developed. Cultivated crops, which mainly include sugar cane, occupy about 5 percent of the study area. Residential and commercial land is located on only slightly more than 4 percent of the area. Population centers include Thibodaux and Shriever in northern Terrebonne Parish; the city of Houma; Donner and Gibson in western Terrebonne Parish; Chauvin, Dulac, and Montegut in southern Terrebonne Parish; Raceland, Lockport, and Pointe aux Chenes in Lafourche Parish; and the other population centers shown in Figure 3-1.

### 4.1.3 Climate Change

The 2014 USACE Climate and Resiliency Policy Statement states the “USACE shall continue to consider potential climate change impacts when undertaking long-term planning, setting priorities, and making decisions affecting its resources, programs, policies, and operations.” A healthy and resilient coastal complex is dynamic, not static, and is subject to the ebb and flow of the various effects, adverse or beneficial, that impact conditions at any given point in time. The most significant adverse potential impact on coastal wetlands and levee and floodwall systems as a product of climate change is sea-level change (rise).

Global, or eustatic, sea level rise and regional subsidence have affected and are projected to continue affecting the watershed. ER 1100-2-8162 states potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence. The WVA incorporated the “intermediate” sea-level change scenario to determine benefit outcomes over the 50-year period of analysis. As documented in the WVA project information sheets from US Fish and Wildlife (See Appendix C), the “low” and “high” sea level change rates were run on all impacted wetlands.

Engineering and Construction Bulletin 2018-14 (ECB 2018-14) provides guidance in the form of preparedness and resilience for climate change within planned, new, and existing USACE Projects. According to the guidance found in ECB 2018-14-5-a”:

*“Climate change information for hydrologic analyses includes direct changes to hydrology through changes in temperature, precipitation, evaporation rates and other climate variables, as well as dependent basin responses to climate drivers, such as sedimentation loadings. The qualitative analysis required by this ECB should focus on those aspects of climate and hydrology relevant to the project’s problems, opportunities, and alternatives, and include consideration of both past (observed) changes as well as projected, future (modeled) changes.”*

Climate Change data from models are projected using Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. RCP 4.5 represents a moderate/ medium approach that provides insight to future climate change conditions. RCP 8.5 represents a high approach that provides insight to future climate change conditions if there were minimal restrictions/ regulations. (<https://climatedata.ca/resource/emissions-scenarios-rcps/>).

The climate in the project area is humid and subtropical with a strong maritime character. Warm, moist southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, dry fronts dominated by northeast high-pressure systems. The influx of cold air occurs less frequently in autumn and only rarely in summer. Tropical storms and hurricanes are likely to affect the area 3 out of every 10 years, with severe storm damage approximately once every 2 or 3 decades. The majority of these occur between early June and November. Earlier storms in the project area include Hurricane Juan (1985), Hurricane Andrew (1992), Tropical Storm Isidore and Hurricane Lili (2002). Recent hurricanes causing significant damage in the project area include Katrina and Rita (2005), Gustav and Ike (2008), Isaac (2012), and Ida (2021). The average high temperature is 79 degrees Fahrenheit, and the average low temperature is 60 Fahrenheit. Average monthly temperatures range from 44 degrees Fahrenheit in January to 91 degrees Fahrenheit in July (<https://usclimatedata.com>). According to USACE Climate Hydrology Assessment Tool (CHAT), the study area consists of one eight-digit Hydrologic Unit Codes (HUC): HUC 08090302 West Central Louisiana Coastal. The annual 1-day temperature projection shows a steady increase of temperature within the study area.

The average annual rainfall in the MTG study area is approximately 62.25 inches, and annual rainfall averages 5.18 inches per month. Normal monthly rainfall varies from 3.60 inches in April and to 7.37 inches in August (<https://usclimatedata.com>). According to USACE CHAT, the annual-accumulated precipitation shows a steady decrease of annual precipitation while the Drought Indicator: Annual-Maximum of Number of Consecutive Dry Days shows a steady increase of drought like conditions within the study area.

#### **4.1.4 Hydrology and Hydraulics**

##### **4.1.4.1 Morganza to the Gulf Project Area (Authorized Project)**

In 2023, CEMVN Hydrology, Hydraulics, and Coastal Branch used the Hydrologic Engineering Center's River Analysis System (HEC-RAS) version 6.3.1 to describe baseline hydrologic conditions across the MTG study area and determine to what extent inundation could occur in the future with the MTG system in place. This modeling effort incorporated the design elevations and peak storm surge elevations identified in the 2021 EDR and included current structures in place that were not present at the time of the 2013 PACR/RPEIS.

Impacts to water levels from storm surge, precipitation, and lateral Atchafalaya inflow for the 50 percent, 20 percent, 10 percent, 4 percent, 2 percent, 1 percent, 0.5 percent, and 0.2 percent AEP events were evaluated under multiple scenarios. All frequency events for both the existing conditions and proposed conditions were run for the year 2035. The precipitation and storm surge, and the storm surge only events were also run for the year 2085 for existing and proposed conditions. The precipitation only and lateral inflow only events were not run for the 2085 year because it was not necessary for the purpose of this model. See Table 4-1 for a summary of the frequency run scenarios.

*Table 4-1. Frequency Run Scenarios*

	Existing	Proposed
Precipitation Only	Gates open	
Precipitation and Storm Surge (2035 and 2085)	Gates closed	
Storm Surge Only (2035 and 2085)	Gates closed	
Lateral Inflow Only	Bayou Black, Chene, and GIWW West gates are closed; All other gates open	
Lateral Inflow Only	Bayou Black and Chene Structures are closed; All other gates open, including GIWW West	

The modeling concludes that under the “1% AEP Precipitation Only” scenario, water surface elevations would not significantly increase from existing water surface level elevations with the complete MTG system in place. For the 2035 and 2085 “1% AEP Storm Surge Only” and “1% AEP Storm surge and Precipitation” scenarios, results show a large reduction in water surface elevation within the levee system and an increase of water surface elevation up to approximately 3.5 feet outside the MTG system when compared to the existing conditions. The “1% AEP lateral inflow only” scenarios were included in the model to show the possible impact of high Atchafalaya River flows on the MTG system and determine how the operation of floodgates may affect the Atchafalaya River flow into the system. Results demonstrated that even during a high-flow Atchafalaya River event, the MTG system would be able reduce surface water elevations on the interior of the MTG system. See Appendix I for the full model report for the MTG levee system for a more detailed discussion of the model conditions and results.

#### **4.1.4.2 Reach A Pre-Construction Engineering and Design**

Additional modeling was completed as part of pre-construction engineering and design (PED) to inform the advancement of the Reach A design from its feasibility level of design in the 2013 PACR/RPEIS (the No Action alternative of DPEA #598). Specifically, HEC-RAS 6.3.1 was used to model water levels surrounding Reach A of the MTG system to compare existing to proposed conditions for evaluation of construction conditions, structure optimization, and independent utility of Reach A.

The modeling conditions included a 6-foot-high embankment and 25-foot-wide gaps in the levee embankment, instead of structures. The optimal number of gaps to maintain the natural flow of water was identified and resulted in the sizing and placement of the 11 ECS, which would be constructed where these optimized 25-foot-wide gaps were located in the modeling. For the constructible features of Reach A, ECS locations would remain unchanged and culverts will be installed until the 2035 lift as described in Section 2.5.2.1. As design advances for the programmatic reaches of the levee, there may be shifts in the alignment (e.g., to minimize impacts to wetlands) that could change the number and placement of the remaining ECS. At this time, ECS design details are not sufficient to evaluate any ECS as a constructible feature in this DPEA and supplemental NEPA evaluations would occur prior to construction.

To determine the ability of Reach A to provide flood risk reduction independent of the overall MTG levee system, the Reach A PACR alignment was assessed under three conditions to determine the water level reduction for the 10-year precipitation and 10-year tidal surge, 50-year precipitation and 50-year tidal surge, 100-year precipitation and 100-year tidal surge, and 10-year precipitation and 100-year tidal surge events when compared to the existing conditions:

Condition 1: Levee embankment height is equal to the PACR design height, 11 ECS, and the GIWW and Minors Canal gates.

Condition 2: Reach A levee embankment is 6 feet high; gaps are placed in the levee embankment where 11 ECS would be located at the completion of construction, and the GIWW and Minors Canal are in place.

Condition 3: Reach A levee embankment is 6 feet high, and gaps are placed in the embankment where 11 ECS would be located at the completion of construction, and no gates are included at the GIWW and Minors Canal

Results show that the fully constructed Reach A PACR alignment would reduce interior water levels compared to the existing conditions with no levee or structures in place independent of the full MTG levee system. Specifically, Condition 1 showed the greatest reduction of interior water levels for the 100-year tidal surge events because the tidal surge effects are reduced by the blockage created by the levee and structures. See Appendix I: Morganza to the Gulf HEC-RAS Hydraulic Modeling Analysis Report (2023) Enclosure E for a full discussion of Reach A specific model conditions, structure sizing, and independent utility results.

Subsequently, as USFWS representatives were conducting WVAs on the Reach A authorized PACR alignment, they identified high-quality habitat south of the GIWW that could be avoided by shifting from the authorized PACR alignment in two locations. The modified PACR alignment with the 11 ECS and 2 alignment shifts *are* the Proposed Action of DPEA #598. Additional hydraulic analysis was done on the modified PACR alignment with these two modifications and confirmed that the Proposed Action would not significantly change the hydrologic conditions of the Reach A project area or inhibit drainage of the levee system following a closure. See Appendix I: Morganza to the Gulf HEC-RAS Hydraulic Modeling Analysis Report (2023) Enclosure F for more details on analysis of the shifted levee alignment (Proposed Action) from the PACR levee alignment (No Action).

## 4.2 RELEVANT RESOURCES

This section contains a description of relevant resources that exist within the study area. The relevant resources described are those recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Relevance based on institutional recognition means that the importance of an environmental resource is acknowledged in the laws, adopted plans, and other policy statements of public agencies, Federally recognized tribes, and private groups. Relevance based on public recognition means that some segment of the general public recognizes the importance of an



environmental resource. Relevance based on technical recognition means that the importance of an environmental resource is based on scientific or technical knowledge or judgment of critical resource characteristics. See Table 4-2 for a summary of the institutional, technical, and public importance of these resources and Table 4-3 for a summary of relevant resources impacted by the Proposed Action.

*Table 4-2. Relevant Resources and Their Institutional, Technical, and Public Importance*

Resource	Institutional Importance	Technical Importance	Public Importance
Aesthetics (Visual Resources)	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, the Coastal Barrier Resources Act of 1990, Louisiana's National and Scenic Rivers Act of 1988, and the National and Local Scenic Byway Program.	High value is placed on the preservation of and accessibility to unique combinations of geological, botanical, and cultural features that may be an asset to a watershed.	Environmental organizations and the public support the preservation of natural pleasing vistas.
Air Quality	Clean Air Act of 1963, Louisiana Environmental Quality Act of 1983.	State and Federal agencies recognize the status of ambient air quality in relation to the NAAQS.	Virtually all citizens express a desire for clean air.
Aquatic Resources/ Fisheries	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1977, as amended; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968.	Critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.
Cultural and Historic Resources	National Historic Preservation Act (NHPA), as amended, and Section 106 and 110 of the NHPA; the Native American Graves Protection and Repatriation Act of 1990; the Archeological Resources Protection Act of 1979; and USACE's Tribal Consultation Policy (2012).	Federal, State, and Tribal stakeholders document and protect cultural resources including archaeological sites, districts, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and/or sites of religious and cultural significance based on their association or linkage to past events, to historically important persons, to design and construction values, and for their ability to yield important information about prehistory and history. State and Federal agencies document and protect sites, their association or linkage to past events, to historically important persons, and to design and construction values, and their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.
Environmental Justice	Executive Order 12898 of 1994 (E.O. 12898) and the Department of Defense's Strategy on Environmental Justice of 1995.	State and Federal agencies recognize social and economic welfare of minority and low-income populations, which may be impacted by the proposed actions.	Public concerns about the fair and equitable treatment and meaningful involvement of all people with respect to environmental and human health consequences of Federal laws, regulations, policies, and actions.
Essential Fish Habitat (EFH)	Magnuson-Stevens Fishery Conservation and Management Act of 1996, Public Law 104-297	Federal and State agencies recognize the value of EFH. The Act states, EFH is "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."	Public places a high value on seafood and the recreational and commercial opportunities EFH provides.
Navigation	Rivers and Harbors Act of 1899 and River and Harbor Flood Control Act of 1970 (PL 91-611).	The Corps provides safe, reliable, efficient, and environmentally sustainable waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.	Navigation concerns affect area economy and are of significant interest to community.

Resource	Institutional Importance	Technical Importance	Public Importance
Noise and Vibration	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, Noise Control Act of 1972, Quiet Communities Act of 1978USACE ER 1105-2-100 and National Environmental Policy Act of 1969	Unwanted noise has an adverse effect on human beings and their environment, including land, structures, and domestic animals and can also disturb natural wildlife and ecological systems.	The EPA must promote an environment for all Americans free from noise that jeopardizes their health and welfare.
Recreation Resources	Federal Water Project Recreation Act of 1965 as amended, and Land and Water Conservation Fund Act of 1965 as amended	Provide high economic value of the local, state, and national economies.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana; and the large per-capita number of recreational boat registrations in Louisiana.
Socioeconomic Resources	USACE ER 1105-2-100, and National Environmental Policy Act of 1969River and Harbor Flood Control Act of 1970 (PL 91-611).	When an environmental document is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental document will discuss all of these effects on the human environment.	Social concerns and items affecting area economy are of significant interest to community.
Threatened, Endangered, and Protected Species	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, EPA, LDWF, and LDNR cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.
Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and Louisiana State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, EPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality and the national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.
Wetlands	Clean Water Act of 1977, as amended; EO 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act.	They provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes.

Resource	Institutional Importance	Technical Importance	Public Importance
Wildlife	Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918	They are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.

Table 4-3. Relevant Resource Impacted by the Proposed Action

Relevant Resource	Impacted	Not Impacted
Navigation	X	
Wetlands	X	
Aquatic Resources/Fisheries	X	
Wildlife	X	
Essential Fish Habitat	X	
Threatened, Endangered, and Protected Species		X
Water and Sediment Quality	X	
Air Quality		X
Cultural Resources <sup>1</sup>		X <sup>1</sup>
Tribal Resources		X
Recreational Resources	X	
Aesthetics (Visual Resources)	X	
Environmental Justice	X	
Noise and Vibration	X	
Socioeconomics	X	
Hazardous, Toxic, and Radioactive Waste (HTRW) <sup>2</sup>		X

<sup>1</sup>For the programmatic features of the Proposed Action, CEMVN shall complete Phase I cultural resources surveys and applicable consultation following the guidelines and procedures in 36 CFR § 800.4(b)(2) before construction on any of these features. All constructible features of the Proposed Action have been subjected to Phase I cultural resources survey. For more details regarding this phased approach for programmatic features, see Section 7.15.

<sup>2</sup>Although the area has been determined to have a low probability of containing HTRW, a Phase I ESA was completed for the No Action, Proposed Action, and Mitigation TSP. More details regarding HTRW can be found in Section 7.13.

#### 4.2.1 Wetland Resources

Louisiana contains one of the largest expanses of coastal wetlands in the contiguous United States and accounts for 90 percent of the total coastal marsh loss occurring in the nation (USACE 2011). This ecosystem provides habitat for migratory birds, wildlife, finfish, shellfish, and other aquatic organisms including threatened or endangered species. In addition, Louisiana's coastal wetlands provide protection from wave action, erosion, and storm damage and offer various consumptive and non-consumptive recreational opportunities. Coastal wetland types within the project area include BLH forests, swamps, and marsh (fresh and intermediate).

Freshwater marsh is found surrounding bodies of open water and is located in the northern portion of the study area along the GIWW (CPRA, 2023). Freshwater habitats generally have salinities less than 0.5 parts per thousand (ppt) and form in accreting, sediment rich, high-energy environments typical for this region. Freshwater marsh is dominated by rush and reed plant species like cattails (*Typha sp.*) and arrowhead (*Sagittaria graminea*) and can form detached mats of vegetation, known as flotant, which encourage colonization by other plant species. Historically, wax myrtle trees would colonize the mat, which results in the

entire mat sinking, allowing for more open water plants to infiltrate thick marshes. Freshwater marsh that does not float is more dramatically impacted by flood events and can be less productive.

Fresh marshes provide nursery habitat for estuarine-dependent species important to recreational and commercial fisheries such as blue crab, white shrimp, Gulf menhaden, Atlantic croaker, red drum, southern flounder, bay anchovy, striped mullet, and others. Fresh marshes also provide habitat for largemouth bass, warmouth, black crappie, blue catfish, bowfin, and gar.

Intermediate marsh is a unique type of wetland marsh found in the study area whose vegetative community reflects the shifts in salinity associated with proximity to marine environments. This type of marsh is the middle part of the gradient found in vegetative communities shifting from fresh to saline waters (0.5-5.0 ppt), and the marsh species that are found in this type are capable of withstanding spikes of salinity that are associated with tropical storm surge events. It is commonly a narrow band of vegetation when compared with other marsh types due to the large differences between freshwater and brackish salinities. Wildlife found within an intermediate marsh is less diverse than found in freshwater marshes, but more individuals may be present.

Swamps are defined by their higher proportional representation of bald cypress and tupelo and a repetitive wet-dry cycle. The Louisiana swamps generally lack a mature tree canopy because of historic logging and have lower productivity where isolated from riverine influences (Shaffer et al., 2003). Bald cypress, as an important indicator species of the health of a swamp, is a large deciduous conifer and has long been recognized for its decay resistant wood. It can grow to a height of 100 to 120 feet with a diameter of 3 to 5 feet. In the original, old grove forests of the south, virgin bald cypress averaged over 500 years old and could reach a diameter of 6 to 8 feet. Young bald cypress tree trunks are considerably tapered and support an open, narrowly pyramidal crown. As the tree ages, the trunk becomes more cylindrical and the crown irregularly fattened. Older trunks often are ashy-gray with swollen, fluted bases, and branches bearded with Spanish moss. Older bald cypress trees also have a very distinctive root system that consists of several descending roots, providing anchorage, and many wide-spreading roots commonly known as "knees." This type of root system makes the bald cypress exceptionally stable, even on the most unstable sites. Permanent inundation results in a loss of regeneration and eventually conversion to marsh (Hodges, 1997).

BLH are alluvial-forested wetlands typically found throughout southern Louisiana in the deltaic plain of the Mississippi River (Hodges, 1997). A variety of plant species, including live oak (*Quercus virginiana*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), and Drummond red maple (*Acer rubrum drummondii*) occur in this habitat. Between the forested wetlands and marsh lies a thin band of scrub shrub habitat, and typical vegetation includes elderberry (*Sambucus sp.*), wax myrtle (*Myrica sp.*), buttonbush (*Cephalanthus occidentalis*), and red maple (Connor et al, 1976). In coastal BLH forests stressed by prolonged inundation, the less water tolerant tree species gradually die out leaving the more water tolerant bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*) present (Kiem et al. 2013).

## 4.2.2 Fisheries and Aquatic Resources

Fishery resources are a critical element of many valuable freshwater and marine habitats. They are an indicator of the health of various freshwater and marine habitats, and many species are important commercial resources.

In 2022, Louisiana's fishery landings were over 912,343,648 million pounds (over \$416,483,958 million dockside value). This represented 11 percent of the 2022 U.S. landings in terms of pounds and 7 percent in terms of dollars. Fishery landings in 2022 at ports in or near the study area were: Dulac-Chauvin with 36.2 million pounds (\$59.4 million dockside value) and Golden Meadow-Leeville with 12.7 million pounds (\$22.1 million dockside value) (NMFS 2022).

The study area contains a variety of aquatic habitats, including ponds, lakes, bayous, canals, shallow open water areas, and embayments. Salinities in the area range from fresh water to saline. Fresh and intermediate waterbodies frequently contain submerged or floating aquatic vegetation; however, brackish and saline areas generally do not contain much submerged vegetation.

Fishes and macrocrustaceans in the study area are of three general types: freshwater, resident, and transient marine species. Freshwater species generally live in the freshwater portions of the area, although some species can tolerate low salinities. Resident species are generally smaller and do not commonly migrate very far. Marine transient species spend a portion of their life cycle in the estuary, generally spawning offshore or in high salinity bays, and use coastal marshes as nursery areas (Herke 1971, 1995).

Salinity and submerged vegetation affect the distribution of fish and macrocrustaceans in coastal marshes. The most abundant species collected in freshwater and intermediate marsh areas adjacent to the project area were residents predominantly associated with submerged aquatic vegetation such as grass shrimp (*Palaemonetes* sp.), sheepshead minnow (*Cyprinodon variegatus*), rainwater killifish (*Lucania parva*), least killifish (*Heterandria formosa*), inland silverside (*Menidia beryllina*), sailfin molly (*Poecilia latipinna*), and western mosquitofish (*Gambusia affinis*) (Rogers *et al.* 1992). The most abundant marine transient species collected near the project area included Gulf menhaden (*Brevoortia patronus*), blue crab (*Callinectes sapidus*), bay anchovy (*Anchoa mitchilli*), and striped mullet (*Mugil cephalus*) (Rogers *et al.* 1992). The most abundant species collected by otter trawling in Lake Barre included brown shrimp (*Farfantepenaeus aztecus*), Atlantic croaker (*Micropogonias undulatus*), blue crab, bay anchovy, white shrimp (*Litopenaeus setiferus*), spot (*Leiostomus xanthurus*), hardhead catfish (*Ariopsis felis*), sand seatrout (*Cynoscion arenarius*), brief squid (*Lolliguncula brevis*), least puffer (*Sphoeroides parvus*), Gulf menhaden (*Brevoortia patronus*), gafftopsail catfish (*Bagre marinus*), and Atlantic bumper (*Chloroscombrus chrysurus*) (Rogers *et al.* 1994, 1997).

The most abundant finfish species collected by LDWF otter trawls from 1998-2008 in Lake Mechant area were bay anchovy, Atlantic croaker, spot, Gulf menhaden, and sand seatrout (USACE 2010). White shrimp, blue crab, and brown shrimp were also collected by otter trawls. LDWF gill nets in the Catfish Lake area frequently collected spotted seatrout (*Cynoscion nebulosus*), Gulf menhaden, spot, Atlantic croaker, hardhead catfish, and black



drum (*Pogonias cromis*). The most abundant species collected by LDWF seines in Lake Boudreaux were bay anchovy, inland silverside, naked goby (*Gobiosoma bosc*), Atlantic croaker, and Gulf killifish (*Fundulus grandis*). Grass shrimp, brown shrimp, blue crab, and white shrimp were also commonly collected in the seines (USACE 2010).

Freshwater and intermediate marshes in and around the project area also provide habitat for freshwater recreational and commercial fisheries species. Freshwater species include largemouth bass (*Micropterus salmoides*), yellow bass (*Morone mississippiensis*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), redear sunfish (*L. microlophus*), warmouth (*L. gulosus*), blue catfish (*Ictalurus furcatus*), channel catfish (*I. punctatus*), buffalo (*Ictiobus* sp.), freshwater drum (*Aplodinotus grunniens*), bowfin (*Amia calva*), and gar (*Lepisosteus* sp.).

Marshes in the area support many commercially and recreationally important marine fish and shellfish species including red drum (*Sciaenops ocellatus*), black drum, sheepshead (*Archosargus probatocephalus*), striped mullet, southern flounder (*Paralichthys lethostigma*), Gulf menhaden, sand seatrout, gray snapper (*Lutjanus griseus*), Spanish mackerel (*Scomberomorus maculatus*), white shrimp, brown shrimp, blue crab, eastern oyster (*Crassostrea virginica*), and Gulf stone crab (*Menippe adina*).

4.2.3 Essential Fish Habitat (EFH)

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect EFH. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, or growth to maturity for species regulated under a Federal fisheries management plan.

Specific categories of EFH in estuaries include all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), including the sub-tidal vegetation (sea grasses and algae) and adjacent inter-tidal vegetation (marshes and mangroves). The Gulf of Mexico Fisheries Management Council (GMFMC), in cooperation with NMFS, has delineated EFH for Federally managed species identified in Gulf Fisheries Management Practices (FMPs) (GMFMC 2016). The estuarine waters in the proposed project area include EFH for several Federally managed species (Table 4-4). Table 4-5 identifies EFH for highly migratory species including blacktip, bull, spinner, Atlantic sharpnose, and finetooth sharks within the watershed of MTG project area. Specific categories of EFH in the project area include estuarine emergent marsh, mud/sand/shell/oyster substrates, submerged aquatic vegetation, and estuarine water column.

Additionally, coastal wetlands provide nursery and foraging habitat that supports economically important marine fishery species such as spotted seatrout, southern flounder, Atlantic croaker, Gulf menhaden, striped mullet, and blue crab. These species serve as prey for other Federally managed fish species such as mackerels, snappers, groupers, billfishes, and sharks.

Table 4-4. EFH Species Found in the MTG Watershed

Common Name	Life Stage	EFH
Red Drum	Adult	Estuarine sand/shell bottom, emergent marsh, soft bottom, and SAV
	Juvenile	Emergent marsh, soft bottom, and SAV
	Larvae/Post-Larvae	Emergent marsh, sand/shell bottoms, SAV, and soft bottom
Brown Shrimp	Juvenile	Emergent marsh, oyster reefs, sand/shell bottom, SAV, soft bottom
White Shrimp	Juvenile	Emergent marsh and soft bottoms
Gray Snapper	Adult	Estuarine soft bottoms, emergent marsh, and sand/shell bottoms
Lane Snapper	Juvenile	Estuarine sand/shell bottoms, SAV, soft bottoms,
	Post-Larvae	Estuarine SAV

*Table 4-5. Highly Migratory Species EFH Found in the MTG Watershed*

Common Name	Life Stage	EFH State Waters Eco-Region 4
Blacktip Shark	Neonate & Juvenile	Estuarine waters of Terrebonne and Timbalier Bays; all nearshore and offshore waters
	Adult	Estuarine waters of Atchafalaya, Terrebonne and Timbalier Bays; all nearshore and offshore waters
Bull Shark	Juvenile	Nearshore waters of Terrebonne Bay to Mississippi River delta
Spinner Shark	Neonate	Terrebonne Bay and estuarine and nearshore waters to Grand Isle
	Juvenile	All nearshore waters between Vermilion and Atchafalaya Bays; Terrebonne and Barataria Bays.
Finetooth Shark	Neonate	Timbalier Bay and waters offshore Timbalier islands
	Juvenile & Adult	Estuarine and nearshore waters east of Terrebonne Bay
Atlantic Sharpnose Shark	Neonate	All nearshore and offshore waters of Atchafalaya, lower Terrebonne and Timbalier Bays, and Barataria Bay
	Juvenile & Adult	Estuarine and nearshore waters east of Terrebonne Bay

#### 4.2.4 Wildlife

Wildlife resources are a critical element of various aquatic and terrestrial habitats. They act as indicators of habitat health and function, in addition to serving as important commercial resources. The study area contains a variety of wildlife habitats, including BLH habitats, swamp, and fresh/intermediate marsh. The wildlife habitat impacted on the Mandalay National Wildlife refuge is marsh (51.32 acres) and BLH (0.85 acres). Below is a list of potential wildlife that may reside or be seen in the study area.

**Birds:** Migratory waterfowl such as snow geese, gadwalls, pintails, mallard, teal, coot, redheads, ringnecks, lesser scaup, mergansers, wigeons, canvasbacks and black ducks

make use of wetland habitats in the project area. In addition, other avian species such as ibises, egrets, cormorants, terns, gulls, skimmer, pelicans, and various raptors rely on the diverse array of habitats present in the project area. Neotropical migrants also use the project area as essential stopover and breeding habitat during annual migrations (Zoller 2004; Wakeley and Roberts 1996). Mudflats and shallow-water areas in the vicinity also provide crucial habitat for a wide variety of shorebirds (killdeer, avocet, stilt, dowitchers, snipe, and sandpipers), while seabirds such as pelicans (*Pelecanus sp.*), gulls (*Larus sp.*), and terns (*Sternula sp.*) are found more frequently in deeper water areas. Bald eagles (*Haliaeetus leucocephalus*), a recently delisted Endangered Species make seasonal use of both wetland and forested habitats in the project area.

**Mammals:** Populations of furbearers, such as beavers (*Castor canadensis*), mink (*Neovison vison*), foxes (*Vulpes spp.* and *Urocyon cinereoargenteus*), and North American river otter (*Lontra canadensis*), have typically remained stable across the project area. White tailed deer (*Odocoileus virginianus*), northern raccoon (*Procyon lotor*), and North American opossum (*Didelphis virginiana*) are found within the Project Area. In addition, nutria, an invasive rodent that eats seedling cypress and other tree species preventing regeneration (Shafer et al., 2016), occur in the Project Area.

**Reptiles and Amphibians:** The project area contains a wide range of Amphibians and reptiles including species of frogs, lizards and snakes. American alligators (*Alligator mississippiensis*) are abundant in the wetlands around the project area.

#### 4.2.4.1 Mandalay National Wildlife Refuge

The Mandalay National Wildlife Refuge is a part of the Southeast Louisiana National Wildlife Refuges Complex. This refuge protects and conserves freshwater marsh, forested habitat, and floatant marsh complexes in western Terrebonne Parish. The refuge provides crucial habitat for both migratory and wading waterfowl and is an important location on the Mississippi Flyway.

#### 4.2.5 Threatened, Endangered, and Protected Species

Within the State of Louisiana, there are 32 threatened and endangered (T&E) or at-risk species (some with critical habitat) under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and/or NMFS. Of those 32 species, 12 occur in Terrebonne Parish (

Table 4-6).

Table 4-6. T&amp;E Species Occurring in Terrebonne Parish

Common Name	Scientific Name	Occurrence	Group	Status
West Indian Manatee	<i>Trichechus manatus</i>	Seasonal	Mammal	T
Piping Plover	<i>Charadrius melodus</i>	Known	Bird	T, CH
Rufa Red Knot	<i>Calidris canutus</i>	Known	Bird	T
Eastern Black Rail	<i>Laterallus jamaicensis ssp. Jamaicensis</i>	Possible	Bird	T
Green Sea Turtle	<i>Chelonia mydas</i>	Known	Reptile	T
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	Known	Reptile	E
Kemp's Ridley Sea Turtle	<i>Lepidochelys kempii</i>	Known	Reptile	E
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Known	Reptile	E
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Known	Reptile	T
Alligator Snapping Turtle	<i>Macrochelys temminckii</i>	Known	Reptile	PT
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Known	Fish	E
Monarch Butterfly	<i>Danaus plexippus</i>	Seasonal	Insect	C

T = Threatened; E = Endangered; PT = Proposed Threatened; C = Candidate; CH = Critical Habitat

Source: <https://www.fws.gov/office/louisiana-ecological-services/species> (accessed August 15, 2023)

T&E species known or believed to occur within the project area include: West Indian manatee (*Trichechus manatus*), eastern black rail (*Laterallus jamaicensis jamaicensis*), alligator snapping turtle (*Macrochelys temminckii*), and monarch butterfly (*Danaus plexippus*). T&E species that may occur in coastal waters of the study area are the gulf sturgeon (*Acipenser oxyrinchus desotoi*), oceanic whitetip shark (*Carcharhinus longimanus*), giant manta ray (*Manta birostris*), sperm whale (*Physeter macrocephalus*), and Rice's whale (*Balaenoptera ricei*).

The USFWS and NMFS share jurisdictional responsibility for sea turtles and gulf sturgeon. Other species that were listed on the Endangered Species List, but which have since been de-listed because population levels have improved, are the bald eagle and the brown pelican. Currently, American alligators and shovelnose sturgeon are listed as threatened under the Similarity of Appearance clause in the Endangered Species Act (ESA) of 1973, as amended, but are not subject to ESA Section 7 consultation. Additionally, proposed species are not protected by the take prohibitions of Section 9 of the ESA until the rule to list is finalized. Under section 7(a)(4) of the ESA, Federal agencies must confer with the Service if their action would jeopardize the continued existence of a proposed species.

#### 4.2.5.1 West Indian Manatee (*Trichechus manatus*)

Manatees are listed as threatened under the ESA and the Marine Mammal Protection Act (MMPA). Manatees inhabit coastal areas from Florida to the Greater Antilles and suitable habitats in Central and South America. Manatees occasionally enter the Pearl, Pontchartrain, Barataria, Mermentau, Calcasieu, and Sabine River basins and associated coastal waters and streams during the summer months (i.e., June through September).

Given the extensive areas of relatively undisturbed wetlands in the region and the paucity of food sources in the project area, it is considered unlikely for the manatee to frequent and utilize waterways within the project area. The project area does not contain West Indian manatee critical habitat.

#### **4.2.5.2 Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)**

The eastern black rail is listed as threatened under the ESA. Rails are known to occur in the Gulf Coast Chenier Plain of Louisiana (specifically Cameron and Vermilion Parishes) and require salt, brackish, and/or freshwater marsh habitats with dense vegetative cover. Occurrences of eastern black rail in Terrebonne Parish are rare; therefore, it is unlikely they would be present in the project area. No critical habitat has been designated for this species.

#### **4.2.5.3 Alligator Snapping Turtle (*Macrochelys temminckii*)**

Alligator snapping turtles are listed in the ESA as “proposed threatened”. The alligator snapping turtle occurs exclusively in the United States from western Georgia to eastern Texas and north to Missouri. Turtles inhabit swamps, large rivers, canals, lakes, and Oxbow. They are most commonly found in freshwater lakes and bayous but are known to occur in coastal marshes. Turtles may be found in the project area due to the availability of suitable habitat nearby.

#### **4.2.5.4 Monarch Butterfly (*Danaus plexippus*)**

Monarch butterflies are listed as candidate under the ESA and are native to North and South America. North American monarchs consist of two distinct populations, eastern and western. Eastern monarchs breed in the eastern United States and Canada and overwinter in central Mexico. Louisiana is part of the eastern migration pattern, and the state is an important stopover on their journey as they depend on coastal wildflowers and native milkweeds for foraging along the way. Monarchs may be found in the project area in the fall and spring during their migration cycle. Currently, the monarch butterfly does not receive statutory protection under the ESA.

#### **4.2.5.5 Bald Eagle (*Haliaeetus leucocephalus*)**

The bald eagle was delisted as a Federally threatened species in 2007 for most of the United States; however, it is protected under the Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA). Bald eagles’ nest in Louisiana from December through mid-May in mature trees (e.g., bald cypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Nest sites typically include at least one perch with a clear view of the water or area where the eagles usually forage.

Habitats suitable for use by the bald eagle are present throughout coastal Louisiana and can be found in the project area. The project area was surveyed for bald eagle nests via helicopter survey on 4 May 2023. During the helicopter survey, three eagle nests were observed in the vicinity of the Proposed Action.



#### 4.2.5.6 Colonial Nesting Waterbirds

Coastal Louisiana contains habitats suitable for support of colonial nesting waterbirds which are protected under the MBTA. Louisiana is considered a hotspot for colonial wading bird and seabird nesting because of its position in the Mississippi Alluvial Valley and along the Gulf of Mexico. It is estimated that the Louisiana coastal zone is home to approximately 200 rookeries of wading birds and seabirds.

Some of the colonial nesting waterbird species in the project area include: anhingas (*Anhinga anhinga*), great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), snowy egrets (*Egretta thula*), little blue herons (*Egretta caerulea*), tricolored herons (*Egretta tricolor*), cattle egrets (*Bubulcus ibis*), green herons (*Butorides virescens*), black-crowned night-herons (*Nycticorax nycticorax*), yellow crowned night-herons (*Nyctanassa violacea*), white ibises (*Eudocimus albus*), glossy ibises (*Plegadis falcinellus*), and white-faced ibises (*Plegadis chihi*). Geologic subsidence, erosion, storm surge, and sea level rise would continue to impact birds by degrading viable nesting habitat within project area.

Habitats suitable for use by colonial nesting waterbirds are present throughout coastal Louisiana and can be found in the project area. On 4 May 2023, the project area was surveyed for colonial waterbird activity via helicopter survey. No evidence of colonial waterbird nesting (or pre-nesting) activities was observed near the project area.

#### 4.2.6 Soils and Prime and Unique Farmlands

The soils of the natural levees in Terrebonne Parish formed in sediments deposited by former channels of the Mississippi River and its distributaries on the Atchafalaya and Lafourche Delta Complex (McDaniel & Trahan 2007). Loamy soils are dominant on the high and intermediate parts of the natural levees, and clayey soils are dominant on the lower parts of the natural levees and in back swamps. The loamy soils, and the clayey soils that rarely flood, make up about 9 percent of the total land area of the parish. They are used mainly for cropland, urban, and industrial purposes. A few areas are in pasture and woodland. The clayey soils on the lowest parts of the landscape are subject to occasional or frequent flooding and make up about 6 percent of the total land area of the parish. They are used mainly for timber production, pasture, recreation, and wildlife. Some narrow, loamy, natural levee ridges in the southeastern and east central parts of the parish extend south into the Gulf Coast Marsh. These areas are subject to occasional flooding during tropical storms and are used mainly for camps, home sites, and activities associated with the seafood industry.

The Farmland Protection Policy Act of 1981 was enacted to minimize the extent that Federal programs contribute to the unnecessary and irreversible conversion of prime or unique farmland to non-agricultural uses. USDA's NRCS is responsible for designating prime or unique farmland protected by the act. Prime farmland, as defined by the act, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. Unique farmland is defined by the act as land other than prime farmland that is used for the

production of specific high value food and fiber crops, such as citrus, tree nuts, olives, and vegetables.

Based on data accessed from the NRCS in 2011, approximately 128,144 acres, or 10.6 percent, of the total acreage in the study area meet the soil requirements for prime farmland (<http://websoilsurvey.nrcs.usda.gov>). Unique farmland is not located in the study area. Prime farmland within the study area is limited to natural ridge tops and consists of the following soil associations: Cancienne silt loam, Cancienne silty clay loam, Commerce silt loam, Commerce silty clay loam, Grammercy silty clay loam, Schriever clay, Sharkey silty clay loam, Sharkey clay, and Vacherie silt loam. Not all of prime farmland in the study area is used for agriculture. NRCS soil surveys indicate nearly all prime farmland acreage in Terrebonne Parish is planted in crops, but only about half of the acreage in Lafourche Parish is agricultural. The crops grown on this land are mainly common bermudagrass, improved bermudagrass, soybeans, wheat, sugar cane, bahiagrass, and corn.

Soils are a critical element of coastal habitats because they support vegetation growth and open-water benthic productivity. The study area lies entirely within the south-central region of the Deltaic Plain. It falls within two major land resource areas (MLRAs): MLRA 131 and MLRA 151. MLRA 131, the Southern Mississippi River Alluvium, makes up about 29 percent of the study area. MLRA 151, the Gulf Coast Marsh, makes up the remaining 71 percent of the study area (NRCS 2011). The soils formed from sediments deposited by former channels of the Mississippi River and its distributaries on the Atchafalaya and Lafourche Delta Complex. Loamy soils are dominant on the high and intermediate parts of the natural levees, and clayey soils are dominant on the lower parts of the natural levees and in backswamps. Elevations range from about 14 feet above mean sea level along the natural levee of Bayou Terrebonne in the northern part of the study area to about 5 feet below sea level in the former marshes and swamps that have been drained.

The Swamp and Marsh soil associations comprise approximately 80 percent of soils within the study area (McDaniel and Trahan 2007; Matthews 1984). These associations occur over a broad plain about level with the Gulf of Mexico between the ridge areas and are frequently flooded. Marsh soils, both fresh and saline, generally have a semifluid peat or muck surface layer, up to four feet thick, over alluvial clays and silty clays. Soil associations include Fausse-Barbary, Harahan-Rita, Allemands-Kenner, Clovelly-Lafitte, Timbalier-Bellpass, and Scatlake. These soils are generally too wet and soft for any agricultural uses. The marsh soils' organic content decreases as conditions move from fresh to saline. Fresh marsh soils contain a mean of 52 percent organic matter, whereas saline soils contain only 18 percent organic matter (Chabreck 1982). Soils in the swamp soil association are usually wet and frequently flooded. These soils, identified primarily as Barbary-Fausse soils, are level, very poorly drained soils that have a mucky or clayey surface layer and a clayey subsoil. Some acreage of former marshes and swamps have been protected, pumped-off, and drained and are used as pasture or for urban use. Rita-Harahan soils have been identified in these areas. Rita-Harahan soils are level, poorly drained soils that have a clayey or mucky surface layer and a clayey or loamy subsoil; in former swamps and marshes. Uses include woodland, pasture, recreation, and campsites. The remaining 20 percent of soils in the study area are comprised of natural ridges, levees, and open water.

The lower portions of the natural levees are formed by the Sharkey and Schriever soil associations. These soils are black to dark gray on the surface and have higher clay material and organic matter content than do soil associations on the highest portions of the natural levees. They are subject to rare or occasional flooding, and support bottomland vegetation. Uses include woodland, pasture, recreation, campsites, and wildlife habitat. The highest parts of the natural levees along the bayous, including along Highway 57 to the south of Lake Boudreaux, contain soils of the Commerce and Cancienne-Grammercy associations. These level, somewhat poorly drained and poorly drained brown to grayish brown soils have a loamy or clayey surface layer and clayey subsoil or are loamy throughout. They rarely flood and are used mainly for cropland, pasture, woodland and urban purposes. Some narrow, loamy, natural levee ridges in the southeastern and east-central parts of Terrebonne Parish extend south into the Gulf Coast Marsh. These areas are subject to occasional flooding during tropical storms and are used mainly for camps, homesites, and activities associated with the seafood industry.

Sugar cane is the principal agricultural crop grown in the region (McDaniel and Trahan 2007; Matthews 1984). Corn is also a major crop. Soybeans, rice, vegetables, and pasture grasses are also grown.

#### 4.2.7 Water Quality

Section 305(b) of the Clean Water Act (CWA) requires each state to monitor and report on surface and groundwater quality, which the Environmental Protection Agency (EPA) synthesizes into a report to Congress. The Louisiana Department of Environmental Quality (LDEQ) produces a Section 305 (b) and Section 303(d) Water Quality Report every two years that provides a status report on the quality of Louisiana's surface water, and the methodology of data collection for surface water. It also identifies impaired water bodies. Section 303(d) of the CWA requires states to identify waterbodies that are impaired or in danger of becoming impaired due to exceedances of Federally approved water quality standards. The State of Louisiana and the EPA have established surface water quality standards to assess ambient water quality conditions and to establish a priority ranking for such waters ((Louisiana Administrative Code (LAC), Title 33:IX.1101 et seq. (LAC 2021)). Most recently, the LDEQ released the 2022 Louisiana Water Quality Inventory: Integrated Report.

The 2022 Louisiana Water Quality Integrated Report, LDEQ outlines three subsegments that are within the project area: LA120403\_00-Intracoastal Waterway-From Bayou Boeuf Locks to Bayou Black in Houma; includes segments of Bayous Boeuf, Black, and Chene, LA120405\_00-Lake Hache and Lake Theriot, LA120505\_00-Bayou Du Large-From Houma to Marmande Canal. 0 contains the full water quality report in accordance with Section 404(b)(1) of CWA.

#### **LA120403\_00-Intracoastal Waterway-From Bayou Boeuf Locks to Bayou Black in Houma; includes segments of Bayous Boeuf, Black, and Chene**

The 2022 LDEQ report states that this subsegment is labeled as Fully Supporting for Primary Contact Recreation (swimming), Secondary Contact Recreation (boating), Fish and Wildlife Propagation (fishing), Drinking Water Supply, Agriculture. There is no impairment for

this subsegment. Below are four water quality charts that show trends between July 2012 to September 2020 for pH, Temperature, Specific Conductance, and Dissolved Oxygen for this subsegment.

#### **LA120405\_00-Lake Hache and Lake Theriot**

The 2022 LDEQ report states that two portions of this subsegment are labeled as Fully Supporting for Primary Contact Recreation (swimming) and Secondary Contact Recreation (boating) while Fish and Wildlife Propagation (fishing) is labeled as Not Supporting. There are three suspected causes of impairments for this subsegment for Fish and Wildlife Propagation (fishing): Dissolved Oxygen, Non-Native Aquatic Plants, and Turbidity. There are three IRC categories for the suspected causes: IRC-4a, IRC-4b, and IRC-5. The suspected causes for the impairments that resulted in the IRC categories are: Introduction of Non-Native organisms (Accidental or Intentional), Natural Sources, Pesticide Application, Waterfowl, and an unknown point source.

#### **LA120505\_00-Bayou Du Large-From Houma to Marmande Canal**

The 2022 LDEQ report states that two portions of this subsegment are labeled as Fully Supporting for Primary Contact Recreation (swimming) and Secondary Contact Recreation (boating) while Fish and Wildlife Propagation (fishing) is labeled as Not Supporting. There are six suspected causes of impairments for this subsegment for Fish and Wildlife Propagation (fishing): Chloride, Dissolved Oxygen, Nitrate/Nitrite, Non-Native Aquatic Plants, Phosphorus Total, and Total Dissolved Solids. There are three IRC categories for the suspected causes: IRC-4a, IRC-4b, and IRC-5. The suspected causes for the impairments that resulted in the IRC categories are: Natural Sources, Silviculture Harvesting, Introduction of Non-Native Organisms, On-Site Treatment Systems, and Package Plant or other Permitted Small Flows Discharge.

### **4.2.8 Air Quality**

The EPA, Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards, (NAAQS), for six principal pollutants, called “criteria” pollutants. They are carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), lead (Pb), particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide (SO<sub>2</sub>). Ozone is the only parameter not directly emitted into the air, but it forms in the atmosphere when three atoms of oxygen are combined by a chemical reaction between oxides of nitrogen and volatile organic compounds in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of nitrogen and volatile organic compounds, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

The EPA Green Book Nonattainment Areas for Criteria Pollutants (Green Book) maintains a list of all areas within the United States that are currently designated “nonattainment” areas with respect to one or more criteria air pollutants. Nonattainment areas are discussed by county or metropolitan statistical area (MSA). MSAs are geographic locations, characterized by a large population nucleus, that are comprised of adjacent communities with a high degree of social and economic integration. MSAs are generally composed of multiple

counties. Review of the Green Book and Louisiana Department of Environmental Quality Air Quality list of “nonattainment” areas indicates that Terrebonne Parish is currently in attainment for all Federal NAAQS pollutants. Table 4-7 describes NAAQS set by the EPA under 40 CFR part 50.

Table 4-7. National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
<a href="#">Carbon Monoxide (CO)</a>		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
<a href="#">Lead (Pb)</a>		primary and secondary	Rolling 3 month average	0.15 µg/m <sup>3</sup> <sup>(1)</sup>	Not to be exceeded
<a href="#">Nitrogen Dioxide (NO<sub>2</sub>)</a>		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb <sup>(2)</sup>	Annual Mean
<a href="#">Ozone (O<sub>3</sub>)</a>		primary and secondary	8 hours	0.070 ppm <sup>(3)</sup>	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
<a href="#">Particle Pollution (PM)</a>	PM <sub>2.5</sub>	primary	1 year	12.0 µg/m <sup>3</sup>	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m <sup>3</sup>	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m <sup>3</sup>	98th percentile, averaged over 3 years
	PM <sub>10</sub>	primary and secondary	24 hours	150 µg/m <sup>3</sup>	Not to be exceeded more than once per year on average over 3 years
<a href="#">Sulfur Dioxide (SO<sub>2</sub>)</a>		primary	1 hour	75 ppb <sup>(4)</sup>	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m<sup>3</sup> as a calendar quarter average) also remain in effect.

(2) The level of the annual NO<sub>2</sub> standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O<sub>3</sub> standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O<sub>3</sub> standards.

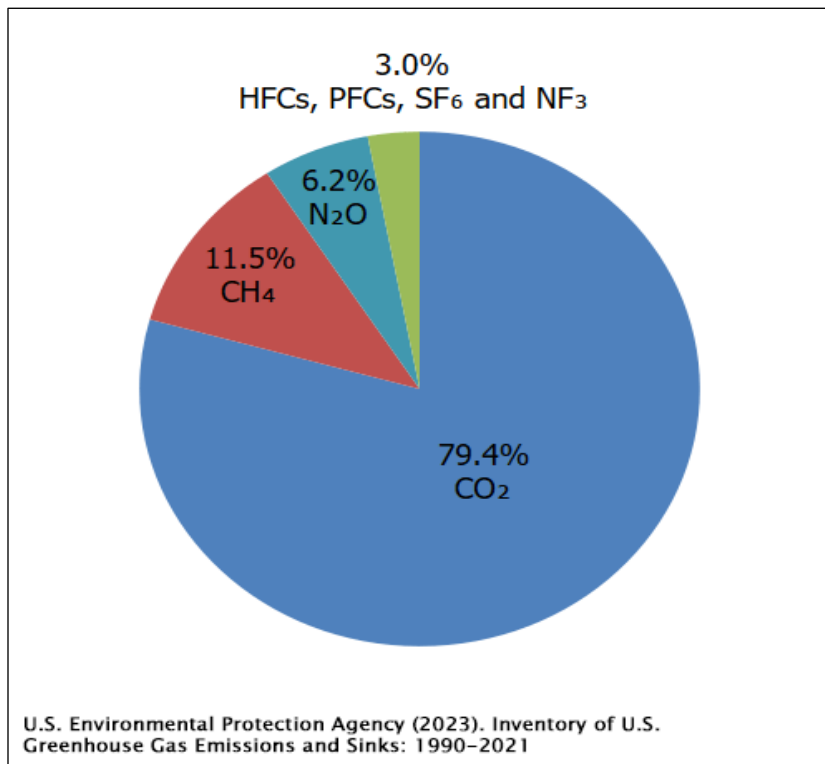
(4) The previous SO<sub>2</sub> standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan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

Source: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>, 28 August 2023.



## 4.2.9 Greenhouse Gasses

The CEQ's, CEQ-2022-0005, on January 9, 2023, introduced the interim guidance on Greenhouse Gas (GHG) and how agencies are able to compute GHG and the social cost for their projects. The components that are analyzed within GHG are Carbon dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), and Nitrous Oxide (N<sub>2</sub>O). Primary sources of CO<sub>2</sub> can be natural sources like decomposition of organic material and anthropogenic sources like burning of fossil fuel (Carbon Dioxide 101, 2023). For CH<sub>4</sub>, emissions can come from a variety anthropogenic process including flora and fauna sources (Crutzen etc. all, 1986). For N<sub>2</sub>O, majority of the point source revolves around agricultural processes: fertilization (Nitrous Oxide Emissions, 2023). For GHG, CO<sub>2</sub> is the primary contributor to GHG and climate change, followed by CH<sub>4</sub> and N<sub>2</sub>O. Figure 4-1 outlines the total U.S. emissions of 2021 showing that over 75 percent of GHG is CO<sub>2</sub> (Overview of Greenhouse, 2023).



*Figure 4-1. Total U.S. Emissions of GHG*

## 4.2.10 Noise and Vibration

This section presents an overview of the existing noise and vibration conditions in the project area and the environmental consequences and mitigation, as they pertain to the implementation of the project alternatives.

### 4.2.10.1 Noise Terminology

Noise can be defined as unwanted sound. Sound, traveling in the form of waves from a source, is characterized by a variety of parameters that include the rate of oscillation of

sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). The sound pressure level (referred to as sound level) is the most common descriptor used to characterize the loudness of an ambient sound level. It is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

Pressure oscillation rates can be measured in units of hertz, which correspond to the frequency of a sound. Typically, sound does not consist of a single frequency, but a broad band of frequencies varying in levels of magnitude (sound power). The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. In addition, humans cannot hear low and high-end frequencies well. Therefore, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes frequencies below 1,000 and above 5,000 hertz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies and greater sensitivity to mid-range frequencies.

This method of frequency weighting is referred to as A weighting and is expressed in units of A weighted dB (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A weighted noise levels are shown in Table 4-8.

Noise analyses and regulations use the following terms:

- **Leq: Equivalent energy level** – A-weighted sound level corresponding to a steady-state sound level that contains the same total energy as a varying signal over a given sample period. This is typically computed over 1-, 8-, and 24-hour sample periods. An hourly sample period is denoted as Leq (h).
- **Ldn: Day-night average level** – The energy average sound level for a 24-hour day determined after the addition of a 10-dBA penalty to all noise events occurring at night between 10 p.m. and 7 a.m. This is a useful measure for community noise impact because individuals in their homes are increasingly sensitive to noise at night when they are relaxing or sleeping relative to daytime hours.
- **Lmax: Maximum noise level** – Representing the highest sound level measured for a given period.
- **Lmin: Minimum noise level** – Representing the lowest sound level measured for a given period.
- **Lx: Statistical noise descriptor** – The noise level exceeded some percent of a specified time period. For example, L10 indicates the noise level that is exceeded 10 percent of the time during a given period.

Noise effects on humans can range from annoyance to physical discomfort and harm. Sleeping patterns, speech communication, mental acuity, and heart and breathing rates can all be disturbed by noise. Perception of the noise is affected by its pitch, loudness, and

character. Levels from isolated point sources of noise typically decrease by about six dBA for every doubling of distance from the noise source. When the noise source is a continuous line, such as vehicle traffic on a highway, sound levels decrease by about three dBA for every doubling of distance. Noise levels can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the reduction of noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) and the presence of dense vegetation can also affect the degree to which sound is attenuated over distance.

#### 4.2.10.2 Vibration Terminology

Vibration refers to ground-borne noise and perceptible motion. The most common impacts from ground-borne vibration include annoyance, movement of structure floors, rattling of windows, shaking of items on shelves or hanging on walls, disruption of vibration-sensitive operations or activities, and triggering of landslides. Vibrations caused by construction can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source due to spreading of the energy and frictional losses. Thus, ground-borne vibrations from most construction activities rarely reach the levels that can damage structures but can achieve the perceptible ranges in buildings very close to construction sites.

In extreme cases, the vibration can cause damage to buildings or equipment. In most circumstances, common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures, with the occasional exception of blasting and sheet pile-driving during construction. To assess the potential for structural damage associated with vibration, the vibratory ground motion near the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions, typically in units of inches per second (in/sec). The PPV is defined as the maximum instantaneous peak of the vibration signal.

According to FTA guidelines (2018), the construction vibration damage criterion for non-engineered timber and masonry buildings is 0.2 in/sec, and that of structures or buildings constructed of reinforced-concrete, steel, or timber is 0.5 in/sec. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception. A vibration level that causes annoyance would be well below the damage threshold for normal buildings. Generally, ground-borne vibration does not provoke adverse human reaction to those who are outdoors as the effects associated with the shaking of building are absent. The root mean square amplitude is most frequently used to describe the effect of vibration on the human body. The root mean square amplitude is defined as the average of the squared amplitude of the signal and is approximately 70 percent of the PPV for a single frequency vibration. Vibration velocity level (Lv) in dB notation (VdB) is commonly used to measure root mean square. The dB notation acts to compress the range of numbers required to describe vibration and is referenced to one in one million in/sec in the United States. The threshold of perception for vibration is typically around 64 VdB.

Construction activities can either result in continuous or single-impact (transient) vibration impacts. Typical equipment or activities that could result in continuous vibration impacts

include excavation equipment, traffic, vibratory pile drivers, and vibratory compaction equipment; examples of transient vibration sources include blasting and drop balls. Some construction activities, like jackhammers or impact pile drivers, can continually generate single transient events at a high frequency. However, for evaluation purposes, this equipment would be regarded as having frequent or continuous vibration impacts. Damage thresholds for continuous sources are approximately half of the thresholds for transient sources.

#### 4.2.10.3 Existing Noise and Vibration Sources

The project involves construction Southwest of Houma, Louisiana. Haul routes would include portions of Louisiana Highway 182. The area surrounding the project areas and haul routes are mainly agricultural and rural residential. Noise sources in the project area are comprised of four general types: agricultural, recreational, general stationary, and general mobile.

- **Agricultural Noise:** The predominant land use near the project area is related to agricultural activities. Farm operations produce noise from a variety of sources. These include heavy equipment for plowing and harvesting, crop-spraying aircraft, onsite processing equipment, and irrigation water pumps. Farm tractors typically produce an average of 84 dBA Lmax at 50 feet (FHWA 2021(upload)). Crop-spraying aircraft typically fly at low altitude and may cause loud temporary noise exceeding those of commercial aircraft. Crop-spraying is typically seasonal and short in duration at any given location. In addition to affecting the farmers and farm laborers, agricultural noise also affects those living in or near agricultural areas.
- **Recreational Noise:** Recreational noise can include hunting and boating noise. Hunting on private and public land (limited) for waterfowl, deer, pig, and fur bearer is common. Firearms typically generate instantaneous noise exceeding 140 dBA (American Speech-Language-Hearing Association 2017). There is regular boat traffic on the Intercoastal Waterway which could produce noise greater than 86 decibels at 50 feet. ([https://www.cppperformance.com/t-state\\_noise\\_laws.aspx](https://www.cppperformance.com/t-state_noise_laws.aspx), updated 2005). The project is not expected to change the effect of these activities.
- **General Stationary Noises:** General stationary noises (i.e., those emanating from fixed locations) are associated with a variety of land uses. Stationary sources can include air conditioning units, power tools, motors, generators, appliances, and manufacturing and industrial facilities. There are few industrial facilities near the project area with an unknown decibel level, and frequency of noise and vibration emanation. Therefore, contribution of general stationary noises to the ambient noise levels in the project area is minimal.
- **General Mobile Noise:** General mobile noise sources can include vehicles, aircraft, boats, and trains. Mobile noise is usually temporary and variable but can be intense and annoying because of its abruptness and intensity. In urban areas, these mobile sources contribute to the ambient noise. The closest mobile noise sources to the project area are mobile noise sources on LA Highway 182, boat traffic on the Intercoastal Waterway, and agricultural equipment.

#### 4.2.10.4 Existing Noise and Vibration Sensitive Receptors

Places where quiet is an essential element of a land use's intended purpose qualify as a noise sensitive receptor, such as historical monuments with significant outdoor use. Places where people normally sleep, like residences, hotels, and hospitals, qualify as noise-sensitive receptors. For these types of receptors, nighttime sensitivity to noise must be considered. Various institutional land uses where excessive noise could interfere with speech, meditation, and concentration also qualify as noise sensitive receptors. These land uses include schools, libraries, theaters, churches, cemeteries, monuments, and museums. Parks may also be considered noise sensitive receptors, but this classification is dependent on their use. For example, a park intended primarily for active recreation would not be considered a noise-sensitive receptor (FTA 2018). Noise-sensitive receptors may also have stationary noise sources at their locations.

*Table 4-8. Weighted (dBA) Sound Levels of Construction Equipment Modeled Attenuation at Various Distances*

Noise Source	50 ft	100 ft	200 ft	500 ft	1,000 ft
Backhoe	78 dBA	72 dBA	68 dBA	58 dBA	52 dBA
Dumptruck	76 dBA	70 dBA	64 dBA	56 dBA	50 dBA
Excavator	81 dBA	75 dBA	69 dBA	61 dBA	55 dBA
Front End Loader	79 dBA	73 dBA	67 dBA	59 dBA	53 dBA
Dozer	82 dBA	76 dBA	70 dBA	62 dBA	56 dBA
Hydraulic Cutterhead Dredge	No data available	No data available	79 dBA	No data available	64dBA
Airboat	59 dBA	No data available	No data available	No data available	40 dBA

1. The dBA at 50 ft is a measured noise emission. The 100- to 1,000-ft results are modeled estimates. Source: FHWA 2006. "Highway Construction Noise Handbook"
2. <https://www.tremr.com/007pandas/death-lax-regulations-noisy-airboats>
3. 2003 Bayou Chene Bald Eagle Dredging Noise Coordination with USFWS

#### 4.2.11 Aesthetics

Reach A is within Terrebonne Parish and southwest of Houma. The area is centered between Bayou Black and Bayou du Large which are both natural bayou ridges. These ridges, or river terraces, are the prevalent landform in the area and are considered high ground. Land use along these ridges includes cultivated crops, pastureland, marine industry, and rural residential development. Primary vistas within the project area are from State Highways 182 and 315. These highways form a portion of the 204-mile-long Wetlands

Cultural Trail, a Louisiana Scenic Byway which recognizes, educates, preserves, and enhances the region's inherent culture, heritage, and beauty.

Additional vistas into the interior of this landscape are only available via boat. The landscape and vegetation between these waterways are primarily brackish and saline marshes. Public access beyond State Highways 182 and 315 is limited to the Gulf Intracoastal Waterway and countless straight channels and related spoil banks, which cut through the coastal marsh. These were most likely caused by navigation for petroleum, fisheries, pipelines, or other related resources. User activity in the area primarily relates to consumptive recreation and support services for agriculture, petroleum, marine, and fisheries.

The following visual resources scenic character has been recognized by national or state designations. There may be additional visual resources not identified including public parks and recreation areas. Specific project details used for the resource's environmental impact analysis may identify other visual resources:

- The Wetlands Cultural Trail Scenic Byway is 204.1 miles in length and has two interconnected loops and three spurs; the spurs are primarily contained within the study area. The eastern spur extends along LA 182 between Houma and Gibson allowing access to Houma's Downtown National Historical District and Mandalay National Wildlife Refuge. Two southern spurs descend from Houma to Cocodrie along LA 56 with a side route on LA 57 to Dulac. The Wetlands Cultural Scenic Byway provides viewsheds along LA 182 from Houma to Gibson and along LA 56 south of Houma.
- Mandalay National Wildlife Refuge (NWR) is located approximately 6 miles southwest of Houma, Louisiana. Access to the interior is limited to boat travel. The 4,212-acre refuge is a stopping point for migratory birds. Recreation use includes wildlife observation and photography. The refuge also provides opportunities for environmental education and interpretation. The Northern portion of Reach A would transect this NWR.

#### **4.2.12 Recreation**

Reach A is within Terrebonne Parish and southwest of Houma. The area is centered between Bayou Black and Bayou du Large with the Intracoastal Waterway bisecting the brackish and saline marsh. Major bodies of water located in the project area include Lake Hatch, Minors Canal, and numerous man-made oil field canals. The Mandalay NWR is located within the project area.

The 4,212-acre Mandalay NWR, which is managed by the US Fish and Wildlife Service, is located approximately six miles southwest of Houma, Louisiana, and approximately 55 miles southwest of New Orleans. The refuge, established in 1996 in Terrebonne Parish, Louisiana, is accessible only by boat and has beautiful marshes with ponds, levees, and manmade canals. The Northern portion of Reach A would transect this NWR.

The most prominent recreational activities within the project area are consumptive uses: fishing and waterfowl hunting. Limited consumptive recreation uses include recreational



crabbing, shrimping, and crawfishing. Natural ridges are also utilized for deer and small game hunting. Non-consumptive recreational activities attract far fewer participants and include birdwatching, hiking, camping, wildlife observation, boating, and photography.

Factors contributing to the high proportion of boating activity for fishing include the high quality of the recreational fishery, especially an abundance of red drum and trout. Pleasure boating occurs to a lesser degree than boat fishing. One indicator of the amount of recreational fishing occurring in the study area is the number of recreational boats registered in Terrebonne parishes. In 2019, there were 14,656 registered boats, 29,331 resident fishing licenses, and 5,140 resident hunting licenses issued by the State of Louisiana.

Table 4-9 through Table 4-11 show the number of fishing licenses, hunting licenses, and boat registrations, respectively, within the project area. The fishing and hunting license and boat registration data are provided by the Louisiana Department of Wildlife and Fisheries (<https://www.wlf.louisiana.gov/resources/category>, accessed September 2023).

*Table 4-9. Fishing Licenses Sold in the Vicinity of Project Area - Fiscal Year 2019*

Parish	Resident Freshwater	Resident Saltwater	Non-resident Freshwater	Non-resident Saltwater
Terrebonne	14,960	14,371	89	87
State/Parish Average	5,049	3,106	37	29

*Table 4-10. Active Boat Registrations in the Vicinity of the Project Area - Fiscal Year 2019*

Parish	Boat Registrations
Terrebonne	14,656
State / Parish Average	4,716

*Table 4-11. Hunting Licenses Sold in the Vicinity of the Project Area - Fiscal Year 2019*

Parish	Resident	Non-resident	Resident Duck Only	Non-resident Duck Only
Terrebonne	3,216	2	1,924	2
State / Parish Average	2,032	3	682	2

## 4.2.13 Socioeconomics

### 4.2.13.1 Population

Population and household characteristics in the region of influence (ROI) determine consumption patterns, land use activities, and future development patterns. Throughout 1970s, the Lafourche and Terrebonne Parishes experienced significant growth; from 1970 to

1980 their populations grew by 20.8 percent and 24.8 percent respectively. The population in Terrebonne Parish and Lafourche Parish declined slightly in the late 1980s but recovered by the late 1990s. Between 2005 and 2006 population increased as those fleeing Hurricane Katrina moved to the ROI. Post- Katrina population in the ROI continued to increase at steady incremental rate; these trends are expected to continue over the next 25 years. The largest population center in the ROI is Houma, LA. According to the American Community Survey 2021, the population of Houma was 33,461.

#### 4.2.13.2 Households

Table 4-12 shows the number of households in the ROI from the year 1970 to the year 2045. The number of households in the ROI increased by an average of 4 percent every year between 1970 and 1980. In the following decades, the two parishes experienced steady growth, closely mirroring trends in population. In most recent years, the number of households in Lafourche Parish increased from 35,650 in 2010 to 38,090 in 2020 (6.8 percent increase) and the number of households in Terrebonne Parish increased from 40,020 in 2010 to 43,050 in 2020 (7.6 percent increase). According to the American Community Survey 2021, the number households in Houma was 14,893. Projected data estimates that trends in the number of households in the study area will continue. The number of households in Lafourche Parish is expected to reach 41,810 by the year 2035 and the number of households in Terrebonne Parish is expected to reach 46,320.

*Table 4-12. Populations and Households*

Population (Ths.)								
Parish	1970	1980	1990	2000	2010	2020	2030	2040
Terrebonne	76.17	95.09	97.04	104.76	111.55	114.46	115.31	115.88
Lafourche	69.05	83.47	85.81	89.78	96.68	98.66	99.22	99.50
Number of Households (Ths.)								
Parish	1970	1980	1990	2000	2010	2020	2030	2040
Terrebonne	19.60	29.50	31.86	36.16	40.02	43.05	45.37	47.19
Lafourche	18.01	25.70	28.82	32.05	35.65	38.09	40.03	41.52

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

#### 4.2.13.3 Labor and Employment

##### 4.2.13.3.1 Labor Force

Labor and employment numbers illustrate the level the economic activity in the ROI- an integral part of the social and economic environment. The labor force includes all citizens over the age of 16 employed or actively seeking employment in the ROI.

Table 4-13. displays the total labor force in the ROI from 1990-2046. Employment trends in the ROI are strongly influenced by the oil and gas industry; meaning employment is highly sensitive to booms and busts in the oil and gas industry. For example, the price of oil declined sharply in the late 1990s and, in response, the labor force in Terrebonne Parish declined by 4 percent and the labor force in Lafourche Parish declined by 3 percent. Similar trends occurred in the years following a sharp decline in oil prices in 2008 and 2014.

Moody Analytics predicts that the labor force will flatten out over the next 25 years. As concerns over climate change increase there is pressure to move away from a dependence on fossil fuels. The year 2020 saw another collapse in the price of oil, but this time oil prices may not recover as consumers and producers alike look to other energy efficient solutions.

#### 4.2.13.3.2 Unemployment Rate

The unemployment rate is the percentage of people that are unemployed out of the total labor force. The unemployment rate is another proxy for the overall health of the economy.

Table 4-13 shows the unemployment rate for the ROI as well as the total unemployment rate for state of Louisiana.

Overall, the unemployment rate in the ROI is relatively low. The unemployment rate of the state of Louisiana much higher than the unemployment rate in the ROI with only a few exceptions. As mentioned previously, historically, employment in the ROI is tied to the oil and gas industry though the unemployment rate is much more sensitive to changes to the market than the labor force because people only drop out of the labor force when economic conditions are so bad that they stop seeking employment altogether. The spikes in unemployment correspond with an overall decline in the price of oil. There are significant increases in the unemployment rate in 1992, 2000, 2005, post-2008, 2015. Moody's Analytics estimates that the unemployment will flatten out over the next 25 years.

*Table 4-13. Labor and Employment*

Labor Force (Ths.)						
Parish	1990	2000	2010	2020	2030	2040
Terrebonne	40.52	45.88	50.91	50.53	49.80	50.37
Lafourche	36.71	41.14	45.07	44.46	43.74	44.15
Unemployment Rate (%)						
Parish	1990	2000	2010	2020	2030	2040
Terrebonne	4.36	4.65	6.47	6.47	7.17	7.08
Lafourche	4.09	4.49	6.14	5.87	6.50	6.42
Louisiana	6.18	5.28	7.94	6.86	7.05	6.69

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

#### **4.2.13.3.3 *Employment by Industry***

The type of employment in the ROI gives us an idea of what industries areas are important to the ROI.

Table 4-14 shows the employment by industry for each parish in the ROI. The biggest industry in the ROI is the trade, transportation, and utilities industry. Historically, Terrebonne Parish heavily relied on the natural resource and mining industry. After the collapse of oil in the 1980s Terrebonne Parish began to diversify and employment in industries like government, manufacturing and health/education services became more popular. Popular industries in Lafourche Parish include government, manufacturing, and professional/business services. The natural resource and mining industry pays the highest wages in ROI. According to the 2018 American Community Survey, retail trade is the most common industry in Terrebonne Parish followed by healthcare/social assistance, mining, quarrying, and oil and gas extraction and food services. The most common industries in Lafourche Parish include healthcare/social assistance, manufacturing, retail trade, and construction.

Moody Analytics predicts that trade, transportation, and utilities will remain the most popular industry in the ROI followed by healthcare/education services and government.

*Table 4-14. Employment by Industry (Ths.)*

Terrebonne Parish				
Industry	1970	1990	2010	2040
Natural Resources and Mining	4.57	4.69	5.44	4.36
Construction	1.48	2.06	3.14	2.93
Manufacturing	2.98	2.75	5.94	4.39
Trade; Transportation; and Utilities	6.10	8.57	12.33	11.33
Information	0.50	0.44	0.40	0.39
Financial Activities	1.13	2.12	2.90	2.97
Professional and Business Services	0.94	1.70	5.62	6.30
Education & Health Services	0.94	3.31	5.47	8.37
Leisure and Hospitality	1.37	3.11	4.81	5.13
Other Services	0.65	1.12	1.84	1.39
Government	3.75	5.90	6.99	6.03
Lafourche Parish				
Industry	1970	1990	2010	2040
Natural Resources and Mining	1.18	1.24	1.50	1.26
Construction	0.57	0.67	2.15	1.79
Manufacturing	2.45	2.19	2.58	2.12
Trade; Transportation; and Utilities	4.79	6.50	11.79	10.34
Information	0.14	0.35	0.25	0.26
Financial Activities	1.01	2.03	1.92	1.53
Professional and Business Services	0.54	1.21	3.61	3.01
Education & Health Services	0.44	1.27	3.09	3.84
Leisure and Hospitality	0.52	1.10	2.70	2.81
Other Services	0.36	0.56	0.69	0.64
Government	2.92	4.93	7.24	7.44

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

#### 4.2.13.4 Public Facilities and Services

Public and quasi-public facilities and services in the project area include medical facilities, schools, police stations/sheriff's offices, and fire stations. According to 2023 EJ Screening Tool data, there are eight hospitals in the study area. Lafourche Parish has five police stations/sheriff's offices and a juvenile justice facility located within the study area and Terrebonne Parish has three police stations/sheriff's offices, according to 2018 ESRI data. There are 48 fire stations located within the study area—18 in Lafourche Parish and 30 in Terrebonne Parish. Public and quasi-public facilities and services in the project area also include a Final RPEIS May 2013 Morganza to the Gulf of Mexico, LA Final Revised



Programmatic EIS 5-49 extensive network of pumps and levees for flood risk reduction, and a series of navigation canals, including the GIWW, the HNC and Bayou Lafourche.

#### 4.2.13.5 Transportation

Several major highways are located within the study area. For example, in Terrebonne Parish, Highways 315, 661, 57, 56, and 55 run in a north-south direction through the project boundaries while Highways 24, 90, 182, 309, 311, 316, 3040, 659, 660, and 58 run in an east-west direction. In Lafourche Parish, Highway 24 runs in an east-west direction through MTG project features as described in the 2013 PACR/RPEIS. In addition, numerous smaller highways and local streets would be within MTG project features as described in the 2013 PACR/RPEIS. A series of navigation canals, including the HNC and the GIWW, are also located within the study area as well as the Port of Terrebonne. The HNC is Houma's 26-mile direct waterway route to the Gulf of Mexico from the Intracoastal Waterway. The GIWW is a navigable inland waterway that passes through the heart of Houma-Terrebonne in an east-west direction. The Port of Terrebonne, located in Houma roughly 26 miles north of the Gulf of Mexico at the convergence of the HNC and GIWW, is classified as a medium draft port and has 400 acres of leasable, waterfront acres. The port is connected (via the HNC and GIWW) to ports and docks along the U.S. gulf coast and other markets. The Houma-Terrebonne Airport and Industrial Park is also located within the study area. The airport provides easy access to the Gulf of Mexico and to the Central and South American markets.

#### 4.2.13.6 Income Per Capita

Income per capita serves as a proxy for regional and community economic growth. Table 4-15 shows the income per capita for the ROI for the years 1970, 1980, 1990, 2000, 2010, 2020, 2030, and 2040. Income per capita in the ROI increased throughout the past 50 years in response to economic growth and inflation.

*Table 4-15. Income Per Capita (\$)*

	1970	1980	1990	2000	2010	2020	2030	2040
Parish								
Terrebonne	2,953	9,571	13,307	20,821	38,788	50,482	71,469	103,019
Lafourche	2,829	9,200	13,239	23,485	40,391	50,061	65,374	86,354

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

#### 4.2.13.7 Tax Revenues and Property Values

If hurricanes significantly impact businesses, industries, farms, and property values, and impact local employment and income, the tax base created by these activities could be impacted as well. Reduction in the flood risk from the surges associated with tropical events is the primary objective of projects similar to those proposed and can have a commensurate positive impact on property values. Conversely, the lack of hurricane damage risk reduction in areas most sensitive to storm damage could limit the growth of property values. In 2009, USACE identified a total of 52,041 residential and nonresidential structures within the project

study area: 45,778 residential structures and 6,263 nonresidential/commercial structures. According to the U.S. Census Bureau, the average median value of owner-occupied homes in Lafourche Parish between 2017-2021 was estimated to be \$162,100 (compared with the state average of \$174,000). The average median value of owner-occupied homes in Terrebonne Parish during this same period was estimated to be \$160,600.

#### **4.2.13.8 Community Cohesion**

Community cohesion is the unifying force of a group due to one or more characteristics that provide commonality. These characteristics may include such commonality as race, education, income, ethnicity, religion, language, and mutual economic and social benefits. Community cohesion is the force that keeps group members together long enough to establish meaningful interactions, common institutions, and agreed upon ways of behavior. It is a dynamic process, changing as the physical and human environment changes. The changes brought about by water resource developments can impact community cohesion in different ways. For example, changing a ROW may divide a community; it may cause the dislocations of a significant number of residents; or it may require the relocation of an important local institution, such as a church or community center. On the other hand, a water resource development, such as construction of a hurricane levee, can represent an important public works project heavily supported by the local community.

The presence of social institutions such as libraries, places of worship, and schools provide residents an opportunity for civic participation and engagement, which increases community cohesion. The study area is comprised of settled communities with stable complements of places of worship, schools, and community interaction. According to 2023 EJ Screening Tool Community Report, there are 31 schools and 98 places of worship in the study area.

#### **4.2.14 Environmental Justice**

Environmental Justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income regarding the development, implementation, and enforcement of environmental laws, regulations, and policies, with no group bearing a disproportionate burden of environmental harm and risks. Recent guidance has emerged directing Federal agencies to ensure disadvantaged or socially vulnerable communities shall be considered throughout the Civil Works programs and in all phases of project planning and decision-making, consistent with the goals and objectives of various Administration policy. Federal agencies should assess the effects of their projects on communities with EJ concerns in accordance with EO 12898: Environmental Justice, 1994 and EO 14008, Tackling the Climate Crisis at Home and Abroad, 2021. For USACE, compliance with these Executive Orders is mandatory pursuant to Section 112(b)(1) of WRDA 2020 (Public Law 116-260). ("In the formulation of water development resources projects, the Secretary shall comply with any existing Executive Order regarding EJ to address any disproportionate and adverse human health or environmental effects on minority communities, low-income communities, and Indian Tribes.")

The EJ assessment utilizes the Environmental Justice Index (EJI) developed by the Center for Disease Control and Prevention's Agency for Toxic Substances Disease Registry, 2022

(Accessed 15 Nov 2023) <https://www.atsdr.cdc.gov/placeandhealth/eji/index.html>. The EJI uses data from the U.S. Census Bureau, the U.S. Environmental Protection Agency, the U.S. Mine Safety and Health Administration, and the U.S. Centers for Disease Control and Prevention to rank the cumulative impacts of environmental injustice on health for every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The EJI ranks each tract on 36 environmental, social and socio-economic (including minority and low-income data), and health factors and groups them into three overarching modules and ten different domains.

The following subsections provide information on the methods used to identify areas of EJ concern for Terrebonne and Lafourche Parishes. While the Reach A project area is in Terrebonne Parish, information for Lafourche Parish is also presented because the EJ study area includes the larger Morganza to the Gulf of Mexico HSDRR Project.

The EJI scores census tracts using a percentile ranking that represents the proportion of tracts that experience cumulative impacts of environmental burden and injustice equal to or lower than a tract of interest. For example, an EJI ranking of 0.75 signifies that 75 percent of tracts in the nation likely experience less severe cumulative impacts on health and well-being than the tract of interest, and that 25 percent of tracts in the nation likely experience more severe cumulative impacts from environmental burden. Census tracts having an index score of 0.75 or greater indicate a high prevalence of a chronic condition test and tracts having a high prevalence score are considered areas of EJ concern.

The EJI consists of three modules including Social Vulnerability, Environmental Burden, and Health Vulnerability. Social Vulnerability includes racial/ethnic minority status, socioeconomic status (poverty, unemployment, and several others), household characteristics (elderly, disabilities), and housing types (group quarters and mobile homes). Environmental Burden includes air pollution, hazardous and toxic sites, built environment, transportation infrastructure, and water pollution while Health Vulnerability includes pre-existing disease burdens. shows the types of data comprising each of the three modules.

Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or a disease outbreak, or an anthropogenic event, such as a harmful chemical spill. The degree to which a community exhibits certain social conditions, including high poverty, low percentage of vehicle access, or crowded households, may affect that community's ability to prevent human suffering and financial loss in the event of disaster. These factors describe a community's social vulnerability.

The EJI combines indicators into functional groups representing distinct aspects of environmental burden and social and health vulnerability. These domains represent discrete aspects of social vulnerability and environmental burden, such as socioeconomic status and air pollution.

Table 4-16. EJI Models

Source: CDC Social Vulnerability Website

Overall Environmental Justice Rank	Social Vulnerability	Racial/ Ethnic Minority Status	Minority Status
		Socioeconomic Status	Poverty
			No High School Diploma
			Unemployment
			Housing Tenure
			Housing Burdened Lower-Income Households
			Lack of Health Insurance
			Lack of Broadband Access
		Household Characteristics	Age 65 and Older
			Age 17 and Younger
			Civilian with a Disability
	Environmental Burden	Housing Type	Speaks English "Less than Well"
			Group Quarters
			Mobile Homes
		Air Pollution	Ozone
			PM2.5
			Diesel Particulate Matter
			Air Toxics Cancer Risk
		Potentially Hazardous & Toxic Sites	National Priority List Sites
			Toxic Release Inventory Sites
			Treatment, Storage, and Disposal Sites
			Risk Management Plan Sites
			Coal Mines
		Built Environment	Lead Mines
			Recreational Parks
			Houses Built Pre-1980
		Transportation Infrastructure	Walkability
			High-Volume Roads
			Railways
	Health Vulnerability	Pre-existing Chronic Disease Burden	Airports
			Water Pollution
			Impaired Surface Water
			Asthma*
			Cancer*
			High Blood Pressure*
			Diabetes*
			Poor Mental Health*

Figure 4-2. Areas of EJ Concern shows the census tracts in Lafourche and Terrebonne Parishes that are in the high vulnerability range when compared to the nation as a whole. Census tracts having an EJI high vulnerability score of 0.75 or greater are considered areas of EJ concern and are highlighted in yellow in Figure 4-2.

Eleven census tracts in Terrebonne and five in Lafourche Parishes are areas of EJ concern based upon the EJI. Each of these tracts are shown in Table 4-17 and the criteria they meet to be considered areas of EJ concern.

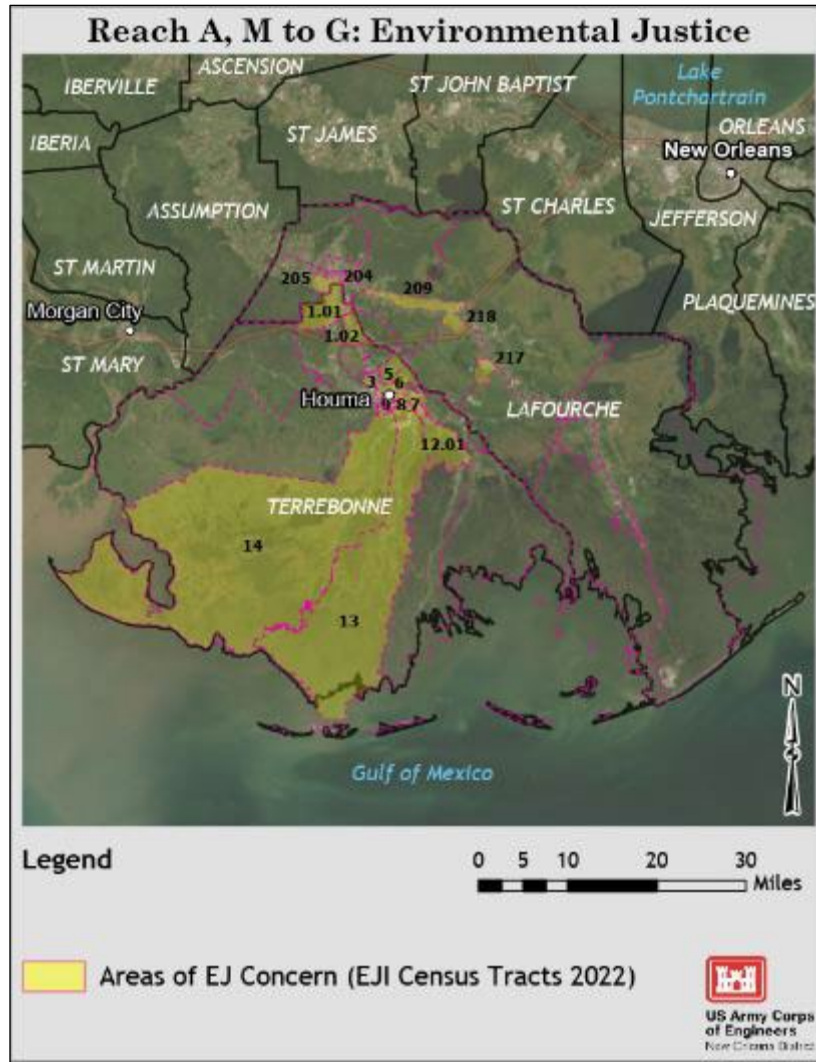


Figure 4-2. Areas of EJ Concern

Sixteen census tracts in Terrebonne and Lafourche Parishes have a high social vulnerability (EJI score of 0.75 or greater) and are areas of EJ concern. Five of the 16 tracts identified as having a high vulnerability are areas of EJ concern because of a high Environmental Burden. Table 4-17 shows the census tracts in both Terrebonne and Lafourche that are areas of EJ concern. About half of the population of Terrebonne Parish live in a census tract where the high prevalence of a chronic condition test is met.

Table 4-17. Census Tracts and Criteria Met for Areas of EJ Concern

			EJ Criteria	
Parish/Census Tract	Total Pop	EJI Score*	Environmental Burden	Social Vulnerability
Terrebonne				
1.01	6,045	0.76	0.75	0.86
1.02	4,376	0.77	0.52	0.55
12.01	2,886	0.78	0.57	0.71
5	5,497	0.81	0.57	0.80
3	5,631	0.82	0.54	0.88
14	3,252	0.85	0.55	0.75
6	5,594	0.88	0.61	0.80
13	8,422	0.95	0.79	0.88
9	4,515	0.96	0.87	0.85
7	6,698	0.97	0.81	0.98
8	5,387	0.98	0.93	0.91
Lafourche				
217	4,155	0.77	0.45	0.80
218	5,021	0.81	0.31	0.85
205	7,189	0.82	0.43	0.76
209	2,038	0.84	0.48	0.79
204	2,088	0.85	0.30	0.99

\*Scores of 0.75 or greater indicate high prevalence of a chronic condition test and are considered an area of EJ concern.

#### 4.2.14.1 EJ Outreach and Meeting

On Wednesday, July 19, 2023, hybrid-style (in-person and WebEx) EJ engagement meetings were held at 1:00pm and 6:00pm at the Folklife Museum at, 317 Goode St. Houma, LA 70360. The purpose of the meetings was to describe the overall project, as well as the proposed borrow pits and access routes for levee reaches A & F. Public Outreach focused on civic and environmental organizations that served residents in Houma, Gibson, Bourg, Lockport, Dulac, Montegut, Larose, and Chauvin. Initial and follow up calls were made to 48 churches (20 of which agreed to inform their members of the meeting), 7 local libraries, 2 food banks, 4 civic organizations, and 3 environmental non-profits. Tribes in the area were also made aware of the meetings, including, Grand Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw, Point-au-Chien Indian Tribe, Isle de Jean Charles, United Houma Nation, and Chitimacha Tribe of Louisiana. Letters received from several bayou tribes include, in part, the following questions:

- Will borrow pits be located near housing, and will they be backfilled after excavation?
  - The group voiced concerns that post-excavation pits fill up with water/gators and pose a hazard/attractive nuisance to residents and children.



- Do borrow pits weaken the surrounding lands and pose a greater flood risk for those nearby?
- Can USACE provide the borrow pit trucking access routes and times of day hauling will occur?
- How will local traffic be affected and for how long?
- Will trucks be on the road during school drop-off and pick-up times?
  - The group voiced concerns that borrow pit trucking may tear up local roadway – how will this be addressed?

Some of these questions were answered during the EJ outreach meeting and others will be answered in Section 0.

## **4.2.15 Cultural, Historic, and Tribal Trust Resources**

### **4.2.15.1 Cultural Resources**

Cultural Resources assessments and surveys have been conducted in lower Terrebonne Parish since 1926. The most recent and synthesized of these are Weinstein and Kelley (1992), Brown et al. (2000), and Moreno et al. (2011). Numerous earthen mounds and shell middens have been located and recorded. Prehistoric settlement in lower Terrebonne Parish dates as early as the Marksville Period (A.D. 1 – 400) and includes mound sites, hamlets, and shell middens. Societies in the project area subsisted on marsh resources such as clams, fish, mammals, birds, and reptiles, while shellfish were also utilized as a food source and to provide a base on which to settle. By the Coles Creek Period (A.D. 700 - 1200), settlements in the region may have been organized as major mound sites surrounded by satellite villages and seasonal camps. Villages were concentrated on stable levee surfaces or at the confluence of distributaries. Both year-round occupation and seasonal movement have been suggested for the inhabitants of the area. During Plaquemine times (A.D. 1200 – 1700), the settlement pattern suggests a complex social hierarchy, with large ceremonial sites composed of multiple mounds surrounding a central plaza, and smaller villages and hamlets scattered throughout the area. Non-mound sites that have been located are on elevated natural levees and seem to have focused on the cultivation of crops. The majority of known prehistoric sites located in the vicinity of the project area date to this late prehistoric period and suggest a significant occupation of the region.

The early historic period in southeast Louisiana is marked by increasing settlement and European dealings with Native American tribes. Early French writings describe a native cultural landscape of small tribal groups and shifting alliances. The most is known about the Chitimacha Indians, a Federally recognized Native American tribe that claims ties to much of south Louisiana as its ancestral homeland and is currently clustered around Charenton in St. Mary Parish. In addition to the many ancient Chitimacha village locations recorded in State Records, the Chitimacha Indians remember, respect, and maintain numerous traditional cultural properties within south Louisiana.

Although it is generally accepted that the Houma Indians were located near the confluence of the Red and Mississippi rivers during the early historic period, some historic accounts suggest that they were virtually wiped out by fighting and other causes of death during the

years at the end of the 17th century and the beginning of the 18th century. By the middle of the 20th century, the Houma had grown and were settled in Terrebonne and Lafourche parishes. Descendants of these people are organized today as the United Houma Nation but are not Federally recognized as a Native American tribe.

After early European exploration of the area, the French began colonization efforts in the early 18th century. Settlement was sparse until the Acadians began arriving circa 1765, and their influence persisted throughout the Antebellum Era. The Civil War left the project vicinity relatively unaffected, but after the Civil War, all of south Louisiana had a hard task of recovery following the abolition of slave labor and war-related destruction of levees and other aspects of infrastructure. New plantations and new economies began to develop. By the late 19th century, small communities were emerging along the bayous. Population fluctuations took place as blacks, the predominant population before the Civil War, migrated outward to seek more opportunities.

The growth of the sugar industry was a boom to the area, and in 1917 the first commercial gas well struck near Montegut. Numerous oil and gas fields dot the region today. The shrimping industry grew as innovations occurred that allowed greater catches to be more easily retrieved and distributed. Canal systems and the GIWW have made a large portion of the project vicinity navigable by water, which has aided in the distribution of all resources. Today, the project vicinity is a vital economic area with diverse productive strategies and diverse peoples.

These prehistoric and historic peoples and activities have left behind many material remains throughout the current project areas. These signs of settlement or activity are collectively termed “historic properties” by the National Historic Preservation Act (NHPA).

There are three recorded sites near features at the southern end of Reach A: Site 16TR3 (shell midden - destroyed), 16TR19 (NRHP eligible Mound site with Historic and Prehistoric components) and 16TR218 (Plaquemine village site and historic cemetery). Two recorded sites are located nearby the northern features of Reach A: Site 16TR213 and 16TR215, and both are unassessed for NRHP eligibility. A Phase 1 cultural resources survey for Reach A of the MTG Project is currently underway and large portions of survey for Reach A has been completed. A Determination of No Historic Properties Affected has been shared with the Louisiana State Historic Preservation Office (SHPO) and with Federally recognized Tribes, dated December 15, 2023.

#### **4.2.15.2 Tribal**

In addition to cultural resources or historic properties considered eligible for the National Register of Historic Places, USACE’s 2023 Tribal Consultation Policy asks the agency to determine if any of three categories of resources would be significantly adversely affected by the Proposed Action. The three categories are: Tribal Rights, Tribal lands, and protected tribal resources (see Section 7. E.O. 13175 for more information on Government-to-Government Consultation between Federally recognized Tribes and USACE). Tribal interest varies by geographic limits and USACE uses the most inclusive approach to consultation and coordination. Six (6) Federally recognized Tribes have an aboriginal/historic interest in the watershed. The tribes are: 1) the Chitimacha Tribe of Louisiana, 2) the Coushatta Tribe

of Louisiana, 3) the Jena Band of Choctaw Indians, 4) the Mississippi Band of Choctaw Indians, and 5) the Tunica-Biloxi Tribe of Louisiana.

According to available government records, there are no tribal lands, nor are there specific tribal treaty rights related to access or traditional use of the natural resources in the watershed. There are, however, many protected tribal resources within the Parish representing pre-contact utilization of the landscape, burial practices, and continued historic period occupation. In a series of maps dating from the 1730s through the 1780s, the project area is not accurately represented (d'Anville, 1752; Demaringy, 1743 and Gauld, 1778). The Chetemaches (Chitimacha Tribe of Louisiana) is noted as having “old villages” along Bayou LaFourche and near present day Plaquemine Louisiana, but no detail is provided for along Bayou Terrebonne. Native American occupation of the area clusters along the Bayou Grande and Petit Calliou and other older landforms in the area. There are resident State-recognized Tribes in the watershed such as the Houma and the Grand Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw.

To augment CEMVN's background research into the interested Federally recognized Tribes and the types of tribal resources that have the potential to be within the watershed, CEMVN, consulted with Federally recognized Indian tribes on actions having the potential to significantly affect protected tribal resources, tribal rights, or Indian lands via our National Historic Preservation Act (NHPA) Section 106 consultation letter (See Appendix D for responses).

Additionally, in an effort to comply with E.O. 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and E.O. 14096, Executive Order on Revitalizing Our Nation's Commitment to Environmental Justice for All, CEMVN's engaged with state-recognized tribes potentially impacted by the project as part of an Environmental Justice outreach meeting held for the project on 19 July 2023. Per the USACE Tribal Consultation Policy, 5 December 2023, and E.O. 13175, engagement does not constitute consultation. The Environmental Justice meeting documented comments from two (2) state-recognized Tribes interested in the project area: the United Houma Nation and the Grand Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw tribes. Representatives from both state-recognized Tribes stated their interest in being informed of the proposed borrow pit locations and construction traffic routes, so they could relay the information to their Tribal members.

## SECTION 5

# Future Without Project Conditions

The Future without Project (FWOP) conditions for this assessment include construction of the Morganza to the Gulf of Mexico (MTG), Louisiana, hurricane and storm damage risk reduction project as authorized by Section 1001 (24) of the WRDA of 2007 and reauthorized by Section 7002(3) of the Water Resources Reform and Development Act of 2014 (WRRDA 2014). NEPA requires that in analyzing alternatives to a Proposed Action, a Federal agency must consider the impacts associated with not implementing the Proposed Action. FWOP conditions are established using the existing conditions, trends, and variability in the study area to forecast reasonably foreseeable future conditions over the period of analysis in the absence of the Proposed Action. Reasonably foreseeable future conditions are to include actions by USACE, other public, and/or private entities and includes the key assumption that entities will meet their existing legal responsibilities, even if those responsibilities are not currently being met, to include existing Federal projects.

Section 1.7.1 discusses completed, ongoing, and planned actions by TLCD, which includes construction to-date of 80 miles of levees in the vicinity of the authorized MTG levee system. Section 4.2 discusses the Relevant Resources and Existing Conditions of the affected environment and project areas. The environmental consequences of taking “No Action” is discussed, by resource, in Section 6.

### 5.1 WETLANDS RESOURCES

Under the FWOP conditions, the MTG Project, as described in the PACR/RPEIS dated May 2013, would be constructed. The project consists of construction of 98 miles of earthen levee using a combination of side cast and hauled-in borrow materials, 22 floodgates on navigable waterways, 23 environmental water control structures, 9 road gates, and fronting protection for 4 existing pumping stations. Approximately 3,443 acres of wetlands, including BLH forest; swamp; fresh, intermediate, brackish, and salt marshes; and shallow open water, would be directly impacted from the Proposed Action through their conversion to uplands and open water under the intermediate sea level rise (SLR) scenario.

Table 5-1 summarizes the impacts of the acres affected by the project’s constructible and programmatic features by relative sea level rise scenario as described in the PEIS.

*Table 5-1. Direct Impacts to Wetlands (acres) from Implementation of the 1% Annual Exceedance Probability Storm Surge Risk Reduction System described in the PEIS. Impacts were Evaluated Based on Low, Intermediate, and High RSLR Scenarios*

Feature	Low RSLR Scenario			Intermediate RSLR Scenario			High RSLR Scenario		
	Tidal Wetland	Force Drain Wetland	Total Wetland	Tidal Wetland	Force Drain Wetland	Total Wetland	Tidal Wetland	Force Drain Wetland	Total Wetland
Constructible Features	645	26	671	644	26	670	643	26	669
Programmatic Features (Total Alignment – Constructible Features)	3,413	31	3,444	3,412	31	3,443	3,405	31	3,436
Total Impact	4,058	57	4,115	4,056	57	4,113	4,048	57	4,105

Throughout most of the study area, substantial losses of vegetated wetlands are expected to continue due to sea level rise, subsidence and insufficient sediment accretion. Salinity regimes would likely move northward, converting fresh and intermediate marshes into brackish marshes. Brackish and saline marshes are expected to become dominated by large lakes and bays with little, if any, submerged aquatic vegetation (SAV). Vegetated wetlands in the study area may be improved under the FWOP conditions through Louisiana Coastal Area (LCA), Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and other Federal, state, and local restoration programs.

## 5.2 AQUATIC AND FISHERIES RESOURCES

In the FWOP, the proposed activities approved in the 2013 PACR/RPEIS would occur. The construction of the levee, floodgates, control structures, and other features in the proposed ROW would directly and permanently convert wetland and open water habitat to uplands and project features. This habitat conversion would be influenced by relative sea level rise at the time when the project feature is constructed. Affected wetland habitats include BLH forest, swamp, and fresh, intermediate, brackish, and salt marshes.

Sessile and slow-moving aquatic invertebrates would be disturbed by the dredge or excavation activities or buried by the placed material. Construction activities would temporarily increase turbidity, water temperatures, and biological oxygen demand (BOD), and decrease dissolved oxygen. These temporary conditions would likely displace more mobile fisheries species from the construction area. Non-mobile benthic organisms could be smothered. These impacts would be minimized, as much as practicable, through implementation of appropriate Best Management Practices such as silt curtains, confinement dikes and berms.

Organism access to marsh and open-water areas would be impeded by some features included in this activity and would be enhanced by others. Features with a potentially beneficial influence on fish access include environmental control structures along Falgout Canal in Reach B. In some areas, the proposed levee would restrict fish access to



floodgates on navigable waterways and environmental structures only. Additionally, previously constructed levees by the NFS would likely continue to inhibit recruitment and reduce fishery species access to marsh and open water areas.

### **5.3 ESSENTIAL FISH HABITAT**

In the FWOP, the proposed activities approved in the 2013 PACR EIS would occur. The construction of the levee, structures, and other features in the proposed ROW would directly and permanently convert wetland and open water habitat to uplands and project features. This habitat conversion would be influenced by relative sea level rise at the time when the project feature is constructed. Affected wetland habitats include BLH forest, swamp, and fresh, intermediate, brackish, and salt marshes.

Construction activities in the proposed ROW could bury EFH substrates or temporarily change environmental conditions, including turbidity and salinity, in the water column. These impacts would be minimized, as much as practicable, through implementation of appropriate Best Management Practices.

Construction of the levee, structures and other features would lead to loss of habitat function and changes in hydraulic patterns. EFH would be impacted by water quality degradation, ponding stress on wetland vegetation, and the reduction or elimination of estuarine dependent fishery species access to nursery and foraging habitat. Similarly, previously constructed levees by the NFS would likely continue to reduce fishery species access to EFH.

### **5.4 WILDLIFE**

Under FWOP conditions, activities proposed in the 2013 PACR EIS would occur. This action would involve the construction of the levee, associated structures, and other features in the proposed ROW. These actions would result in the conversion of wetland and open water habitat to uplands and project features. Habitat shifts would also be influenced by relative sea level rise at the time of project feature construction.

Throughout the majority of the study area, wildlife abundance is expected to decline due to the ongoing conversion of marsh to open water and the gradual subsidence of forested habitat (LCWCRTF and WCRA 1998). The exception to this trend of habitat loss are those areas receiving increased fresh water from the Atchafalaya River Delta. Overall, given the trend of habitat conversion the abundance of seabirds, wading birds, shorebirds, raptors, and other birds using marsh and open water habitats is expected to decrease in deteriorating wetland areas of the project area. Furbearer and alligator populations are expected to decrease in the deteriorating wetlands within the study area and vicinity.

The abundance of raptors and other birds using hardwood forests is also expected to decrease as a result of expected subsidence, increasing water levels, and decreasing diversity in forested communities. Squirrel, rabbit, and white-tailed deer numbers are expected to decline as well.

The fresh marshes near the Atchafalaya River and Bayou Penchant would likely expand from increasing amounts of fresh water, nutrients, and sediments as the Atchafalaya River Delta matures. Habitat quality for waterfowl and alligators would remain high throughout this area. Brown pelican and bald eagle numbers are projected to increase in areas presently occupied (LCWCRTF and WCRA 1998, USACE 2010).

Construction activities using earthen materials to create wetland mitigation areas along the proposed ROW could result in disturbance in the form of noise or wave action which may displace terrestrial wildlife in the area. These disturbances would be temporary with wildlife likely to return post construction. Migratory waterfowl and other avian species would be temporarily displaced from the project area.

It is anticipated that wildlife populations would move to existing adjacent habitat areas during construction activities. These impacts to wildlife would be minimized, as much as practicable, through implementation of appropriate best management practices such as avoidance to threatened and endangered species in the vicinity. Terrestrial organism access to forage, and cover would be limited. However, increased inundation may provide more habitat to some furbearer species such as otters and beavers.

Wildlife habitat in the study area may be improved under the No Action Alternative through LCA, CWPPRA, and other Federal, state, and local restoration programs. For example, the LCA Project, Convey Atchafalaya River Water to Northern Terrebonne Marshes and operation of the HNC Lock would redistribute existing freshwater to prevent, reduce, and/or reverse future wetland loss and sustain productive fish and wildlife habitat in Terrebonne Parish (USACE 2010).

## **5.5 THREATENED, ENDANGERED, AND PROTECTED SPECIES**

A Biological Assessment (BA) prepared by the CEMVN associated with the 2013 PACR/RPEIS assessed the impacts of the project on the following threatened and endangered species: Gulf sturgeon, Kemp's ridley sea turtle, Loggerhead sea turtle, Green sea turtle, Leatherback sea turtle, Hawksbill sea turtle, Piping plover, Finback whale, Humpback whale, Right whale, Sei whale, and Sperm whale.

The 2011 BA concluded the MTG Project would not affect any listed species under USFWS or NMFS' purview for any of the plan alternatives.

## **5.6 SOILS**

Under the FWOP conditions, the project, as described in the PACR and PEIS, dated May 2013, would be constructed.

Construction of the levee, structures, and other features in the proposed ROW would potentially impact approximately 359 acres of prime farmland. Construction of the mitigation projects would potentially impact approximately 53 acres of prime farmland. Preliminary drawings of the Lockport to Larose Ridge and Larose Section C-North Variant footprints show that approximately 262 acres and 51 acres of agricultural land would be impacted,

respectively. According to a review of NRCS data, some of the impacted farmland is classified as prime farmland and would be impacted.

Remaining prime and unique farmlands inside the MTG levee system would have a reduced risk of damage from most storms. Indirect effects could include reduced risk of damage from storm surge, thereby promoting additional development on prime and unique farmlands. This alternative, combined with local levee projects that might convert prime farmlands, would cause adverse Cumulative Impacts to prime farmlands in the project area. Additionally, due to continuing land loss in the project area, levees protecting prime farmland would become increasingly vulnerable to storm damage over time.

## **5.7 WATER QUALITY**

Under FWOP, the project that is presented in the 2013 PACR/RPEIS would be constructed. This includes construction of 98 miles of levee at various heights and widths, floodgates, tidal exchange structures and locks. Excavation of borrow sites, dredging of waterways, and dredge material placement would also occur in accordance with the 2013 PACR/RPEIS. These activities could result in an increase in localized turbidity plumes as a result of runoff and disturbance of soils near water bodies. The construction of the features could also increase the chance of suspended solids within the water ways. With the increase in turbidity and suspended solids, short term impacts to dissolved oxygen are expected due to the increase of sediments within the water column. Best management practices, Stormwater Pollution Prevention Plan (SWPPP), Section 401, Section 402, and Section 404(b)(1) would be implemented for the proposed construction to help minimize the impacts to water quality within the project ROW and adjacent water bodies.

With the construction of the proposed levees and other project features would come a level of concern regarding the impairment of the current streams within the project footprint. As stated within the water quality existing conditions section, there are multiple areas where streams are impaired within the project ROW. The 2013 PACR/RPEIS acknowledges that the construction of the proposed features and the operation of these features could impact the water quality within the protected side of the levee where the impairment of streams are primarily located. The closing of structures could inadvertently impact the water quality of the streams on the protected side by minimizing the water circulation from the protected side to the flood side. This could result in changes in dissolved oxygen levels, nutrients levels, and pH levels that could impact the impairment of waterbodies within the MTG Project study area.

## **5.8 AIR QUALITY**

Under FWOP, the parish within the project area is projected to remain within the Attainment Status per LDEQ.

## **5.9 GREENHOUSE GASSES**

In the FWOP conditions, there would be emissions from construction of the project in accordance with the 2013 PACR/RPEIS, along with other reasonably foreseeable Federal, state, and local projects. As guidance on the quantification of GHG emissions under NEPA

was first released on 9 January 2023, the 2013 PACR/RPEIS did not include an assessment of GHG emissions from construction of the authorized MTG Project. This assessment would be completed in supplemental NEPA documents that would be prepared for the MTG levee system, as the level of detail to perform that analysis has not yet been developed for the MTG Project.

## **5.10 NOISE AND VIBRATION**

Under the FWOP scenario, the proposed activities approved in the 2013 PACR EIS would occur. The construction of the levee, structures, and other features in the proposed ROW would directly and permanently convert wetland and open water habitat to uplands and project features. Depending on the distance of people and property to construction areas, heavy machinery associated with construction could result in nuisance noise. One construction activity, pile driving, may cause temporary noise impacts above 70 dB. Given the proximity of some project features to developed areas, a number of residential and commercial properties may be exposed to adverse impacts from construction noise. Noise producing construction activities, such as pile driving, would likely be limited to daylight hours. To protect construction workers from hearing impairment, regulations for Occupational Noise Exposure (29 CFR Part 1910.95) under the Occupational Safety and Health Act of 1970, as amended, would be followed. This section mandates that noise levels emitted from construction equipment be below 90 dB for exposures of 8 hours per day or more. Localized and temporary noise impacts would likely result in wildlife and fishery resources temporarily leaving construction areas during construction activities. Organisms should be able to avoid and relocate to areas less impacted by noise during construction. If it is determined that a key species of concern is present, then the team would follow feasible administrative and/or engineering controls, determine and implement appropriate buffer zones, and implement construction activity windows.

## **5.11 AESTHETICS**

Visual resources would proceed as they have in the past and would be dictated by construction in accordance with the 2013 PACR/RPEIS, state and local levee and floodgate construction, as well as the natural land use patterns and processes that exist in the area. Visual resources tied directly to Mandalay NWR and Point aux Chenes Wildlife Management Area (WMA) would see significant direct and indirect impacts. These public recreation areas would both be transected by the expanded levee system which would become the dominant landform in the area. The expanded levee system would also become a major part of the rural viewshed and dominate the backdrop along southern portions of the Wetlands Cultural Trail Scenic Byway. Portions of LA182, LA 315, LA 57, and LA 56 would have fewer sweeping, unadulterated marsh panoramas. Positive and indirect impacts of the system to visual resources would include a reduction in accessibility to the Wetlands Cultural Trail Scenic Byway due to storm related flooding. The system would also be a benefit by reducing the amount of flood risk and damages to land use and user activity like the cultural landscape of the Houma Historic District.

## 5.12 RECREATION

Conditions within the recreational environment would proceed as they have in the past and would be dictated by construction of the project in accordance with the 2013 PACR/RPEIS, state and local levee and floodgate construction, as well as the natural land use patterns and processes in the area. Impacts to fishing and hunting during construction are expected to be minimal as fish and wildlife resources would relocate and return once construction activities are complete. The floodgates and lock would directly impact recreational boating and fishing. When these features are in operation, recreational boats would not be able to traverse the waterways.

Recreational resources tied directly to the Mandalay NWR and the Point aux Chenes WMA would closely correspond to the environmental effects of hydrology alterations and wildlife habitat transitions. These public recreation areas would both be transected by the expanded levee system, thus reducing the amount of contiguous hunting acres. The expanded levee system would also benefit land-based recreation activities by providing additional access and opportunities for development of walking trails along the levees that may connect with existing trails.

## 5.13 SOCIOECONOMICS

### 5.13.1 Population and Households

Table 5-2 shows projected trends in population and housing in the region of influence. Population and housing would be impacted in the FWOP. The construction of the authorized alignment project footprint includes the displacement of approximately 10 housing units. Some residents and residential structures in the study area would experience risk reduction from flooding and some residents may benefit from discounted flood insurance premiums offered by the NFIP. Additionally, construction of the project has the potential to raise water levels outside the levees by several feet during storm events. These areas include portions of the communities of Gibson, Bayou Dularge, Dulac, and Cocodrie. For reasons discussed in the 2013 PACR report, the USACE has assumed the worst-case compensation scenario, a 100 percent buy-out of all of the structures outside of the project alignment (including 876 residential structures). Should this scenario prove to be the appropriate mitigation method (again, see the PAC report for details), approximately 2,500 people would need to be relocated to areas behind the Federal risk reduction system. Additional residential structures may need to be bought out and additional residents may need to be relocated as a result of construction of the Larose Section C-North Variant Reach.

*Table 5-2. Populations and Households*

Population (Ths.)								
Parish	1970	1980	1990	2000	2010	2020	2030	2040
Terrebonne	76.17	95.09	97.04	104.76	111.55	114.46	115.31	115.88
Lafourche	69.05	83.47	85.81	89.78	96.68	98.66	99.22	99.50
Number of Households (Ths.)								
Parish	1970	1980	1990	2000	2010	2020	2030	2040
Terrebonne	19.60	29.50	31.86	36.16	40.02	43.05	45.37	47.19
Lafourche	18.01	25.70	28.82	32.05	35.65	38.09	40.03	41.52

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

### 5.13.2 Labor and Employment

Table 5-3 displays the projected trends in labor force and unemployment rates. The FWOP trends would be impacted by the construction of the 2013 authorized alignment. This alignment would induce, temporary impacts to businesses within proximity to the project footprint due to delays caused by increased vehicular traffic congestion. Additionally, businesses and industries that rely on navigable channels (e.g., the GIWW, the HNC, and Bayou Lafourche) for transport of goods could also experience delays during construction of floodgates and lock structures. There is also expected to be a direct, temporary increase in employment as a result of construction activity. The construction of the 2013 authorized alignment would provide risk reduction from flooding for businesses and industries within the study area. Positive Cumulative Impacts to employment, businesses, and industrial activity associated with providing flood risk reduction may occur. Additionally, should the worst-case scenario prove to be the appropriate mitigation method (see the PAC report for details), 114 commercial warehouses, four professional facilities, a retail store, grocery store, and a restaurant would need to be relocated to the protected side of the project. These relocations would be from the communities of Isle de Jean Charles, Lower Chauvin, The “Four Point” area in lower Bayou Grand Caillou, Lower Bayou Dularge, and Gipson, none of which are in the vicinity of Reach A. The warehouses and businesses would have the same functions as in the previous locations and would still have use of the local waterways as transfer points for goods and services. The worst-case scenario analysis did not include the Lockport to Larose or the Larose Section C-North Variant reaches. These two reaches may require additional relocations of warehouses and businesses.



*Table 5-3. Labor and Employment*

Labor Force (Ths.)						
Parish	1990	2000	2010	2020	2030	2040
Terrebonne	40.52	45.88	50.91	50.53	49.80	50.37
Lafourche	36.71	41.14	45.07	44.46	43.74	44.15
Unemployment Rate (%)						
Parish	1990	2000	2010	2020	2030	2040
Terrebonne	4.36	4.65	6.47	6.47	7.17	7.08
Lafourche	4.09	4.49	6.14	5.87	6.50	6.42
Louisiana	6.18	5.28	7.94	6.86	7.05	6.69

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

### 5.13.3 Public Facilities and Services

Public and quasi-public facilities and services in the project area include medical facilities, schools, police stations/sheriff's offices, and fire stations. FWOP conditions include the construction of various flood risk reduction projects including the 2013 authorized alignment. There may be temporary, construction-related impacts to public facilities in the immediate vicinity of the project areas. Indirect impacts with the construction of the 2013 authorized alignment include increased risk reduction from flooding for public facilities in the study area.

Additionally, 14 public facilities, including the Lower Bayou du Large School, are located outside of the project alignment and, should the worst-case scenario prove to be the appropriate mitigation method, would need to be relocated to the protected side of the project. The worst-case scenario analysis did not include the Lockport to Larose or the Larose Section C-North Variant reaches. These two reaches may require additional relocations of public facilities. A more detailed examination of impacts would be conducted in a future NEPA document before construction on these two reaches would occur.

### 5.13.4 Transportation

Several major highways are located within the study area. FWOP conditions include the construction of the Morganza to Gulf project in accordance with the 2013 PACR/RPEIS and other various flood risk reduction measures. There would be a slight increase in traffic congestion and debris during the construction of these projects.

### 5.13.5 Regional and Community Growth

#### 5.13.5.1 Income Per Capita, Tax Revenues, and Property Values

Current and future trends in income per capita can be found in Table 5-4. FWOP conditions include the construction of the Morganza to Gulf project in accordance with the 2013

PACR/RPEIS and other various flood risk reduction projects. The construction would reduce flooding for communities in the study area. Without strong storm and flood risk reduction, a community's sustainability and opportunity for growth would be limited. Although improvements to flood and hurricane damage risk reduction features would not fully eliminate the threat of storm damages in the future, by providing risk reduction, confidence and investment in the study area would increase. Increased risk reduction from flooding would preserve the opportunity for community and regional growth. In addition, the lower incidence of flooding that this alternative is designed to achieve would reduce the propensity for disruption of community life. Additionally, should the worst-case scenario prove to be the appropriate mitigation method (see the 2013 PAC report for details), all impacted residents and businesses located outside of the MTG Project alignment would be relocated to areas behind the Federal risk reduction system. To the extent that these communities re-establish community ties behind the Federal risk reduction system, the opportunity for community growth would be preserved as a result of the increased risk reduction from flooding. Regional growth is not expected to be impacted under this scenario.

Property values near the construction site itself may decrease temporarily due to the added traffic congestion and construction noise and dust. The impact, however, would be temporary, lasting only as long as the construction. Indirect impacts under the proposed alternative may include an increase in tax revenue and property values due to the increased risk reduction from flooding for residential properties and businesses in the study area. Positive Cumulative Impacts to tax revenues and property values under the proposed alternative may occur. The lower flood risk that would accrue to the study area under this alternative may have the effect of spurring additional economic growth in the region than would otherwise occur. It follows that increases in tax revenues would ensue given additional economic growth. Additionally, should the worst-case scenario prove to be the appropriate mitigation method (see the PAC report for details), all residents and businesses located outside of the project alignment would be relocated to areas behind the Federal risk reduction system. Tax revenues would be expected to shift to the new locations. Property values for the owners relocated to the protected side would be expected to experience the same potential growth as a result of increased risk reduction from flooding as those for property owners currently within the boundaries of the proposed alternative.

*Table 5-4. Income Per Capita (\$)*

	1970	1980	1990	2000	2010	2020	2030	2040
Parish								
Terrebonne	2953	9571	13307	20821	38788	50482	71469	103019
Lafourche	2829	9200	13239	23485	40391	50061	65374	86354

Source: U.S. Bureau of Economic Analysis (BEA); U.S. Census Bureau (BOC); Moody Analytics (ECCA) Forecast

### 5.13.6 Community Cohesion

FWOP conditions include the construction of various flood risk reduction projects including the 2013 authorized alignment. Storm surge risk reduction measures are designed to protect

the community from the catastrophic effects of flooding, preserving the physical integrity of the developed landscape that promotes patterns of social interchange. Impacts may include an increase in community cohesion due to the increased risk reduction from flooding for the residents and civic infrastructure in the study area. Positive impacts to community cohesion under the proposed alternative may occur as the lower incidence of flooding allows communities to focus more on community-building activities rather than preparing for and recovering from flood events. Additionally, should the worst-case scenario prove to be the appropriate mitigation method (see the 2013 PACR/RPEIS for details), all impacted residents and social institutions located outside of the MTG Project alignment would be relocated to areas behind the Federal risk reduction system. To the extent that these communities re-establish community ties behind the Federal risk reduction system, the opportunity for community cohesion would be preserved as a result of the increased risk reduction from flooding.

#### **5.14 ENVIRONMENTAL JUSTICE**

Under the FWOP, the MTG flood risk reduction system as described in the 2013 PACR/RPEIS would be constructed. Both positive and adverse impacts from construction of the constructible and programmatic features could be felt by disadvantaged communities in the study area. Positive impacts include a reduction in flood risk and adverse impacts to disadvantaged communities. Adverse impacts include construction-related impacts such as noise, traffic, and dust. Additionally, the 2013 PACR/RPEIS identified potential flooding inducements to areas south of the project area. Supplemental NEPA evaluations would further refine these findings based upon new H&H modeling. Further evaluation of both positive and adverse impacts from the MTG Project to disadvantaged communities would also be provided in supplemental NEPA documents, as the level of detail to perform that analysis has not yet been developed for the MTG Project.

#### **5.15 CULTURAL, HISTORIC, AND TRIBAL TRUST RESOURCES**

The FWOP condition includes what would be constructed as described in the 2013 PACR/RPEIS and includes any previous actions taken by local entities. Before Federal funding enabled design of larger footprint construction, local entities have built smaller levees or other flood risk reduction aids on portions of the overall MTG alignment. These previous actions have not affected any previously identified historic properties. The FWOP condition would reduce the risk of storm surges that could potentially damage historic properties.

## SECTION 6

# Environmental Consequences

This section includes an analysis of potential beneficial and adverse effects on the resources due to construction of Reach A, whether in accordance with the 2013 PACR/RPEIS (No Action PACR Alignment) or with modifications to the PACR (Proposed Action). The analysis includes discussion of direct, indirect, and cumulative impacts, the relationship between short-term uses and long-term productivity, and any irreversible or irretrievable commitments of resources.

Direct impacts are those that are caused by the action taken and occur at the same time and place (40 CFR §1508.8(a)). Indirect impacts are those that are caused by the action and are later in time or further removed in distance but are still reasonably foreseeable (40 CFR §1508.8(b)). Cumulative impacts are the effects on the environment that results from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future action, regardless of what agency or person undertakes such actions. More information on the cumulative impacts is discussed in Section 6.16. The comparative analysis includes an assessment of the potential effects of alternatives on the relevant resources. Table 6-1 provides a summary of the potential environmental consequences by resource for each alternative analyzed.

*Table 6-1. Summary of Environmental Consequences by Resource*

Resource	No Action (PACR Alignment)	Proposed Action Modified Alignment	Mitigation Sites
<b>Wetlands</b>	Direct Impacts	Direct Impacts	No Impacts
<b>Aquatic Resources / Fisheries</b>	Direct & Indirect Impacts	Direct Impacts	Direct & Indirect Impacts
<b>EFH</b>	Direct & Indirect Impacts	Direct Impacts	Direct & Indirect Impacts
<b>Wildlife</b>	Direct & Indirect Impacts	Direct & Indirect Impacts	Direct Impacts
<b>Threatened, Endangered, and Protected Species</b>	Would Not Affect	Not Likely to Adversely Affect	Not Likely to Adversely Affect
<b>Prime and unique Farmland</b>	Direct Impacts	Direct Impacts	Direct Impacts (Gipson only)
<b>Water Quality</b>	Temporary	Temporary	Temporary
<b>Air Quality</b>	No Impacts	No Impacts	No Impacts
<b>Greenhouse Gasses</b>	Direct Impacts	Direct Impacts	Direct Impacts
<b>Noise and Vibration</b>	Temporary	Temporary	Temporary
<b>Aesthetics</b>	Direct & Indirect Impacts	Direct & Indirect Impacts	No Impacts
<b>Recreation</b>	Direct & Indirect Impacts	Direct & Indirect Impacts	No Impacts
<b>Socioeconomics</b>	Direct & Indirect impacts	Direct & Indirect Impacts	Indirect Impacts
<b>Environmental Justice</b>	No Impacts	Indirect Impacts	No Impacts
<b>Cultural Resources</b>	Potential to Affect Historic Properties Does Exist	No Historic Properties Affected	Potential to Affect Historic Properties Does Exist. Further 106 Consultation Required.

## 6.1 WETLAND RESOURCES

### 6.1.1 No Action (PACR Alignment for Reach A)

#### *Direct Impacts*

Implementation of the No Action Alternative would include the direct conversion of fresh marsh, BLH, and swamp wetland habitats to non-wetland habitat consisting primarily of earthen levee, manmade canals from sidecast borrow, and to a lesser extent t-wall and other features associated with flood gates and pump stations. Wetland functions and values in the existing condition would be lost within the footprint of the levee system associated with the No Action Alternative. Wetland impacts that would occur in the No Action Alternative were not assessed using an approved WVA model. Impacts were estimated by CEMVN via desktop assessment that utilized best available aerial imagery supplemented by WVA field data where the No Action and Proposed Action alignments overlap. Because a full WVA assessment was not performed for the No Action Alternative, AAHUs impacted were not determined.

See Table 6-2 for a summary of estimated impacts by acres of the No Action Alternative, which is to construct the 2013 PACR MTG alignment for Reach A. Approximately 396.96 acres of wetlands are estimated to be directly impacted by construction of the levee (213.05 acres) and use of sidecast borrow (183.91 acres). This

includes approximately 21.95 acres of swamp, approximately 80.63 acres of BLH, and approximately 294.38 acres of fresh marsh.

*Table 6-2. Estimated Wetland Impacts of the Authorized MTG Reach A Footprint (No Action)*

Wetland Habitat Type	Acres Impacted
Swamp	21.95
BLH	80.63
Fresh Marsh	294.38
<b>Total</b>	<b>396.96</b>

The No Action Alternative would have direct impacts to the USFWS Mandalay National Wildlife Refuge. Of the direct impacts in Table 6-2, an estimated 14.54 acres of BLH and 67.79 acres of fresh marsh impacts would occur on the Refuge. Sidecast borrow accounts for 13.69 acres of BLH impacts and 16.47 acres of fresh marsh on the Refuge alone.

Borrow sources in non-wetland areas were not considered under this alternative, as the No Action Alternative assesses the impacts of the Reach A footprint of MTG as constructed in accordance with the 2013 PACR/RPEIS, which uses only sidecast borrow material for construction of the levee. The No Action Alternative, which is construction of the 2013 PACR/RPEIS alignment as authorized at a feasibility level of design, does not minimize or avoid direct impacts to wetlands to the extent practicable as only sidecast borrow, which lies entirely within wetlands, would be implemented.

As discussed in Section 6.1.2, there are viable borrow sources from non-wetland agriculture and developed lands that could be explored in place of sidecast borrow. Additionally, USFWS identified several high-quality wetland habitats within the No Action Alternative footprint where direct impacts could be avoided through design shifts in the alignment. Implementation of these design changes from USFWS is also discussed in Section 6.1.2.

#### *Indirect Impacts*

Implementation of the No Action Alternative could result in indirect impacts to wetlands. While the RPEIS determined water surface elevations within the levee system would be the same as pre-project conditions, the PACR clearly states that there were legitimate concerns the proposed alignment would cause significant alteration of hydrology and hydraulics.

The No Action Reach A alignment contains only one ECS, which may not be sufficient to maintain adequate flow and pre-project surface water elevations. Alterations in flow and surface water elevations could adversely impact wetlands over time by reducing wetland function, shifts in wetland habitat types, or loss of wetlands through conversion to open water.



*Cumulative*

Cumulative impacts to wetlands from construction of the No Action Alternative would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the TLCD non-Federal levees and/or other non-Federal levees in proximity to the MTG levee alignment.

**6.1.2 Proposed Action - Modified PACR Alignment for Reach A**

Implementation of the Proposed Action would have impacts to fresh marsh, BLH, and swamp wetland habitats similar to the No Action Alternative, but to a lesser extent. That is, the Proposed Action would include the direct conversion of fresh marsh, BLH, and swamp wetland habitats to non-wetland habitat consisting primarily of earthen levee, and to a lesser extent a floodwall and other features associated with flood gates and pump stations. The Proposed Action would not include sidecast borrow, which would leave pits alongside the levees where borrow material would be removed. Wetland functions and values in the existing conditions would be lost within the footprint of the levee system. The Wetland Value Assessment (WVA) model was utilized as described in Section 1.8 to assess the quality of wetlands of the area and determine the effects of the Proposed Action on future wetland conditions. Full documentation of the WVA analysis is located in Appendix H summarizes the wetland impacts of the Proposed Action by wetland habitat type for all features of the Proposed Action.

*Table 6-3. Wetland Impacts of the Proposed Action (Programmatic and Constructible Features)*

<b>Wetland Habitat Type</b>	<b>Acres Impacted</b>	<b>AAHUs Impacted</b>
Swamp	18.13	9.69
BLH	14.39	3.56
Fresh Marsh	301.16	156.58
<b>Total</b>	<b>333.68</b>	<b>169.83</b>

The Proposed Action avoids and minimizes impacts to wetlands through the elimination of sidecast borrow present in the authorized MTG Reach A alignment (No Action Alternative) and the adoption of recommendations from USFWS to avoid high quality wetlands on Reach A south of the GIWW. These design changes from the No Action Alternative have resulted in a net decrease of 63.28 acres of impacts to wetlands (Table 6-4).

*Table 6-4. Acres of Wetland Impacts Avoided by the Proposed Action*

<b>Wetland Habitat Type</b>	<b>Change in Acres Impacted</b>
Swamp	-3.81
BLH	-66.25
Fresh Marsh	+6.78
<b>Net Change</b>	<b>-63.28</b>

### **Programmatic Features for Reach A**

#### *Direct Impacts*

A total of 186.22 acres (-96.81 AAHUs) of wetlands would be directly impacted by construction of the programmatic features of the Proposed Action (

Table 6-5). The direct impacts would be the conversion of wetlands to upland habitat by construction of the levee directly on the habitat. This includes 18.14 acres of swamp (-9.69 AAHUs), 12.62 acres of BLH (-3.01 AAHUs), and 155.46 acres of fresh marsh (-84.11 AAHUs). As the programmatic features are currently at a feasibility level of design, these impacts are an estimate and will be determined with greater fidelity in supplemental NEPA evaluations as the design is advanced. See Appendix H for more information on WVA analyses.

Compensatory mitigation would be required for impacts resulting from construction of the programmatic features. These impacts would be fully mitigated for in compliance with all appropriate laws and policies and in accordance with the MTG Compensatory Mitigation Plan (Appendix E).

*Table 6-5. Direct Impacts of Programmatic Features*

Features	Wetland Habitat Type	Acres Impacted	AAHUs Impacted
Programmatic	Swamp	18.14	9.69
	BLH	12.62	3.01
	Fresh Marsh	155.46	84.11
	Total	186.22	96.81

The direct impacts of the programmatic features would impact a portion of the USFWS Mandalay NWR. Of the direct impacts in

Table 6-5, 0.85 acres (0.15 AAHUs) of BLH and 51.32 acres (29.06 AAHUs) of fresh marsh impacts would occur on the NWR.

Design of the programmatic features is preliminary; therefore, as design progresses, there may be additional opportunities to avoid and minimize impacts to wetlands through subsequent NEPA analysis for these features.

#### *Indirect Impacts*

Implementation of the programmatic features of the Proposed Action would not result in indirect impacts to wetlands. Similar to the No Action Alternative, the 2023 MTG HEC-RAS modeling concluded that the proposed drainage structures were sufficient to maintain adequate flow and that construction of the Proposed Action would not alter surface water elevations (Appendix I). Model results included in this report indicate that implementation of the Proposed Action would alter water elevations of approximately 0.5 feet (FWP vs FWOP) for some locations and scenarios, but these differences are within model tolerance. See Appendix I for more information. Preliminary AdH results also concluded that there would be no change in surface water salinity patterns in the project area as a result of the Proposed Action. Except for named storm events or high-water surface elevation, environmental control structures and floodgates would remain open, therefore existing hydrologic conditions would be maintained to the maximum extent practicable while providing hurricane and storm damage risk reduction.

#### *Cumulative Impacts*

Cumulative impacts to wetlands from construction of the Proposed Action would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the TLCD non-Federal levees and/or other non-Federal levees in proximity to the MTG levee alignment.

### **Constructible Features for Reach A**

#### *Direct Impacts*

A total of 147.46 acres (-73.02 AAHUs) of wetlands would be directly impacted by construction of the earthen levee and Access Road 3 (

Figure 2-8) (Table 6-6). This includes approximately 1.76 acres of BLH (-0.55 AAHUs) and 145.7 acres of fresh marsh (-72.47 AAHUs). Wetlands would not be impacted by the proposed borrow site NFS-A 100, staging area, or Access Road 4, as these constructible features are located entirely within agriculture or in developed areas (Figure 2-16). There are no direct impacts to the Mandalay National Wildlife Refuge from the constructible features of the Proposed Action, as these features do not intersect with the NWR.

*Table 6-6. Direct Impacts of Constructible Features*

Features	Wetland Habitat Type	Acres Impacted	AAHUs Impacted
Constructible	Swamp	0	0
	BLH	1.76	0.55
	Fresh Marsh	145.7	72.47
	Total	147.46	73.02

All direct impacts from the constructible features of the Proposed Action would be mitigated in-kind and concurrent with construction in accordance with the Clean Water Act, Section 404(b)(1) and the Water Resources Development Act of 1986, Section 906, as amended. Direct impacts to BLH from implementation of the Proposed Action would be offset through the purchase of mitigation bank credits. Direct impacts to fresh marsh would be offset through construction of fresh marsh at the Lake Salvador mitigation site.

Mitigation requirements to compensate for wetland impacts determined through WVA methodology are provided in Section 3.

#### *Indirect Impacts*

Constructible features of the Proposed Action would not have indirect impacts to wetlands. As described in the indirect impacts for programmatic features, there would be no indirect impacts to wetlands as the pre-project site hydrology and hydrodynamics would not be changed by implementation of the Proposed Action.

#### *Cumulative Impacts*

Cumulative impacts for constructible features would be similar to those described for programmatic features.

### **6.1.3 Mitigation Plans**

#### **BLH/Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible feature of Reach A)**

There would be no direct, indirect, or cumulative impacts incurred by the purchase of mitigation credits for BLH/Swamp credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).



### **Corps-Constructed Site – Amelia**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 280 acres of existing agricultural land would be converted to BLH swamp habitat.

#### *Indirect Impacts*

Implementation of this alternative would prevent the overall loss in the basin of BLH habitat.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help slow the loss of wetlands.

### **Corps-Constructed Site – Gibson**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 250 acres of existing agricultural land would be converted to BLH swamp habitat.

#### *Indirect Impacts*

Implementation of this alternative would prevent the overall loss in the basin of BLH habitat.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help slow the loss of wetlands.

### **Fresh Intermediate Marsh**

#### **Purchase of Mitigation Bank Credits**

##### *Direct, Indirect, and Cumulative Impacts*

There would be no direct, indirect, or cumulative impacts to wetlands incurred by the purchase of mitigation credits.

### **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 260 acres of open water would be converted to fresh intermediate marsh habitat, offsetting impacts to incurred by construction of the constructible feature of Reach A.

#### *Indirect Impacts*

Implementation of this project would prevent an overall loss of fresh intermediate marsh habitat within the study area.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help slow the loss of wetlands.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 250 acres of open water would be converted to fresh intermediate marsh habitat.

#### *Indirect Impacts*

Implementation of this project would prevent an overall loss of fresh intermediate marsh habitat within the study area.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would help slow the loss of wetlands.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 520 acres of open water would be converted to fresh intermediate marsh habitat.

#### *Indirect Impacts*

Implementation of this project would prevent an overall loss of fresh intermediate marsh habitat within the study area.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help slow the loss of wetlands.

### **Corps-Constructed Site – GIWW**

#### *Direct Impacts*

There would be a beneficial impact to wetlands as approximately 320 acres of open water would be converted to fresh intermediate marsh habitat.

#### *Indirect Impacts*

Implementation of this project would prevent an overall loss of fresh intermediate marsh habitat within the study area.

#### *Cumulative Impacts*

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin would help slow the loss of wetlands.

## 6.2 AQUATIC AND FISHERIES RESOURCES

### 6.2.1 No Action (PACR Alignment for Reach A)

The construction of the Reach A levee and associated features would restrict aquatic organism access to marsh and open water areas within the project area. Under the No Action alignment, fisheries resources would only be able to cross the levee at the GIWW W floodgate, Minor's Canal Floodgate, and the single ECS. While the floodgates and ECS would remain open except during storm events, one ECS and the two floodgates would be inadequate to maintain the current level of fisheries connectivity and would cause permanent and moderate adverse effects.

Construction of levee utilizing sidecast borrow would result in the loss of an estimated 396.96 acres of habitat. While ditches left from borrow excavation would be a deep-water habitat for fisheries, this is less valuable than shallow open water or marsh. Shallow open water and marsh habitats are less abundant and more productive than deep water habitats found in coastal Louisiana. Direct mortality or injury of fisheries species may also occur due to burial or increased turbidity from excavation activities. Depending on the depth of the areas excavated for borrow, one possible benefit could be a refuge during extreme water temperature spikes.

Within the Reach A segment, modeled salinity changes are minimal (less than 1 ppt) and are not likely to adversely affect fisheries resources under normal operating procedures (all flood gates and environmental control structures open).

Throughout most of the study area, substantial losses of fisheries habitat are expected to continue due to sea level rise, subsidence and insufficient sediment accretion. Salinity regimes would likely move northward, converting fresh and intermediate marshes into brackish marshes. Brackish and saline marshes are expected to become dominated by large lakes and bays with little, if any, SAV. Fisheries in the study area may be improved under the No Action Alternative through Louisiana Coastal Area (LCA), Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and other Federal, State, and local habitat restoration programs.

### 6.2.2 Proposed Action - Modified PACR Alignment for Reach A

#### Programmatic Features

Impacts associated with the programmatic features from the Proposed Action would be similar in nature to the No Action Alternative. The construction of the levee, structures, and other features in the proposed ROW would have similar negative effects to fisheries through loss of 186.22 acres of habitat; however, in contrast with the No Action Alternative, the Proposed Action avoids impacting 63.28 acres sensitive wetland and fisheries habitat. The Proposed Action includes the Minor's Canal floodgate, 11 environmental control structures along the levee alignment, and the GIWW West floodgate. The addition of 10 environmental control structures would allow for better hydrologic flow which would reduce access and movement impacts to fisheries and aquatic organisms. The size and location of the Minor's Canal floodgate would not change. The GIWW West floodgate design could range from the authorized width of

125' up to 225'. Fisheries and aquatic organism access and movement impacts could vary based on GIWW West floodgate design details (e.g., width). For instance, a 225' floodgate would likely have a decreased impact to fisheries and aquatic organisms, because in general a wider structure opening (up to the existing channel width of approximately 750 feet) would likely have less impact on flow and cross-sectional area of the GIWW, and this could reduce impacts to fisheries and aquatic organism access and movement. The modeled salinity changes are expected to be similar to the No Action Alternative and therefore no significant impact to fisheries and aquatic organisms is expected based on changes in salinity. Some wetland habitats would be impacted with the addition of access roads on the northern and southern ends of the reach (Figure 2-7 and

Figure 2-8). Culverts would be placed along the proposed roads to maintain much of the hydrological connectivity. Additionally, the Proposed Action would use borrow pits located on agricultural land, which would incur less impacts to fisheries than the No Action Alternative that would rely on sidecast borrow.

### **Constructible Features**

The impacts associated with the constructible features of the Proposed Action would be similar to those associated with the programmatic features of the alignment. However, because the constructible features occur over a smaller area the impact would be limited to 147.46 acres.

## **6.2.3 Mitigation Plans**

### **BLH Swamp**

#### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

##### *Direct, Indirect, and Cumulative Impacts*

No new direct, indirect, or cumulative impacts to fisheries and aquatic resources would be incurred from the purchase of these credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

#### **Corps-Constructed Site – Amelia**

##### *Direct, Indirect, and Cumulative Impacts*

This sites location adjacent to the GIWW would require boat access, which could incur minor temporary impacts while construction is occurring. The conversion of this site from existing agriculture to BLH swamp would not incur any additional fisheries or aquatic resource impacts.

#### **Corps-Constructed Site – Gibson**

##### *Direct, Indirect, and Cumulative Impacts*

The conversion of this site from existing agriculture to BLH swamp would not incur any additional fisheries or aquatic resource impacts.

### **Fresh Intermediate Marsh**

#### **Purchase of Mitigation Bank Credits**

##### *Direct, Indirect, and Cumulative Impacts*

No new direct, indirect, or Cumulative Impacts to fisheries and aquatic resources would be incurred from the purchase of these credits.

## Corps Constructed Sites:

### **Corps-Constructed Site – Lake Salvador (TSP for the constructible features of Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

Construction and dredging associated with borrow and marsh building activities would have temporary minor negative impacts to fisheries. Mobile species would be displaced, and slow-moving or sessile species may experience mortality from dredging activities and placement of new material. Additionally, local increases of turbidity due to construction and dredging activities would cause minor temporary negative impacts to fisheries.

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would prevent the net loss of wetland function and overall decline of fisheries species within the basin. It would be beneficial in both preserving the species biodiversity and combating the current trend of conversion of coastal wetlands to open water, which could be accelerated due to sea level rise. Overall, the conversion of less valuable more abundant open water habitat to more valuable less abundant fresh/intermediate marsh would be a net benefit to fisheries and aquatic species.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following sites will be considered, subject to supplemental NEPA evaluation.

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador project except to a lesser degree.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador project except to a greater degree.

### **Corps-Constructed Site – GIWW**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador project except to a greater degree.



## 6.3 ESSENTIAL FISH HABITAT

### 6.3.1 No Action (PACR Alignment for Reach A)

Construction of The Reach A levee and associated features would restrict fisheries access to EFH within the project area. Under the No Action alignment, fish would only be able to cross the levee at the GIWW W floodgate, Minors Canal Floodgate, and the single ECS. While the floodgates and ECS would remain open except during storm events, one ECS and the two floodgates would be inadequate to maintain the current level of fisheries access to EFH. This would cause permanent and moderate adverse effects to EFH.

Construction of levee utilizing sidecast borrow would result in the loss of an estimated 396.96 acres of habitat. While ditches left from borrow excavation would be a deep-water habitat for fisheries, this is less valuable than shallow open water or marsh. Shallow open water and marsh habitats are less abundant and more productive than deep water habitats found in coastal Louisiana. Direct mortality or injury of fisheries species may also occur due to burial or increased turbidity from excavation activities. Depending on the depth of the areas excavated for borrow, one possible benefit could be a refuge during extreme water temperature spikes.

Within the Reach A segment, modeled salinity changes are minimal (less than 1 ppt) and are not likely to adversely affect fisheries resources under normal operating procedures (all flood gates and the environmental control structure open).

Estuarine-dependent fisheries species access to nursery and foraging habitat would be impeded by the construction of the levee. Floodgates and the environmental control structure would minimize the extent of these impacts as long as they remained open.

Throughout most of the study area, substantial losses of EFH are expected to continue due to sea level rise, subsidence, and insufficient sediment accretion. Salinity regimes would likely move northward, converting fresh and intermediate marshes into brackish marshes. Brackish and saline marshes are expected to become dominated by large lakes and bays with little, if any, SAV. EFH in the study area may be improved under the No Action Alternative through Louisiana Coastal Area (LCA), Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and other Federal, state, and local restoration programs.

### 6.3.2 Proposed Action - Modified PACR Alignment for Reach A

#### **Programmatic Features**

The impacts associated with the programmatic features from the Proposed Action would be similar in nature to The No Action Alternative. The construction of the levee, structures, and other features in the proposed ROW would have similar negative effects to EFH through loss of 186.22 acres; however, in contrast with the No Action Alternative, the Proposed Action avoids impacting 63.28 acres sensitive wetland and fisheries habitat. The Proposed Action includes the Minor's Canal floodgate, 11 environmental control structures along the levee alignment, and the GIWW West

floodgate. The addition of 10 environmental control structures would allow for better hydrologic flow which would allow for better organism access to EFH habitat. The size and location of the Minor's Canal floodgate would not change. The GIWW West floodgate design could range from the authorized width of 125' up to 225'. Fisheries access impacts to EFH could vary based on GIWW West floodgate design details (i.e., width). For instance, a 225' floodgate would likely have a decreased impact, because in general, a wider structure opening (up to the existing channel width of approximately 750 feet) would likely have less impact on flow and cross-sectional area of the GIWW, and this could reduce impacts to fisheries access and movement. The modeled salinity changes are expected to be similar to the No Action Alternative and would not have a significant impact to EFH. Some wetland habitats would be impacted with the addition of access roads on the northern and southern ends of the reach (Figure 2-7 and

Figure 2-8). Culverts would be placed along the proposed roads to preserve hydrological connectivity. Additionally, the Proposed Action would use borrow pits located on agricultural land instead of side cast borrow, lessening impacts to EFH.

### **Constructible Features**

The impacts associated with the constructible features of the Proposed Action would be similar to those associated with the programmatic features of the alignment. However, because the constructible features occur over a smaller area, the impact would be limited to 147.46 acres.

## **6.3.3 Mitigation Plans**

### **BLH Swamp**

#### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

##### *Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient BLH Swamp credits from a bank within the Mississippi Alluvial Plain to mitigate approximately 250 acres.

No new direct, indirect, or cumulative impacts to EFH would be incurred from the purchase of these credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

#### **Corps-Constructed Site – Amelia**

##### *Direct, Indirect, and Cumulative Impacts*

This site's location adjacent to the GIWW would require boat access, which would incur minor temporary impacts while construction is occurring such as increased turbidity and displacement of some organisms. The conversion of this site from existing agriculture to BLH swamp would not incur any additional EFH impacts.

#### **Corps-Constructed Site – Gibson**

##### *Direct, Indirect, and Cumulative Impacts*

The conversion of this site from existing agriculture to BLH swamp would not incur any additional EFH impacts.

### **Fresh Intermediate Marsh**

Impacts to fresh marsh EFH would be mitigated for through implementation of the mitigation plan (Appendix E) for constructible and programmatic features.

#### **Purchase of Mitigation Bank Credits**

*Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient Fresh/Intermediate Marsh credits from a bank within the Mississippi Alluvial Plain to mitigate approximately 255 acres.

No new direct, indirect, or cumulative impacts to EFH would be incurred from the purchase of these credits.

**Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)***Direct, Indirect, and Cumulative Impacts*

Construction and dredging associated with borrow and marsh building activities would have temporary minor negative impacts to EFH. Construction and dredging activities could bury EFH substrates and temporarily change environmental conditions, such as increased turbidity. These impacts would be minimized, as much as practicable, through implementation of appropriate Best Management Practices.

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would prevent the net loss of wetland function and overall decline of EFH within the basin. It would be beneficial in both preserving the species biodiversity and combating the current trend of conversion of coastal wetlands to open water, which could be accelerated due to sea level rise. Overall, the conversion of less valuable and more abundant open water habitat to more valuable less abundant fresh/intermediate marsh would be a net benefit to EFH.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following sites will be considered, subject to supplemental NEPA evaluation.

**Corps-Constructed Site – Delta Farms***Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a lesser degree.

**Corps-Constructed Site – Avoca Island Cutoff***Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

**Corps-Constructed Site – GIWW***Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

## 6.4 WILDLIFE

### 6.4.1 No Action (PACR Alignment for Reach A)

#### *Direct Impacts*

Construction of the earthen levee and ditches left from utilizing sidecast borrow would directly impact wildlife through permanent loss of habitat. Affected habitats include BLH forest, swamp, and fresh marsh. See section 6.1.1 for acres of wetlands impacted by the No Action Alternative.

Wildlife species using the marsh and open water habitats in the proposed ROW would experience temporary disruptions during construction activities. Generally, wildlife would likely avoid areas disturbed by construction activities. Some aquatic furbearer species may use the proposed ROW and ditches left from borrow excavation as a wildlife corridor and increase ease of movement within their habitat. Nesting and migratory birds would have ample alternative nesting locations available for use. Mammals and reptiles that may inhabit the proposed construction areas would likely react to disturbances by relocating to adjacent marsh or open water habitats.

In order to minimize any potential impacts to nesting bald eagles that may be found in the project area, project implementation would follow the National Bald Eagle Management Guidelines. These guidelines recommend:

- maintaining a specified distance between the activity and the nest (buffer area),
- maintaining natural areas (preferably forested) between the activity and nest trees (Landscape buffers), and
- avoiding certain activities during the nesting season.

On-site personnel would be informed of the possible presence of nesting bald eagles within the project boundary, and would identify, avoid, and immediately report any such nests to the proper authorities. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation would be performed, in coordination with LDWF and the USFWS, to determine potential impacts to nesting Bald eagles. Colonial nesting wading birds (including but not limited to herons, egrets, night-herons, ibis, roseate spoonbills, anhingas, and/or cormorants), shorebirds (including but not limited to gulls, terns, pelicans, and/or black skimmers) are protected under the Migratory Bird Treaty Act (MBTA) and should be avoided when found at the project site to reduce the risk of injuring birds.

#### *Indirect impacts*

Possible indirect impacts to wildlife include temporary disruption due to construction noise. In addition, movement and access to resources may be disrupted by construction of the earthen levee and ditches left from borrow excavation.

#### *Cumulative Impacts*

Historic declines in wetland habitats due to sea level rise and development pressures are expected to continue. Populations of migratory avian species, such as neotropical songbirds and waterfowl, could initially improve and stabilize as critical migratory habitat is protected and enhanced, over time though these populations would continue to decline along with the habitat. Game animals, furbearers, reptiles, amphibians, and invasive species would experience the same cumulative effects of The No Action Alternative. Vegetated wetlands in the study area may be improved under the No Action Alternative through Louisiana Coastal Area (LCA), Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and other Federal, state, and local restoration programs.

## **6.4.2 Proposed Action - Modified PACR Alignment for Reach A**

### **Programmatic Features**

#### *Direct Impacts*

Programmatic features of the Proposed Action would result in the permanent conversion of approximately 12.62 acres of direct, negative impacts to BLH, 18.14 acres of direct, negative impacts to swamp and 155.46 acres of direct, negative impacts fresh marsh. While the features in the Proposed Action are similar to those in No Action, key differences include the shifting of the levee alignment to avoid sensitive habitats and offsite borrow pits instead of sidecast borrow. During construction, temporary disturbance to and displacement of wildlife could occur.

#### *Indirect Impacts*

Overall, the system would remain open leading to minor changes to existing hydrologic conditions resulting in negligible indirect impacts to wildlife.

### **Constructible Features**

#### *Direct Impacts*

A total of 147.46 acres of wetlands would be directly impacted by construction of the earthen levee and associated features. Direct impacts include approximately 1.76 acres of direct, negative impacts to BLH habitats, and approximately 145.70 acres of direct, negative impacts to fresh marsh habitat.

#### *Indirect Impacts*

Indirect impacts associated with constructible features of the project would be similar in nature to those associated with the programmatic features.

#### *Cumulative Impacts*

Cumulative impacts to wildlife under the No Action Alternative are similar to those of the Proposed Action. They would again consider the combined effects of LCA, CWPPRA, and other Federal, state, and local restoration efforts. Populations of migratory avian species, such as neotropical songbirds and waterfowl, could initially improve and



stabilize as critical migratory habitat is protected, over time though these populations would continue to decline along with the habitat. Game animals, furbearers, reptiles, amphibians, and invasive species would experience the same cumulative effects of the 1 percent AEP Alternative.

### **6.4.3 Mitigation Plans**

#### **BLH Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

###### *Direct, Indirect, and Cumulative Impacts*

For unavoidable impacts to BLH from the constructible features of the Proposed Action, the CEMVN would purchase sufficient BLH credits from a mitigation bank within the Mississippi Alluvial Plain to mitigate up to 251 acres. Since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect, or cumulative impacts to wildlife would be incurred from the purchase of these credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

##### **Corps-Constructed Site – Amelia**

###### *Direct, Indirect, and Cumulative Impacts*

Wildlife present at the time of construction would be temporarily displaced to adjacent areas due to noise, movement, and vibration. Some slower moving animals and fossorial animals (e.g., turtles, moles, and gophers) may experience demise during construction, due to earth work in the project area. It is anticipated that displaced animals would return once construction is complete, and that the construction of high-quality forested wetland habitat would provide additional area for the expansion of existing wildlife populations.

##### **Corps-Constructed Site – Gibson**

###### *Direct, Indirect, and Cumulative Impacts*

The conversion of this site from existing agriculture to BLH swamp would not incur any additional wildlife impacts and would be the same as the Amelia site.

#### **Fresh Intermediate Marsh**

##### **Purchase of Mitigation Bank Credits**

###### *Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient Fresh/Intermediate Marsh credits from mitigation banks within the Mississippi Alluvial Plain to mitigate up to 255. Since

permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect, or cumulative impacts to wildlife would be incurred from the purchase of these credits.

### **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

Construction and dredging associated with borrow and marsh building activities would have temporary minor negative impacts to wildlife. Ducks could be temporarily displaced, to adjacent habitats due to noise, movement, and vibration. Additionally, local increases of turbidity due to construction and dredging activities would cause minor temporary negative impacts to some wildlife habitat such as submerged aquatic vegetation.

This project, when added to other past, present, and reasonably foreseeable ecosystem restoration and mitigation projects in the basin, would prevent the net loss of wetland function and overall decline of wildlife species within the basin. It would be beneficial in both preserving the species biodiversity and combating the current trend of conversion of coastal wetlands to open water, which could be accelerated due to sea level rise. Overall, the conversion of less valuable open water habitat to more valuable fresh/intermediate marsh would be a net benefit to wildlife communities.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to wildlife as a result of marsh creation at the Delta Farms site would be similar to those incurred at the Lake Salvador site.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to wildlife as a result of marsh creation at the Delta Farms site would be similar to those incurred at the Lake Salvador site.

### **Corps-Constructed Site – GIWW**

#### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to wildlife as a result of marsh creation at the Delta Farms site would be similar to those incurred at the Lake Salvador site.

## 6.5 THREATENED, ENDANGERED, AND PROTECTED SPECIES

### 6.5.1 No Action (PACR Alignment for Reach A)

#### *Direct Impacts*

It is the CEMVN determination that the No Action Alternative would not affect threatened or endangered species or their critical habitat within the study area. This alignment of Reach A was included in the 2011 BA associated with the 2013 PACR/RPEIS and concluded the MTG Project would not affect any listed species under USFWS or NMFS' purview.

#### *Indirect Impacts*

Implementation of the No Action Alternative could partially offset the loss of coastal habitats thereby benefiting threatened and endangered species dependent on these habitats.

#### *Cumulative Impacts*

The incremental effects of the proposed project could contribute to beneficial effects associated with other coastal projects, including LCA, CWPPRA, and other Federal, state, and local restoration programs. The overall cumulative effects of these projects would be the maintaining of coastal habitats along a greater portion of the Louisiana coastline, thereby reducing any adverse effects of local disturbances on threatened or endangered species.

### 6.5.2 Proposed Action - Modified PACR Alignment for Reach A

#### **Programmatic Features**

BAs associated with the Proposed Action were prepared by CEMVN and submitted to NMFS and USFWS on 16 January 2024 and 10 January 2024, respectively. These BAs identified and assessed impacts of the Proposed Action on the following threatened and endangered species within the project area: Kemp's ridley sea turtle, Loggerhead sea turtle, Green sea turtle, and West Indian manatee. Based on review of existing data, preliminary field surveys, and the use of minimization measures described below, CEMVN has determined that the Proposed Action may affect but is not likely to adversely affect any of the listed species, bald eagles or colonial nesting water birds. USFWS guidelines would be utilized during construction of the Proposed Action to avoid any impacts to the species described below, if encountered.

#### *Direct Impacts*

Sea turtles are not known to nest in Louisiana and are unlikely to be utilizing the project area for foraging habitat due to the paucity of available food sources. Therefore, it is unlikely that they would be in the area at the time of in-water activities. In addition, the presence of construction-related activity, machinery, and noise would be expected to cause these species to temporarily avoid the area during project duration. To minimize the potential for in-water activities to cause adverse impacts to sea turtles, Protected

Species Construction Conditions, developed by NMFS, would be implemented. See Appendix J.

Manatees have been known to enter the coastal waters of Louisiana; however, they are unlikely to be present due to the absence of foraging opportunities in the project area. In addition, the presence of construction-related activity, machinery, and noise would be expected to cause any manatees present to temporarily avoid the project area during periods of in-water activity. To minimize the potential for construction activities to cause adverse impacts to manatees, Standard Manatee Conditions for In-Water Activities, developed by the USFWS, would be implemented. See Appendix J.

Alligator snapping turtles may be present in the project area due to the availability of nearby suitable habitat. Impacts to alligator snapping turtles would likely be similar to manatees in that turtles would avoid areas of in-water activity. Although alligator snapping turtles are not protected by the take prohibitions of Section 9 of the ESA, the CEMVN would implement minimization measures developed by the USFWS to minimize the potential for adverse impacts to the species. See Appendix J.

Based on information provided by USFWS and field surveys conducted by CEMVN, there are existing bald eagle nests in the area; however, all nests are beyond 650 feet from the Proposed Action. In addition, no active colonial nesting water bird rookeries were identified within 1,000 feet of the Proposed Action. Any adult or juvenile birds that move into the project area would likely be temporarily displaced to adjacent habitats due to noise, movement, turbidity and vibration during construction. If bald eagle nests are discovered near the project area, the National Bald Eagle Management Guidelines would be followed during construction to avoid and minimize impacts to this species. If waterbird nesting colonies become established in the area, the 1,000-foot buffer must be maintained unless coordination with the USFWS indicates that the buffer zone may be reduced based on the species present or an agreement is reached with USFWS that allows a modified process to be adopted.

### *Indirect Impacts*

Implementation of the Proposed Action could indirectly impact threatened and endangered species through removal of foraging habitat within the project area. The loss of this habitat would likely be insignificant due to the availability of similar habitat nearby. In addition, construction and operation of machinery in water could temporarily degrade local water quality by increasing turbidity. Impacts from turbidity would likely be reduced by movement of the tides and could be mitigated further by use of best management practices and adherence to regulations governing stormwater runoff at construction sites and staging areas.

### *Cumulative Impacts*

Cumulative impacts to listed and protected species include habitat loss by natural conditions such as tropical storm surge, saltwater intrusion, and subsidence. The project area is expected to continue to lose wetland habitats used by fish and wildlife species for shelter, nesting, feeding, roosting, cover, nursery, and other life

requirements. The loss and deterioration of wetland habitat over time may adversely affect listed species that may be found in the project area. Adverse effects to protected species habitat in the study area may be mediated through LCA, CWPPRA, and other Federal, state, and local restoration programs.

### **Constructible Features**

#### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts for constructible features would be similar to those described for programmatic features.

### **6.5.3 Mitigation Plans**

#### **BLH Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

Implementation of the BLH Swamp TSP would have no direct, indirect, or cumulative impacts on any listed species or their critical habitat, bald eagles or colonial nesting waterbirds.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

##### **Corps-Constructed Site – Amelia**

#### *Direct, Indirect, and Cumulative Impacts*

Construction of the Amelia mitigation site would convert approximately 280 acres of existing agricultural fields to BLH swamp. None of the listed species are found within the project area due to lack of suitable habitat. Therefore, there would be no direct, indirect, or cumulative impacts on any listed species or their critical habitat, bald eagles, or colonial nesting waterbirds.

##### **Corps-Constructed Site – Gibson**

#### *Direct, Indirect, and Cumulative Impacts*

Construction of the Gibson mitigation site would convert approximately 250 acres of existing agricultural fields to BLH swamp. None of the listed species are found within the project area due to lack of suitable habitat. Therefore, there would be no direct, indirect, or cumulative impacts on any listed species or their critical habitat, bald eagles, or colonial nesting waterbirds.

#### **Fresh Intermediate Marsh**

## Purchase of Mitigation Bank Credits

### *Direct, Indirect, and Cumulative Impacts*

Implementation of the Fresh intermediate marsh TSP would have no direct, indirect, or Cumulative impacts on any listed species or their critical habitat, bald eagles or colonial nesting waterbirds.

## **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

### *Direct Impacts*

The West Indian manatee and Kemp's ridley, loggerhead, and green sea turtles have the potential to be found in the proposed Lake Salvador mitigation site. The presence of construction-related activity, machinery, and noise is expected to cause these species to avoid the project area during the construction period. Additionally, direct impacts to manatees and sea turtles from construction related activities are not anticipated as hydraulic cutterhead dredges are slow moving and use of them is not known to impact these species. Impacts to manatees and sea turtles would further be avoided by implementation of standard manatee protection measures developed by the USFWS and protected species construction conditions developed by NMFS.

Eagle nest and colonial nesting bird surveys would be conducted prior to construction to confirm locations of nests and/or rookeries (if any). The Bald and Golden Eagle Protection Guidelines would be followed to prevent direct impacts to any nesting eagles if present.

### *Indirect Impacts*

Construction of the Lake Salvador mitigation site would directly impact approximately 260 acres of wetlands by converting open water habitat to fresh/intermediate marsh. This would permanently remove foraging habitat for the West Indian manatee; and Kemp's ridley, loggerhead, and green sea turtles. However, impacts to these species would be minimal due to the availability of similar habitat nearby.

Temporary impacts to local water quality within the Lake Salvador could also occur during construction and dredging of the borrow pit within Lake Salvador. Changes to temperature, dissolved oxygen (DO), ultimate carbonaceous biochemical oxygen demand (CBODU), total nitrogen (TN), ammonia-nitrogen (NH<sub>3</sub>-N), nitrate-nitrite (NO<sub>3</sub>-N), organic nitrogen (Org-N), total phosphorus (TP), orthophosphate (PO<sub>4</sub>), organic phosphorus (Org-P), phytoplankton chlorophyll-a, and total suspended solids (TSS) could reduce the availability of prey items. However, these changes are expected to be negligible due to the small size of the borrow pit compared to the overall size of the Lake Salvador basin and high flushing rate of the lake. Overall, there would be temporary short-term, adverse impacts to water quality both during and for a short time following construction. Impacts to threatened and endangered species associated with



alteration of local water quality could be mitigated through use of best management practices.

### *Cumulative Impacts*

Potential cumulative impacts to the threatened or endangered species and other protected species from the Lake Salvador Project are anticipated to minimally increase indirect impacts to manatees, sea turtles, bald eagles, and colonial nesting birds in the study area. There would be less than significant cumulative impacts to listed and protected species through implementation of Lake Salvador because of the temporary and minimal nature of the impacts.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

Direct impacts would be similar to those described for the Fresh Intermediate Marsh TSP except approximately 250 acres of open water habitat would be converted to fresh intermediate marsh. Indirect and cumulative impacts would be similar to those described for the Fresh Intermediate Marsh TSP.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

Direct impacts would be similar to those described for the Fresh Intermediate Marsh TSP except approximately 522 acres of open water habitat would be converted to fresh intermediate marsh. Indirect and cumulative impacts would be similar to those described for the Fresh Intermediate Marsh TSP.

### **Corps-Constructed Site – GIWW**

#### *Direct, Indirect, and Cumulative Impacts*

Direct impacts would be similar to those described for the Fresh Intermediate Marsh TSP except approximately 320 acres of open water habitat would be converted to fresh intermediate marsh. Indirect and cumulative impacts would be similar to those described for the Fresh Intermediate Marsh TSP.

## **6.6 SOILS**

### **6.6.1 No Action (PACR Alignment for Reach A)**

#### *Direct Impacts*

Approximately 33.9 acres of prime farmland would be directly impacted by the implementation of the No Action Alternative. This impact to prime farmland would also

potentially impact any landowners farming in the affected 33.9 acres and would also impact their crop yield directly.

#### *Indirect and Cumulative Impacts*

The incremental effects of the No Action Alternative could contribute to beneficial effects associated with other coastal projects, including LCA, CWPPRA, and other Federal, state, and local restoration programs. The overall cumulative effects of these projects would be the maintaining of coastal habitats along a greater portion of the Louisiana coastline, thereby reducing any adverse effects of natural and anthropogenic stressors to prime farmland protected by the levee system.

## **6.6.2 Proposed Action - Modified PACR Alignment for Reach A**

### **Programmatic Features**

#### *Direct Impacts*

Implementation of the Proposed Action programmatic features with offsite borrow would directly impact approximately 346 acres of Prime and Unique Farmland. This impact to prime farmland would also potentially impact any landowners farming in the affected areas and would also impact their crop yield directly.

#### *Indirect and Cumulative Impacts*

The incremental effects of the Proposed Action programmatic features with offsite borrow could contribute to beneficial effects associated with other coastal projects, including LCA, CWPPRA, and other Federal, State, and local restoration programs. The overall cumulative effects of these projects would be the maintaining of coastal habitats along a greater portion of the Louisiana coastline, thereby reducing any adverse effects of natural and anthropogenic stressors to prime farmland protected by the levee system.

### **Constructible Features**

#### *Direct Impacts*

Implementation of the Proposed Action constructible features with offsite borrow would potentially impact up to approximately 65.3 acres of Prime and Unique Farmland directly. This impact to prime farmland would also potentially impact any landowners farming in the affected areas and would also impact their crop yield directly. Impacts to prime farmlands would require coordination with the Natural Resources Conservation Service.

#### *Indirect and Cumulative Impacts*

The incremental effects of the Proposed Action constructible features with offsite borrow could contribute to beneficial effects associated with other coastal projects, including LCA, CWPPRA, and other Federal, state, and local restoration programs. The overall cumulative effects of these projects would be the maintaining of coastal habitats along a greater portion of the Louisiana coastline, thereby reducing any adverse effects of natural and anthropogenic stressors to prime farmland protected by the levee system.

### 6.6.3 Mitigation Plans

#### **BLH Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

###### *Direct Indirect and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

##### **Corps-Constructed Site – Amelia**

###### *Direct, Indirect, and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

##### **Corps-Constructed Site – Gibson**

###### *Direct Impacts*

There would be a direct impact to 109 acres of prime farmland for this mitigation effort. Impacts to prime farmlands would require coordination with the Natural Resources Conservation Service.

###### *Indirect and Cumulative Impacts*

The loss of prime farmland could reduce habitat quality over time.

#### **Fresh Intermediate Marsh**

##### **Purchase of Mitigation Bank Credits**

###### *Direct, Indirect, and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

##### **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

###### *Direct, Indirect, and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

**Corps-Constructed Site – Delta Farms***Direct, Indirect, and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

**Corps-Constructed Site – Avoca Island Cutoff***Direct, Indirect, and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

**Corps-Constructed Site – GIWW***Direct Indirect and Cumulative Impacts*

There would be no impact to Prime or Unique Farmland for this mitigation effort.

**6.7 WATER QUALITY****6.7.1 No Action (PACR Alignment for Reach A)***Direct Impacts*

Excavation of borrow sites, dredging, and dredge material placement would occur in accordance with the 2013 PACR. For the proposed construction, excavation, and dredging, there is a potential for an increase in localized turbidity plumes as a result of runoff and disturbance of soils near water bodies. The dredging of the proposed borrow sites could cause an increase of turbidity within waterbodies located within the flood side of the levee. The construction of the features could also increase the chance of suspended solids within the water ways. With the increase in turbidity and suspended solids, short term impacts to dissolved oxygen are expected due to the increase of sediments within the water column. Localized temporary pH changes may also occur during the construction phase. To minimize the impacts from the construction activities to the surrounding water bodies, a best management practices, a SWPPP, would be prepared to help mitigate the potential impacts from runoff from construction activities. Minimal water quality impacts to the area water quality would be limited to the duration of construction activities and would return to previous conditions once construction is complete.

A Clean Water Act (CWA) section 404(b)(1) evaluation was completed and signed on March 24, 2013, as part of the 2013 RPEIS. This evaluation included the authorized alignment for Reach A and is located in the 2013 RPEIS Appendix C.

*Indirect Impacts*

The indirect impacts of the No Action Alternative to the water quality within the study area is not clearly defined. Tidal exchange from the protected side of the levee to the flood side of the levee could be impacted due to the construction of the proposed levee, but this is expected to be minimal based on hydrologic modeling. However, the No Action Alternative could cause the possibility of stagnation of water on the protected side of levee. The construction of the proposed levee could also limit the influx of

mineral sediments within the protected side of the levee. This reduction of minerals could impact the growth of marshes within the protected side.

### *Cumulative Impacts*

When combined with coastal environments within this study area, the construction of The No Action Alternative could impact water quality. The construction of the levees could impact the water quality standards within the project area, which could result in the IRC labeling of waterbodies within the project area and therefore an increase of regulations by local agencies and restricted uses of set stream.

## **6.7.2 Proposed Action - Modified PACR Alignment for Reach A**

### **Programmatic Features**

#### *Direct Impacts*

Under the Proposed Action, there would be temporary impacts to water quality within the surrounding water bodies. This would come from the placement of fill material, the transportation of material within the construction area, and other construction activities. Though temporary turbidity and suspended solids could result from the construction of the levees, the nature of impacts to the surrounding ecosystem would be minimal and would not violate water quality standards or criteria or exacerbate existing water quality impairments in the GIWW, Minors Canal, Bayou Dularge or neighboring water bodies. To minimize the impacts from the construction activities to the surrounding water bodies, best management practices would be employed and a SWPPP would be prepared to help mitigate the potential impacts from construction activities runoff. Impacts to the area water quality would be limited to the duration of construction activities and would return to previous conditions once construction is complete.

The clearing and excavation of proposed borrow sites A60, A82, and NFS-A1 could result in a temporary discharge of material from the borrow site into the surrounding waterbodies. Additional discharges that could occur would be the removal of groundwater or other water point sources (rain, etc.) from the excavated borrow site. Should dewatering be necessary, water may be pumped out into adjacent ditches that could drain into the GIWW (A60 and NFS-01) or Bayou Dularge (A82). It is expected that there would be a temporary increase in turbidity within the water bodies directly surrounding any areas of the runoff or groundwater pumping operations. Any increases in turbidity would likely be diminished by the moving currents of the waterbodies, and any free-floating sediment would likely settle.

The Proposed Action was evaluated under Section 404(b)(1) of the Clean Water Act (CWA) on 14 November 2023. The evaluation can be found within Appendix I. To comply with Section 401 of the CWA, a Louisiana Water Quality Certificate would be obtained from Louisiana Department of Environmental Quality, per Louisiana Administrative Code 33:IX when supplemental NEPA work is performed for the programmatic features.

#### *Indirect Impacts*

Indirect impacts of the proposed construction to the water quality within the study area is not clearly defined. Tidal exchange from the protected side of the levee to the flood side of the levee could be impacted due to the construction of the proposed levee. This construction could cause the possibility of stagnation of water on the protected side of levee, but this is expected to be minimal based on hydrologic modeling. The construction of the proposed levee could also limit the influx of mineral sediments within the protected side of the levee. This reduction of minerals could impact the growth of marshes within the protected side. If the construction of the levee occurs, some marshes on the flood side could be subjected to increased wave energy from refraction of the waves.

### *Cumulative Impacts*

The construction of the proposed project in addition to coastal environments within this study area could impact the water quality. The construction of the levees could impact the water quality standards within the project area that could result in the IRC labeling of waterbodies within the project area. The change in labeling result in an increase of regulations by local agencies and restricted uses of set stream.

## **Constructible Features**

### *Direct Impacts*

Under the Proposed Action, there would be temporary impacts to water quality within the surrounding water bodies. The temporary impacts to water quality would come from the placement of fill material, the transportation of material within the project area, and other construction activities. Though fill material would not be discharged into nearby waterbodies, the construction of water control features like flood gates could cause a temporary increase in turbidity and suspended solids within the subjected water bodies. Though temporary turbidity and suspended solids could result from the construction of the levees, the nature of impacts to the surrounding ecosystem would be minimal and would not violate water quality standards or criteria or exacerbate existing water quality impairments in the GIWW, Bayou Dularge, or neighboring water bodies. To minimize the impacts from the construction activities to the surrounding water bodies, best management practices would be employed, and a SWPPP would be prepared to help mitigate the potential impacts from runoff from construction activities. Minimal impacts to the area water quality would occur during construction and these impacts would be eliminated after construction is completed.

The clearing and excavation of the proposed borrow site NFS-A100 could result in a temporary discharge of material from the borrow site into the surrounding waterbodies. Additional discharges that could occur would be the removal of groundwater or other water point sources (rain, etc.) from the excavated borrow site. The water collected would be pumped out into adjacent areas and would likely drain into the neighboring streams/bayou near the proposed borrow site. It is expected that there would be a temporary increase in turbidity within the water bodies directly surrounding any areas of the runoff or groundwater pumping operations. Any increases in turbidity would likely be diminished by the moving currents of the waterbodies, and any free-floating sediment would likely settle.



The Proposed Action was evaluated under Section 404(b)(1) of the Clean Water Act (CWA) on 14 November 2023. The evaluation can be found within Appendix I. To comply with Section 401 of the CWA, a Louisiana Water Quality Certificate would be obtained from Louisiana Department of Environmental Quality, per Louisiana Administrative Code 33:IX. Coordination with LDEQ is on-going and WQC would be obtained prior to the signing of a FONSI.

#### *Indirect Impacts*

Indirect impacts of the proposed construction to the water quality within the study area is not clearly defined. Tidal exchange from the protected side of the levee to the flood side of the levee could be impacted due to the construction of the proposed levee, but this is expected to be minimal based on hydrological and hydraulic modeling. This construction could cause the possibility of stagnation of water on the protected side of levee. The stagnation of water could cause an impact to aquatic species that depend on the ebb and flow of freshwater within certain bodies of water. The construction of the proposed levee could also limit the influx of mineral sediments within the protected side of the levee. This reduction of minerals could impact the growth of marshes within the protected side. If the construction of the levee occurs, the marshes on the flood side could be subjected to an increase in wave energy from refraction of the waves.

#### *Cumulative Impacts*

When combined with coastal environments within this study area, the construction of The No Action Alternative could impact water quality. The construction of the levees could impact the water quality standards within the project area, which could result in the IRC labeling of waterbodies within the project area and therefore an increase of regulations by local agencies and restricted uses of set stream.

### **6.7.3 Mitigation Plans**

#### **BLH/Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

##### *Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient BLH Swamp credits from a bank within the Mississippi Alluvial Plain to mitigate approximately 250 acres. The purchasing of the BLH Swamp credits would not impact the water quality.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

##### **Corps-Constructed Site – Amelia**

##### *Direct, Indirect, and Cumulative Impacts*

The conversion of approximately 280 acres of agricultural land to BLH Swamp would have temporary impacts to water quality. As mentioned previously, the increase in turbidity and suspended solids could result from the proposed work but would be minimal and would be eliminated after construction is completed.

### **Corps-Constructed Site – Gibson**

#### *Direct, Indirect, and Cumulative Impacts*

The conversion of approximately 250 acres of agricultural land to BLH Swamp would have temporary impacts to water quality. As mentioned previously, the increase in turbidity and suspended solids could result from the proposed work but would be minimal and would be eliminated after construction is completed.

Marsh

### **Fresh Intermediate Marsh**

### **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

Construction activities associated with marsh building would have temporary impacts to water quality. As mentioned previously, the increase in turbidity and suspended solids could result from the proposed work but would be minimal and would be eliminated after construction is completed.

A section 404 (b)(1) evaluation is ongoing and will be incorporated into the draft once received. To comply with Section 401 of the CWA, a Louisiana Water Quality Certificate will be submitted to Louisiana Department of Environmental Quality per Louisiana Administrative Code 33:IX.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a lesser degree.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

## **Corps-Constructed Site – GIWW**

### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

## **6.8 AIR QUALITY**

### **6.8.1 No Action (PACR Alignment for Reach A)**

During construction of The No Action Alternative, there would be a probability for increased air emissions from the usage of internal combustion engines, creation of particulate emissions during project construction, and increased dust due to vehicular traffic. Potential emissions would include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth disturbance. The emissions from supply trucks and workers commuting to work would temporarily impact air quality in the vicinity of the project area. Operation of construction equipment and support vehicles would also generate Volatile Organic Compounds (VOCs), Particulate Matter (PM)<sub>10</sub>, PM<sub>2.5</sub>, Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO), Ozone (O<sub>3</sub>) and Sulfur Oxides (SO<sub>x</sub>) emissions from diesel engine combustion. During the construction of the Proposed Action, proper and routine maintenance of all vehicles and other construction equipment would be implemented to ensure that emissions are within the design standards of all construction equipment. Once all construction activities associated with the selected alternative cease, air quality within the vicinity would return to pre-construction conditions.

Currently, Terrebonne Parish is in attainment status of all NAAQS according to EPA and LDEQ. Any reductions in ambient air quality would be short-term, minor, and would not cause or contribute to a violation of Federal or State ambient air quality standards. If the construction duration is projected to be long term, there is a possibility that air quality may be impacted, and further analysis would be needed.

### **6.8.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct Impacts*

During construction of this project, an increase in air emissions could be expected. These emissions could include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth disturbance. Emission of fugitive dust near the construction area is not anticipated to be a problem as the site is rural and not highly populated.

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

*Indirect Impacts*

There would be no adverse indirect impacts to air quality in the parish with construction of the proposed action.

*Cumulative Impacts*

Cumulative impacts to air quality in the project area due to construction of this project in addition to the other construction activities within the area that may be occurring concurrently would be temporary and minimal. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the proposed action.

**Constructible Features***Direct Impacts*

During construction of this project, an increase in air emissions could be expected. These emissions could include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth disturbance. Emission of fugitive dust near the construction area is not anticipated to be a problem as the site is rural and not highly populated.

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

*Indirect Impacts*

There would be no adverse indirect impacts to air quality in the parish with construction of the proposed action.

*Cumulative Impacts*

Cumulative impacts to air quality in the project area due to construction of this project in addition to the other construction activities within the area that may be occurring concurrently would be temporary and minimal. After the construction period, there would be no incremental contribution to cumulative air quality impacts due to the proposed action.

**6.8.3 Mitigation Plans***Direct, Indirect, and Cumulative Impacts*

During construction of this project, there is a probability of an increase in air emissions from the usage of internal combustion engines (Gasoline and Diesel), creation of particulate emissions during project construction, and increase in dust due to vehicular traffic. The potential emissions would include 1) exhaust emissions from operations of various types of non-road construction equipment and 2) fugitive dust due to earth

disturbance. The emissions from supply trucks and workers commuting to work would temporarily impact air quality in the vicinity of the project area. Operation of construction equipment and support vehicles would also generate Volatile Organic Compounds (VOCs), Particulate Matter (PM)<sub>10</sub>, PM<sub>2.5</sub>, Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO), Ozone (O<sub>3</sub>) and Sulfur Oxides (SO<sub>x</sub>) emissions from diesel engine combustion. During the construction of the Proposed Action, proper and routine maintenance of all vehicles and other construction equipment would be implemented to ensure that emissions are within the design standards of all construction equipment. Once all construction activities associated with the selected alternative cease, air quality within the vicinity is expected to return to pre-construction conditions.

Currently, Terrebonne Parish is in attainment status of all NAAQS according to EPA and LDEQ. If the construction duration is projected to be short term, any increases or impacts on ambient air quality would be expected to be short-term and minor and would not be expected to cause or contribute to a violation of Federal or state ambient air quality standards. If the construction duration is projected to be long term, there is a possibility that air quality may be impacted, and further analysis would be needed.

## **6.9 GREENHOUSE GASSES**

Within this GHG evaluation, the No Action, Proposed Action, and Mitigation Plan were assessed for GHG emissions. For GHG, a baseline assessment must be done to compare the proposed actions to a future without any construction activities. In the baseline assessment, the assumption was the PACR was not constructed there would be emissions from the No Action Alternative. The emissions would be from flood events within the MTG Project area (e.g., evacuation and emergency response). For the baseline assessment, assumptions on the total emergency response were used to determine the potential GHG emissions (Table 6-16). The total emergency response and the associated GHG emissions could vary.

The total GHG emissions were calculated using the type, quantity, horsepower, total hours, and associated emission factors of the equipment (e.g., boats pushing the equipment and the excavators placing the stone) for the entire project life. Approximately 1,075 pieces of equipment were evaluated to determine the GHG emissions for the No Action Alternative and the Proposed Action. The social costs of greenhouse gas emissions (SC-GHG) were calculated for each alternative by summing the individual emissions from the major greenhouse gas pollutants CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O and then multiplying this by the social cost of each pollutant for the year in which they would be generated using tables from the Interagency Working Group on Social Cost of Greenhouse Gases (IWGSC) report as established by Executive Order 13990. This analysis provides interim updated social costs values, with a 3 percent discount rate (IWG 2021).

### **6.9.1 No Action (PACR Alignment for Reach A)**

There would be direct emissions from construction activities for construction of Reach A as the alignment is described in the PACR (i.e., the No Action Alternative). Because a detailed list for construction of the No Action alignment was not available, the equipment

list from the Proposed Action was used to compute the GHG for the No Action Alternative. Construction activities and equipment used for the Proposed Action would be very similar to those for the No Action Alternative. The data presented are representative of the GHG emissions that could be expected with implementation of the No Action Alternative (Table 6-7 through Table 6-8).

*Table 6-7. GHG Emission Estimates Associated with Construction of the No Action Alternative (Includes Borrow Excavation)*

Total GHG Emissions from Construction Activities (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	102,705.22	685.95	247.09	194,419.68

*Table 6-8. GHG Emissions Estimates Associated with 50 years of O/M of the Proposed Levee System. O/M Efforts Include Operation of Tractors and String Trimmers to Maintain Levees*

Total GHG Emissions from O/M (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	363.581	0.016	1.034	691.471

## 6.9.2 Proposed Action - Modified PACR Alignment for Reach A

### Programmatic Features

There would be direct emissions from construction activities for MTG Reach A Programmatic Features. The different components for the construction of programmatic features were calculated as construction and Operations and Maintenance (O/M). The data presented are representative of what GHG emissions could be expected with implementation of the programmatic features of the Proposed Action Alternative (Table 6-9 through Table 6-10).

*Table 6-9. GHG Emission Estimates Associated with Construction of Programmatic Features of the Proposed Action Alternative (Includes Borrow Excavation, does not Include O/M).*

Total GHG Emissions from Programmatic Construction Activities (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	47,177.44	684.14	159.99	128,519.89

*Table 6-10. GHG Emission Estimates Associated with O/M and Construction of Programmatic Features of the Proposed Action Alternative (Includes Borrow)*



Total GHG Emissions from O/M (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	47,541.02	684.15	161.02	12,9211.36

## Constructible Features of Reach A

### *Direct Impacts*

Similar types of impacts associated with direct emissions from construction activities would occur for constructible features. Different components associated with constructible features were broken into four categories: Initial Construction, O/M, and disposal of materials via burning and/or hauling. See Table 6-11 to Table 6-14. Impacts associated with construction of the mitigation plan, which includes positive impacts from carbon sequestration, is discussed separately in Section 6.9.3. Total GHG emissions for all activities associated with the Proposed Action, including mitigation, is discussed in Section 6.9.4.

**Table 6-11. GHG Emission Estimates Associated with Construction of the Constructible Features of the Proposed Action (Includes Borrow Excavation, does not Include O/M, Hauling, Burning, or Mitigation)**

Total GHG Emissions from Programmatic Construction Activities (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	55,527.78	1.81	87.10	65,899.79

**Table 6-12. GHG Emission Estimates Associated with Construction and O/M of the Constructible Features of the Proposed Action (Includes Borrow Excavation, does not Include Construction, Hauling, Burning, Mitigation)**

Total GHG Emissions from O/M (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	55,527.78	1.81	87.11	65,899.79

### **Burning**

The proposed alternative includes the option of burning of vegetative material within the proposed ROW for the constructible levee. The quantity of material is approximately 70 acres. To compute this GHG emission, EPA's Emission Factors for the Southern region (Region 6) was used to compute the CH<sub>4</sub> (242 kg/Hectare) and N<sub>2</sub>O (40 kg/Hectare) (Clearinghouse for Emission Inventories and Emissions Factors, 2023). (Note that 1 hectare = ~2.47 acres.) Both CH<sub>4</sub> and N<sub>2</sub>O were converted to tons/acre and then multiplied by the total potential impacted area: 70 acres. This resulted in 41.3 metric tons for CH<sub>4</sub> and 2.8 metric tons for N<sub>2</sub>O. To compute the CO<sub>2</sub>, the EPA's Greenhouse Gas Equivalencies Calculator was used to estimate the potential CO<sub>2</sub> released for control burning: 742 metric tons.

**Table 6-13. GHG Emission Estimates Associated Burning (does not Include Construction, Hauling, Mitigation, or O/M)**

Total GHG Emissions from burning (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	742	41.3	2.8	

### **Hauling**

The proposed alternative includes the option of hauling vegetative material from the proposed ROW to a landfill located within Orleans Parish: Amid Landfill, 11005 Almonaster Ave. New Orleans, LA. It would take approximately 3,530 one-way trips to the landfill. Two-way trips were assumed for GHG emission estimation resulting in a total of 7,060 truck trips. Table 6-14 shows the GHG emission estimates associated with hauling.

**Table 6-14. GHG Emission Estimates Associated with Hauling (does not Include Construction, Burning, Mitigation, or O/M)**

Total GHG Emissions from ROW to Landfill (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	2,024.62	0.02	4.95	3,501.53

### 6.9.3 Mitigation Plans

There would be direct negative impacts (i.e., emissions) associated with clearing of mitigation sites and direct positive impacts (i.e., sequestration) associated with wetland creation. Overall, there would be a net benefit through carbon sequestration associated with implementing the mitigation plan.

Carbon sequestration was computed by using the Environmental Protection Agency Greenhouse Gases Equivalencies Calculator Carbon Sequestered in One Year by 1 Acre of Average U.S. Forest: 0.84 metric ton CO<sub>2</sub>/acre/year (Greenhouse Gas Equivalencies Calculator, 2023). For both negative (e.g., land clearing) and positive (i.e., creation of wetlands), 0.84 metric ton CO<sub>2</sub>/acre/year, was assumed. Approximately 141.592 acres would be cleared resulting in approximately 118.9373 metric tons of emissions per year which would result in approximately 5946.864 metric tons for the project life. The creation of 255 new wetland acre would result in 214.2 metric tons sequestered per year for a total of 10,710 metric tons sequestered for the life of the project. Net GHG sequestration estimates associated with the proposed mitigation plan are in Table 6-15.

**Table 6-15. Net GHG Sequestration Estimates Associated with Mitigation (does not Include Construction, Borrow, Hauling, Burning, or O/M)**

Total GHG Emissions from Mitigation Activities (Metric Tons)				
Emissions	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2eq</sub>
Total (metric tons)	4,763.13	0	0	4,763.13

### 6.9.4 Comparison of the Baseline Condition, the No Action Alternative, the Proposed Action

The baseline condition in Table 6-16 is the condition if no construction were to occur. The purpose of calculating this allows for an understanding of the net GHG emissions associated with construction that could be calculated by subtracting a construction alternative or feature from the baseline condition. For the baseline condition, assumptions on the total emergency response were used to determine the potential GHG emissions. The total emergency response and the associated GHG emissions could vary.

The two alternatives and a baseline condition, as described above within this analysis, are compared in Table 6-16. Social costs were computed for the alternatives in

Table 6-17.

*Table 6-16. Comparison of the Total GHG emissions for the No Action Alternative and the Proposed Action (Constructible + Programmatic) with a Baseline Condition where No Flood Risk Reduction Project would be Constructed*

Total GHG Emissions by Project Alternative (Metric Tons)				
Emission	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
Baseline Condition	106,038.562	21.9259	631.694	294,831.5314
No Action Alternative Construction	102,705.22	685.95	247.09	194,419.68
No Action Alternative Construction + O/M	103,068.80	685.96	248.13	195,111.15
No Action Alternative Construction + O/M + Mitigation	98,305.67	685.96	248.13	190,348.02
Proposed Action Construction	102,705.22	685.95	247.09	194,419.68
Proposed Action Construction + O/M	103,068.80	685.96	248.13	195,111.15
Proposed Action Construction + O/M + Mitigation	98,305.67	685.96	248.13	190,348.02
Proposed Action Construction + O/M + Burning + Mitigation	99,059.14	727.26	250.96	190,367.85
Proposed Action Construction + O/M + Hauling + Mitigation	100,330.28	685.98	253.08	193,849.54

*Table 6-17. Comparison of Total Social Cost of GHG emissions for the No Action Alternative and the Proposed Action (Constructible + Programmatic) with a Baseline Condition where No Flood Risk Reduction Project would be Constructed*

Total Social Costs of Greenhouse Gases (2025 Dollars)				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total
Baseline Condition	\$5,938,159.49	\$37,274.02	\$13,265,574.69	\$19,241,008.20
No Action Alternative Construction	\$5,751,492.51	\$1,166,112.07	\$5,188,952.99	\$12,106,557.57
No Action Alternative Construction + O/M	\$5,771,853.04	\$1,166,139.27	\$5,210,666.99	\$12,148,659.31
No Action Alternative Construction + O/M + Mitigation	\$5,505,117.43	\$1,166,139.27	\$5,210,666.99	\$11,881,923.69
Proposed Action Construction	\$5,751,492.51	\$1,166,112.07	\$5,188,952.99	\$12,106,557.57
Proposed Action Construction + O/M	\$5,771,853.04	\$1,166,139.27	\$5,210,666.99	\$12,148,659.31
Proposed Action Construction + O/M + Mitigation	\$5,505,117.43	\$1,166,139.27	\$5,210,666.99	\$11,881,923.69
Proposed Action Construction + O/M + Burning + Mitigation	\$5,547,311.80	\$1,166,139.27	\$5,210,666.99	\$11,924,118.06
Proposed Action Construction + O/M + Hauling + Mitigation	\$5,618,495.95	\$1,166,139.27	\$5,210,666.99	\$11,995,302.21

### 6.9.5 Data Gaps and Uncertainties Associated with GHG Emission Estimates

For the baseline condition, assumptions on the total emergency response were used to determine the potential GHG emissions. The total emergency response could vary.

For the No Action Alternative, assumptions were made on the equipment that would be used for the construction. Due to the similarities between the No Action Alternative and

the Proposed Action, the Proposed Action equipment list was used to compute GHG emissions for the No Action Alternative. As stated in Section 6.9.1, an equipment list for the No Action Alternative was not available during the time of computing GHG.

## **6.10 NOISE AND VIBRATION**

### **6.10.1 No Action (PACR Alignment for Reach A)**

Construction activities could result in nuisance noise that varies depending on proximity. Impacts of noise to wildlife and fisheries resources would be temporary and only present when construction is occurring. Organisms should be able to avoid noise and or relocate away from construction areas. One construction activity, pile driving, may cause temporary noise impacts above 70 dB. Because of the proximity of some of the project features to developed areas, there are a number of residential and commercial properties that could be exposed to adverse impacts from construction noise. Noisy construction activities, such as pile driving, would likely be limited to daylight hours. Localized and temporary noise impacts would likely result in wildlife and fishery resources temporarily leaving construction areas during construction activities. The animals could easily relocate to areas of less noise during such times. If it is determined that a key species of concern is present, then the team would follow feasible administrative and/or engineering controls, determine and implement appropriate buffer zones, and implement construction activity windows.

#### Indirect impacts

Depending on the distance of people, property and wildlife to construction areas, heavy machinery associated with the construction of the No Action Alternative could result in nuisance noise. Minimal and temporary indirect noise impacts are anticipated prior to construction activities. Overall, indirect impacts should be minimal and temporary.

#### Cumulative impacts

Cumulative impacts to noise levels resulting from implementation of the No Action Alternative would be related to the potential short-term disruption of fish and wildlife species and similar impacts by other Federal, state, local and private restoration activities, as well as by other human-induced noise disruptions to these organisms. However, during noise-producing activities, these organisms may re-locate to numerous other locations in the project area. Long-term adverse cumulative impacts due to noise levels would not be expected with the implementation of the No Action Alternative.

### **6.10.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct Impacts*

Direct impacts of noise and vibration due to construction of programmatic features in the Proposed Action are similar to those mentioned in the No Action Alternative. Key differences include the shifting of the levee alignment to avoid sensitive habitats. In addition, the Proposed Action calls for the use of borrow pits instead of utilizing side cast borrow as in the No Action Alternative. This alternative source of borrow may result in



minor noise differences. The Proposed Action also calls for the instillation of 11 environmental control structures, which would preserve the areas hydrology. The installation of these control structures may result in the creation of temporary construction noise that could disrupt local wildlife. These impacts should be temporary and minimal. The Proposed Action additionally includes the use of access roads (Figure 2-7 and

Figure 2-8), which may result in additional noise and vibration associated with the transportation of heavy equipment and road construction. Again, given the size and location of these roads, the impact to wildlife should be minimal and temporary.

#### *Indirect Impacts*

Indirect noise impacts resulting from the Proposed Action would be minimal and similar to the No Action Alternative.

#### *Cumulative Impacts*

The cumulative impacts to wildlife under the Proposed Action scenario would be similar to those considered for the No Action Alternative. Cumulative impacts to noise levels resulting from construction of the Proposed Action would be related to the potential short-term disruption of fish and wildlife species and similar impacts by other Federal, state, local, and private restoration activities, as well as by other human-induced noise disruptions to these organisms. However, during noise-producing activities, these organisms may re-locate to numerous other locations in the project area. Long-term adverse cumulative impacts due to noise levels would not be expected with implementation of the Proposed Action.

Existing and any proposed future levees, and trees between the new structures and receptors may act as a sound barrier and attenuate construction and operational noise and vibration. There is no planned concurrent construction in the area that would compound the noise and vibration from this alternative.

### **Constructible Features**

#### *Direct Impacts*

Direct noise impacts associated with constructible features of the project would be similar in nature to those associated with the programmatic features. However, because the constructible features are located on a much smaller area, the impacts would be reduced.

#### *Indirect Impacts*

Indirect noise impacts associated with constructible features of the project would be similar in nature to those associated with the programmatic features.

#### *Cumulative Impacts*

Cumulative impacts associated with constructible features of the project would be similar in nature to those associated with the programmatic features.

### 6.10.3 Mitigation Plans

#### **BLH/Swamp**

##### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

###### *Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient BLH-Wet credits from a mitigation bank within the Mississippi Alluvial Plain to mitigate up to 251 acres. Since permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect, or cumulative impacts to noise quality would be incurred from the purchase of these credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

##### **Corps-Constructed Site – Amelia**

###### *Direct, Indirect, and Cumulative Impacts*

Construction equipment necessary for the initial project construction phase would include dump trucks, bulldozers, tractors, graders, outboard motors, and similar equipment (B-19 below). Noise levels may result in wildlife avoiding the project area during construction; however, movement of equipment during construction would result in the same avoidance behaviors from wildlife species. Nearby residences could experience higher than ambient noise levels during construction, again these levels would be temporary during the period of construction and would be limited to daylight hours. Construction of this project is not anticipated to add significantly to the cumulative effect of noise in the project area as the construction activities would be temporary during the period of construction, restricted to daylight hours and avoidance of the project area by wildlife normally occurs from the movement of agricultural machinery in the area even without the additional noise.

##### **Corps-Constructed Site – Gibson**

###### *Direct, Indirect, and Cumulative Impacts*

The conversion of this site from existing agriculture to BLH swamp would not incur any additional noise impacts.

#### **Fresh Intermediate Marsh**

##### **Purchase of Mitigation Bank Credits**

###### *Direct, Indirect, and Cumulative Impacts*

For this project, the CEMVN would purchase sufficient BLH-Wet credits from a mitigation bank within the Mississippi Alluvial Plain to mitigate up to 255 acres. Since

permitted banks exist as reasonably foreseeable projects in the FWOP conditions, no new direct, indirect, or cumulative impacts to noise quality would be incurred from the purchase of these credits.

### **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

Construction equipment necessary for the initial project construction phase would include dump trucks, bulldozers, tractors, graders, outboard motors, and similar equipment (B-19). Noise levels may result in wildlife avoiding the project area during construction; however, movement of equipment during construction would result in the same avoidance behaviors from wildlife species. Nearby residences could experience higher than ambient noise levels during construction, again these levels would be temporary during the period of construction and would be limited to daylight hours. Construction of this project is not anticipated to add significantly to the cumulative effect of noise in the project area as the construction activities would be temporary during the period of construction, restricted to daylight hours and avoidance of the project area by wildlife normally occurs from the movement of agricultural machinery in the area even without the additional noise.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a lesser degree.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

### **Corps-Constructed Site – GIWW**

#### *Direct, Indirect, and Cumulative Impacts*

This project would result in the same impacts as discussed for the Lake Salvador Project except to a greater degree.

## 6.11 AESTHETICS

### 6.11.1 No Action (PACR Alignment for Reach A)

#### *Direct, Indirect, and Cumulative Impacts*

Visual resources tied directly to Mandalay National Wildlife Refuge and Minors Canal would see significant direct and indirect impacts. The Northern portion of the Reach A levee would intersect the Mandalay NWR along Minors Canal and the GIWW. While access is only available by boat, the Reach A levee would become the dominant landform in this area. The Reach A levee would also become part of the rural viewshed inherent to the Wetlands Cultural Trail Scenic Byway. In particular, the Reach A levee would become the Southward backdrop near the rural community of Waterproof when viewed from LA182, and the Westward backdrop along rural segments of LA 315. While these rural viewsheds would transition, the magnitude of adverse and/or beneficial impacts to visual resources may be likened to other regional and local levees which are prevalent landforms in the project area.

### 6.11.2 Proposed Action - Modified PACR Alignment for Reach A

#### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Impacts to visual resources would be similar to those of the No Action Alternative.

**Levee Borrow Sites:** The proposed borrow sites would not directly or indirectly impact existing visual resources in the region. In cases where a borrow site is adjacent to residential areas, the soil removal process would alter viewsheds for some residents. In these cases, private land previously cleared of vegetation for agriculture use would now contain small freshwater lake(s) depending on how the end site is left. While these sites are generally not publicly accessible, both agriculture sites and borrow sites constitute the region's cultural identity and are intrinsic to many existing viewsheds in the area. See *"Environmental Design of Mississippi River Levee Borrow Areas"* in Appendix B.

#### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to aesthetics under the constructible features remain the same as the those under the programmatic features of the Proposed Action.

### 6.11.3 Mitigation Plans

The proposed mitigation sites would have no adverse impacts to visual resources. The reestablishment of both marsh and BLH sites would preserve and enhance the natural systems and features associated with the region's aesthetic identity.

## 6.12 RECREATION

### 6.12.1 No Action - PACR Alignment for Reach A

Conditions within the recreational environment would proceed as they have in the past and would be dictated by the 2013 PACR/RPEIS, all NFS construction, as well as the natural land use patterns and processes in the area. Impacts to fishing and hunting during construction are expected to be minimal as fish and wildlife resources would relocate and return once construction activities are complete. The floodgates and lock would directly impact recreational boating and fishing. When these features are in operation, recreational boats would not be able to traverse the waterways.

Recreational resources tied directly to the Mandalay NWR and the Point aux Chenes WMA would closely correspond to the environmental effects of hydrology alterations and wildlife habitat transitions. These public recreation areas would both be transected by the expanded levee system, thus reducing the amount of contiguous hunting acres. The expanded levee system would also benefit land-based recreation activities by providing additional access and opportunities for development of walking trails along the levees that may connect with existing trails.

*Direct, Indirect, Cumulative Impacts:*

Recreational resources tied directly to Mandalay NWR and Minors Canal would see significant direct and indirect impacts. The Northern portion of the Reach A levee would intersect the Mandalay NWR along Minors Canal and across the GIWW. Recreational resources in the Refuge would closely correspond to the environmental effects of hydrology alterations. Recreational boats would not be able to traverse the Minors Canal floodgate or the GIWW-West floodgate only during operation.

Additionally, access to public recreational facilities, such as boat launches and marinas, would be interrupted. Impacts to nearby recreational fishing and hunting would be minor in intensity and short-term in duration as fish and wildlife would temporarily relocate during construction activities.

### 6.12.2 Proposed Action - Modified PACR Alignment for Reach A

#### **Programmatic Features**

*Direct, Indirect, Cumulative Impacts*

Impacts to recreational resources would be similar to those of the No Action Alternative.

The proposed borrow sites would not directly or indirectly impact existing recreation resources in the region. In some cases, depending on how the end site is left, the habitat may be suitable to support some recreational activities (i.e., wildlife viewing and fishing), but these benefits are expected to be minimal, and sites would not be open to public access.

#### **Constructible Features**

*Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to recreational resources under the constructible features remain the same as the those under the programmatic features of the Proposed Action.

### **6.12.3 Mitigation Plans**

The proposed mitigation sites would have no adverse impacts to public recreation resources including, but not limited to wildlife observation, boating, fishing and hunting. Benefits to public recreation resources would be minimal and closely correspond with terrestrial and aquatic wildlife resources within this document.

## **6.13 SOCIOECONOMICS**

### **6.13.1 Population and Housing**

#### **6.13.1.1 No Action(PACR Alignment for Reach A)**

##### *Direct Impacts*

There are no direct impacts to housing and population under this alternative.

##### *Indirect Impacts*

Indirect impacts include increased risk reduction from flooding for some residents and residential structures in the study area. Additionally, residents in these communities may benefit from discounted flood insurance premiums offered by the NFIP should the FIRMs be updated to reflect changes in the delineation of Special Flood Hazard Zones showing lower overall flood risk. Induced flooding of residential structures was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

##### *Cumulative Impacts*

Positive cumulative impacts to population and housing associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the Area of Interest (AOI) would occur.

#### **6.13.1.2 Proposed Action - Modified PACR Alignment for Reach A**

##### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

##### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.





### 6.13.2 Employment, Business, and Industrial Activity

#### 6.13.2.1 No Action (PACR Alignment for Reach A)

##### *Direct Impacts*

Under this alternative, there may be direct, temporary impacts to businesses within proximity to the project footprint due to delays caused by increased vehicular traffic congestion. Additionally, businesses and industries that rely on navigable channels (e.g., the GIWW, the HNC, and Bayou Lafourche) for transport of goods could also experience delays during construction of floodgates and lock structures. There is also expected to be a direct, temporary increase in employment as a result of construction activity.

##### *Indirect Impacts*

Indirect impacts under this alternative include increased risk reduction from flooding for businesses and industries within the study area. Induced flooding to businesses and industries was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

##### *Cumulative Impacts*

Positive cumulative impacts to employment, business, and industrial activity associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the AOI would occur.

#### 6.13.2.2 Proposed Action - Modified PACR Alignment for Reach A

##### **Programmatic Features**

##### *Direct Impacts, Indirect Impacts, and Cumulative Impacts*

Under this alternative, direct, indirect, and positive cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

##### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and positive cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

### 6.13.3 Public Facilities and Services

#### 6.13.3.1 No Action (PACR Alignment for Reach A)

##### *Direct Impacts*

Under this alternative, there may be temporary, construction-related impacts to public facilities in the immediate vicinity of the project areas.

#### *Indirect Impacts*

Indirect impacts under this alternative include increased risk reduction from flooding for public facilities in the study area. Induced flooding for public facilities was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

#### *Cumulative Impacts*

Positive cumulative impacts to public facilities and services associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the AOI would occur. Both positive and negative cumulative impacts to population and housing associated with the Houma Navigation Canal Lock Complex Project located in the AOI.

### **6.13.3.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and positive cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

#### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and positive cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

### **6.13.4 Transportation and Navigation**

#### **6.13.4.1 No Action (PACR Alignment for Reach A)**

##### *Direct Impacts*

Under this alternative, there would be direct impacts during construction in the form of increased vehicular congestion along roads, highways, and streets leading to the levee construction site as well as disruptions to navigation during construction of floodgates and the environmental control structure. These impacts are expected to be moderate, but temporary, lasting only as long as construction activities.

##### *Indirect Impacts*

Indirect impacts include moderate to severe degradation of the transportation infrastructure, primarily local roads and highways, as a result of wear and tear from transporting construction materials.

#### *Cumulative Impacts*

Cumulative impacts would be similar to the indirect impacts. There would be moderate to severe degradation of transportation infrastructure in the project area due to both construction of the project and other construction activities in the area.

### **6.13.4.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct Impacts*

Direct impacts under this alternative remain the same as the direct impacts under the No Action Alternative. The additional dump trucks hauling material under this alternative will not have significant impact beyond the moderate, temporary impacts detailed under the No Action Alternative.

##### *Indirect Impacts*

Indirect impacts under this alternative remain the same as the indirect impacts under the No Action Alternative.

##### *Cumulative Impacts*

Positive cumulative impacts under this alternative remain the same as the cumulative impacts under the No Action Alternative.

#### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

### **6.13.5 Community and Regional Growth**

#### **6.13.5.1 No Action (PACR Alignment for Reach A)**

##### *Direct Impacts*

Under this alternative, there are no direct impacts to community and regional growth.

##### *Indirect Impacts*

This alternative would reduce flooding for communities in the study area. Without strong storm and flood risk reduction, a community's sustainability and opportunity for growth would necessarily be limited; with this alternative there is positive indirect impacts to

community and regional growth. Induced flooding for communities was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

#### *Cumulative Impacts*

Positive cumulative impacts to community and regional growth associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the AOI would occur.

### **6.13.5.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

#### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

### **6.13.6 Tax Revenues and Property Values**

#### **6.13.6.1 No Action (PACR Alignment for Reach A)**

##### *Direct Impacts*

Under this alternative, property values near the construction site itself may decrease temporarily due to the added traffic congestion and construction noise and dust. The impact; however, would be temporary, lasting only as long as the construction.

##### *Indirect Impacts*

Indirect impacts under the proposed alternative may include an increase in tax revenue and property values due to the increased risk reduction from flooding for residential properties and businesses in the study area. Induced flooding for residential properties and businesses was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

##### *Cumulative Impacts*

Positive cumulative impacts to community and regional growth associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the AOI would occur.

### **6.13.6.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

#### **Constructible Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

### **6.13.7 Community Cohesion**

#### **6.13.7.1 No Action (PACR Alignment for Reach A)**

##### *Direct Impacts*

Storm surge risk reduction measures are designed to protect the community from the catastrophic effects of flooding, preserving the physical integrity of the developed landscape that promotes patterns of social interchange. No direct, indirect, or cumulative adverse effects on community cohesion in the study area are expected as a result of this alternative.

##### *Indirect Impacts*

Positive indirect impacts may include an increase in community cohesion due to the increased risk reduction from flooding for the residents and civic infrastructure in the study area. Induced flooding was identified in the 2013 PACR/RPEIS. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project.

##### *Cumulative Impacts*

Positive cumulative impacts to community and regional growth associated with the levees, habitat restoration and preservation, shoreline protection, marsh creation, and hydrologic restoration projects located in the AOI would occur.

#### **6.13.7.2 Proposed Action - Modified PACR Alignment for Reach A**

#### **Programmatic Features**

##### *Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

#### **Constructible Features**

*Direct, Indirect, and Cumulative Impacts*

Under this alternative, direct, indirect, and cumulative impacts remain the same as what is listed for each respective type under the No Action Alternative.

**6.13.8 Mitigation Plan****BLH Swamp****Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)***Direct, Indirect, and Cumulative Impacts*

There would be no direct, indirect, or cumulative impacts on population, housing, labor force, transportation, unemployment rate, employment, or public facilities and services from the purchase of mitigation bank credits.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

**Corps-Constructed Site – Amelia***Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.

**Corps-Constructed Site – Gibson***Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.

**Fresh Intermediate Marsh****Purchase of Mitigation Bank Credits***Direct, Indirect, and Cumulative Impacts*

There would be no direct, indirect, or cumulative impacts on population, housing, transportation, labor force, unemployment rate, employment, or public facilities and services from the purchase of mitigation bank credits.

**Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)***Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.



For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

### **Corps-Constructed Site – Delta Farms**

#### *Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.

### **Corps-Constructed Site – Avoca Island Cutoff**

#### *Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.

### **Corps-Constructed Site – GIWW**

#### *Direct, Indirect, and Cumulative Impacts*

There will be minor indirect impacts to transportation during construction of mitigation features.

## **6.14 ENVIRONMENTAL JUSTICE**

EJ is the fair treatment and meaningful involvement of all people regardless of race, color, national origin or income regarding the development, implementation and enforcement of environmental laws, regulations, and policies, with no group bearing a disproportionate burden of environmental harm, and risks. Recent guidance has emerged directing Federal agencies to ensure disadvantaged or socially vulnerable communities shall be considered throughout the Civil Works programs and in all phases of project planning and decision-making, consistent with the goals and objectives of various Administration policy. Federal agencies should assess the effects of their projects on communities with Environmental Justice concerns in accordance with EO 12898: Environmental Justice, 1994 and EO 14008, Tackling the Climate Crisis at Home and Abroad, 2021. For USACE, compliance with these Executive Orders is mandatory pursuant to Section 112(b)(1) of WRDA 2020 (Public Law 116-260). (“In the formulation of water development resources projects, the Secretary shall comply with any existing Executive Order regarding environmental justice to address any disproportionate and adverse human health or environmental effects on minority communities, low-income communities, and Indian Tribes.”)

The EJ assessment utilizes the Environmental Justice Index (EJI) developed by the Center for Disease Control and Prevention’s Agency for Toxic Substances Disease Registry, 2022 (Accessed 15 Nov 2023)

<https://www.atsdr.cdc.gov/placeandhealth/eji/index.html>. The EJI uses data from the

U.S. Census Bureau, the U.S. Environmental Protection Agency, the U.S. Mine Safety and Health Administration, and the U.S. Centers for Disease Control and Prevention to rank the *Cumulative Impacts* of environmental injustice on health for every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The EJI ranks each tract on 36 environmental, social and socio-economic (including minority and low-income data), and health factors and groups them into three overarching modules and ten different domains.

The following subsections provide information on the methods used to identify areas of EJ concern for the two parishes in the EJ study area, Terrebonne, and Lafourche.

The EJI scores census tracts using a percentile ranking which represents the proportion of tracts that experience *Cumulative Impacts* of environmental burden and injustice equal to or lower than a tract of interest. For example, an EJI ranking of 0.75 signifies that 75% of tracts in the nation likely experience less severe *Cumulative Impacts* on health and well-being than the tract of interest, and that 25% of tracts in the nation likely experience more severe *Cumulative Impacts* from environmental burden. Census tracts having an index score of 0.75 or greater indicates a high prevalence of a chronic condition test and tracts having a high prevalence score are considered areas of EJ concern.

The EJI consists of three modules including Social Vulnerability, Environmental Burden, and Health Vulnerability. Social Vulnerability includes racial/ethnic minority status, socioeconomic status (poverty, unemployment, and several others), household characteristics (elderly, disabilities), and housing types (group quarters and mobile homes). Environmental Burden includes air pollution, hazardous and toxic sites, built environment, transportation infrastructure and water pollution while Health Vulnerability includes pre-existing disease burdens.

Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or a disease outbreak, or an anthropogenic event such as a harmful chemical spill. The degree to which a community exhibits certain social conditions, including high poverty, low percentage of vehicle access, or crowded households, may affect that community's ability to prevent human suffering and financial loss in the event of disaster. These factors describe a community's social vulnerability.

The EJI combines indicators into functional groups representing distinct aspects of environmental burden and social and health vulnerability. These domains represent discrete aspects of social vulnerability and environmental burden, such as socioeconomic status and air pollution.

#### **6.14.1 No Action (PACR Alignment for Reach A)**

##### *Direct, Indirect, and Cumulative Impacts*

Direct, indirect, and cumulative impacts to residents in areas of EJ concern from the construction and operation of the 2013 PACR levee measures within the areas of Reach A would be similar to the FWOP condition. There are no direct, indirect, or cumulative, high, disproportionate impacts to areas of EJ concern from the No Action

Alternative. Induced flooding was identified in the 2013 report. However, these indirect impacts are not associated with Reach A and will be reassessed in forthcoming NEPA documents associated with the MTG Project, as necessary. There would be direct positive benefits to Areas of EJ concern from the no action plan similar to those described in the Proposed Action. Areas of EJ concern are those businesses and residents living in socially vulnerable communities, according to the CDC's Social Vulnerability EJ Index. The metrics used to identify vulnerable communities is detailed in Section 4.2.14. People in areas of EJ concern living or working near the PACR levee construction may experience direct, temporary impacts due to the added traffic congestion and construction noise and dust. The impact, however, would be temporary, lasting only as long as the construction and all residents are expected to be similarly impacted. The proposed project alignment would reduce risk of hurricane and storm damages for socially vulnerable populations in the project area. Regional economic growth resulting from the Proposed Action may create additional jobs, thereby benefitting vulnerable groups living within the project area. Further evaluation of both positive and adverse impacts from the MTG Project to disadvantage communities will be provided in a supplemental NEPA evaluation.

#### **6.14.2 Proposed Action - Modified PACR Alignment for Reach A**

##### *Positive Benefits and Adverse Impacts to EJ Areas of Concern*

The Modified PACR Alignment includes levee and associated features for the Reach A segment of the MTG levee system, that are designed at a Programmatic level of detail and levees that are Constructible. Both the programmatic and constructible levees are located in remote areas. The programmatic levee impacts to areas of EJ concern are similar to the constructible levee impacts (discussed below). There are no direct, indirect, or cumulative high, adverse disproportionate impacts to areas of EJ concern from either programmatic or constructible proposed components. Benefits and adverse impacts of Reach A to EJ areas of concern are discussed in the following sections. The 2013 PACR/RPEIS identified induced flooding caused by the Morgana to the Gulf system, and these flooding inducements were not caused by Reach A. Nonetheless, further evaluation of flooding inducements will be provided in supplemental NEPA evaluations associated with MTG.

##### *Direct Positive Benefits to Areas of EJ Concern*

Positive impacts from both the programmatic and constructible levee features include a decrease in flood risk to vulnerable populations in areas of EJ concern. The alternatives would reduce the flood risk, to areas of EJ concern, including flood damages, loss of life, reduced economic activity, and potential out-migration. These positive impacts would be long term and would be likely to better sustain the socioeconomic vitality of the area, positively impacting EJ communities.

Construction of the Reach A, Modified PACR levee (including both programmatic and constructible) could benefit about 5,700 structures. A structure benefiting from the construction of the levee is a structure that may have a lower flood risk once the levee is constructed. About one third of benefiting structures (2,068) are in areas of EJ concern. Figure 6-1 shows the location of the structures (green dots) that could benefit from the

Reach A levee construction. Just under 64 percent of the benefiting structures in areas of EJ concern are residential (excluding mobile homes and non-residential).

- Overall = 5,728
  - Residential = 3,690
  - Manufactured, modular and mobile homes = 1,602
  - Non-Residential = 436
- In EJ Areas = 2,068
  - Residential = 1,319
  - Manufactured, modular and mobile homes = 532
  - Non-Residential = 217

#### Adverse Direct Impacts to Areas of EJ Concern

Direct, adverse impacts to areas of EJ concern from the programmatic levee features and construction of the constructible levee and associated features are not expected to occur. The levee footprint would be constructed in remote areas where housing and other building types are not located. There would be no residential or non-residential property acquisitions related to the construction of the levee and its features.

Additionally, there are no flooding inducements to structures in areas of EJ concern that are caused by the construction of the programmatic and constructible levee features in Reach A.

#### Adverse Indirect Impacts to Areas of EJ Concern

The indirect impacts from the programmatic and constructible levee features are not expected to be high adverse impacts, would be temporary, and related to construction activities. Excavating borrow material and its transport to construct Reach A may cause temporary adverse impacts to nearby housing in areas of EJ concern. Approximately 3.5M CY of borrow material is an estimate to construct Reach A (constructible and programmatic features). The CY estimate includes an oversize factor for wastage and unusable material at the borrow sites. For programmatic features, borrow pits NFS-A1, A60, and A82 would be utilized as discussed in Section 2.5.1.2. Supplemental NEPA evaluations would be prepared prior to excavation of the programmatic borrow sites (NFS-A1, A60, and A82) or if additional borrow sites are required.

Construction of the constructible features would last approximately 730 days and would utilize dump trucks, bull dozers, compactors, backhoes, and fuel tanks. The number of dump trucks required to deliver 392,000 cubic yards of material from borrow pit NFS-A100 for levee construction (constructible feature) is approximately 27,000 trips, which is about 37 truck trips per day over 730 days. The dump trucks would utilize Access Road 4A, shown in Figure 6-1. For the constructible features, NFS-A100 would be utilized, as discussed in Section 2.5.2.2. If additional borrow sites are required, supplemental NEPA evaluations would be required prior to excavation. The area is

remote; however, best management practices would be used to avoid and minimize impacts to residents in areas of EJ concern and are discussed below.

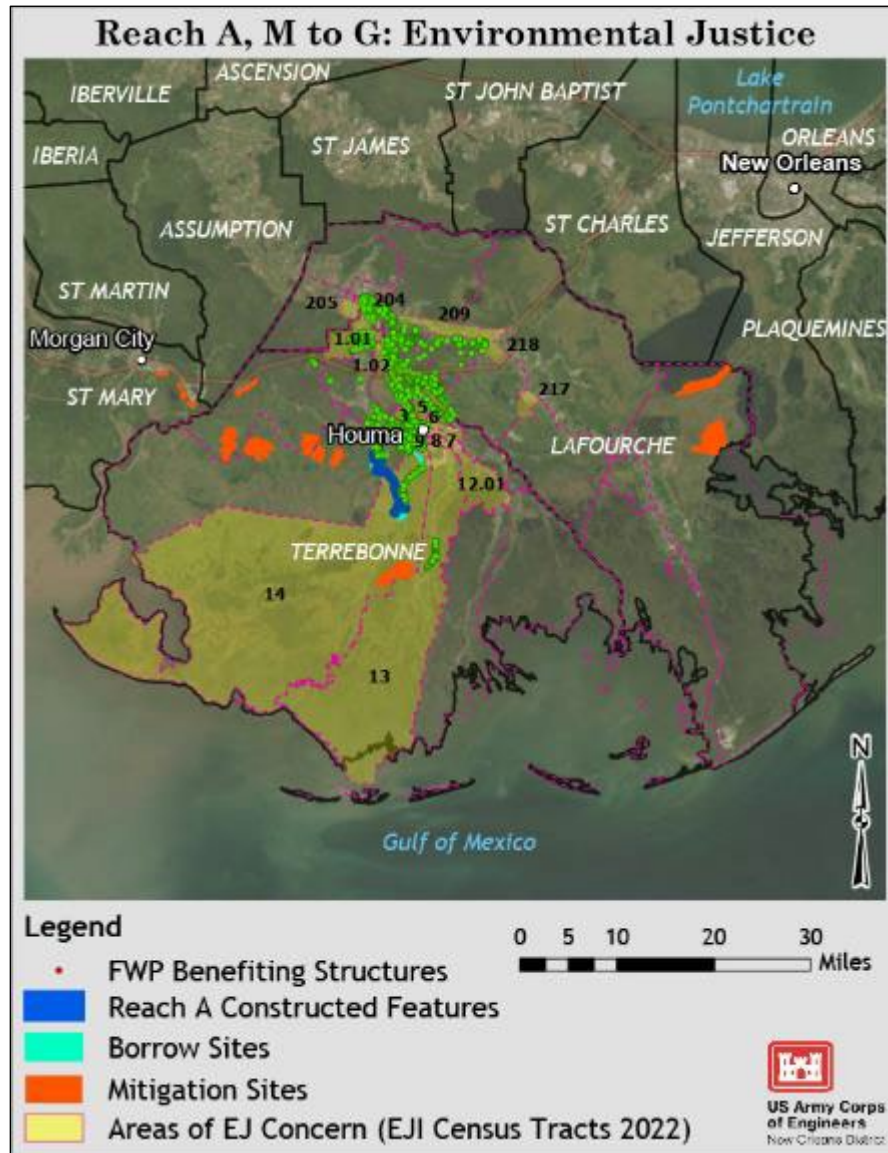


Figure 6-1. Areas of EJ Concern and Structures Benefiting

Borrow pits NFS-A1, A60, and A82 may be used for the programmatic levee construction. Approximately 520,000 cubic yards of borrow would be hauled via dump trucks to the levee site from A60 via Access Road 2 for levee construction east of Minors canal. Dump trucks would haul approximately 713,400 cubic yards of borrow from A82 to the levee using Access Road 4a. An estimated 640,000 cubic yards of borrow from NFS-A1 would be barged in to construct the portion of the levee between Minors Canal and the GIWW. Approximately 832,300 cubic yards of borrow material would be delivered via barge from NFS-A1 to construct the northern section of the South Reach A Levee beginning at the GIWW. Hauling of these approximately 2.7



million cubic yards of material as described above would not impact areas of EJ concern, as transportation of these borrow materials would not occur on public roads.

The amount of material trucked from pit NFS-A1 for the programmatic levee construction south of the GIWW via Highway 315 South and Access Road 3 is estimated to be 832,000 cubic yards or about 57,400 truck trips over a period of about 1,100 days or 52 truck trips per day.

Adverse, indirect impacts of construction of the levee and associated features may include the following: transportation and traffic delays, noise, and dust and air quality impacts. The truck trips transporting borrow material for levee construction would be spread-out over multiple access routes. Additionally, impacts from use of borrow sites is discussed below.

In general, the construction, operation, maintenance of the Reach A levee and features may cause adverse temporary impacts on the road network near the constructible levee alignment due to increased congestion, accelerated roadway wear-and-tear, and traffic delays resulting from re-routing major and local access roads. Temporary impacts on transportation due to increased congestion may occur and is dependent on road closures required to construct the improvements and the levee. Road closures may not occur every day, and if closures are required, they would be for the short-term. On those segments of roads where traffic is re-routed, minor to moderate delays, particularly during peak hours, may occur especially in more congested areas.

Noise along all segments of the levee project area would increase due to the temporary operation of equipment and vehicles used during construction. While noise impacts may cause a temporary inconvenience to residents and facilities closest to the site, noise levels associated with construction activities would be temporary and monitored to ensure acceptable standards are maintained. No permanent noise impacts are anticipated, and all noise emissions are expected to be short-term, lasting only as long as construction activities.

Dust and air quality impacts to EJ areas of concern are expected to be minor and short term. Temporary increases in air pollution could occur from the use of construction equipment (combustible emissions). Combustible emission calculations were made for standard construction equipment, such as bulldozers, excavators, dredgers, pumps, front end loaders, backhoes, and dump trucks.

#### *Mitigation of Indirect Construction-Related Impacts to Areas of EJ Concern*

Best Management Practices include several impact avoidance features which are included as integral components of the Proposed Action to minimize impacts to vehicular transportation. Specific routes would be designated for construction-related traffic to minimize residential disturbance and traffic congestion. USACE contracts would designate specific routes for construction-related traffic to avoid residential areas, to the maximum extent practicable, and staging areas for construction equipment and personnel would be located away from heavily populated areas. Streets that would serve construction-related traffic would be resurfaced, if needed and as appropriate, prior to initiation of construction activities, and maintenance of those streets would be

provided during the construction period. Appropriate detour signage would be placed in order to preserve access to local streets during construction activities. Off-street parking would be provided for construction workers, and shuttle vans would be used to transport construction workers to the work sites, if necessary. Streets that are damaged by any and all construction activities would be repaired.

Noise along all segments of levee construction would increase due to the temporary operation of equipment and vehicles used in the construction of the levee. Short-term noise impacts would be avoided, minimized or mitigated by use of the following best management practices.

The construction duration of the constructible feature of the Proposed Action would be 730 days with an assumed work schedule of 7 days a week, from 0600 to 2100.

Placement of temporary noise barriers adjacent to construction activities.

If machinery causing vibrations is used, the following noise and vibration monitoring language would be included in the contract specifications for specific work items:

- Monitoring of noise levels to verify adherence to contract specifications.
- Limit pile driving activities associated with pile founded T-walls to daylight hours.
- Use vibration monitoring equipment that measures surface velocity waves caused by equipment and monitor vibration up to a threshold value established and approved in writing by USACE. Such measurements would only be taken near residences and occupied buildings that could be adversely affected by excessive ground vibrations.
- Construction equipment noise would be minimized during construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications), and by shrouding or shielding impact tools.
- All equipment, haul trucks, and worker vehicles would be turned off when not in use for more than 30 minutes.
- Equipment warm-up areas, water tanks, equipment storage areas, and staging areas would be located as far from existing residences as is feasible.

No more than three stockpile burn sites burning at one time, so as to minimize the impacts of smoke to nearby residents.

### ***Stockpile Burn Sites***

Material collected from clearing and grubbing of the levee ROW may be disposed of by either windrowing, burning, or chipping. Debris resulting from clearing and grubbing the borrow site would be buried in the borrow pit.

Vegetative material may be collected into piles and burned within the ROW. Approximately 140 burns over the duration of the project would be anticipated, with approximately 4000 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. However, 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.

Most of the material is expected to be burned in stockpile sites. Two burns per day are expected with no more than three stockpile sites burning at one time. The effects of debris removal, either by burn or truck removal, are expected to not cause high, adverse disproportionate impacts to areas of EJ concern. If the debris is removed by trucks, the truck traffic in the area would increase by five trucks per day over an approximate 730 day construction period.

### **Borrow Sources**

Three borrow sites are being considered for excavation of material that could be used for the programmatic features of Reach A. The three borrow sites are called NFS-A1, A60, and A82 and are shown in Figure 2-7 and

Figure 2-8. The three borrow site are located in rural areas, while site A60 is also remote. Impacts from excavation of material to surrounding areas of EJ concern are expected to occur. Additionally, haul routes used to transport the material via dump trucks to the levee site are located in areas of EJ concern. A fourth borrow pit is also being considered for the constructible levee segment, Borrow NFS-A100 (Figure 2-16), which is also currently vacant land (vacant of buildings) and located in a remote area and in an area of EJ concern.

Residents living near the borrow sites and along the haul routes may experience minor, temporary, adverse indirect impacts. Potential impacts to these communities include an increase in truck traffic accessing and leaving the borrow sites, noise, and dust. Truck traffic and noise along roads, highways and streets during borrow site excavation would cease following completion of work activities. There may also be a degradation of the transportation infrastructure, primarily local roads and highways, as a result of the wear and tear from transporting earthen material. Best management practices would be utilized to avoid, reduce, and contain temporary impacts to human health and safety. During PED, the particulars of these impacts would be identified, including the approximate duration of activities involved in extracting material and the number of truck trips needed to deliver the material.

Additional concerns of adverse impacts associated with borrow pits were expressed during an EJ outreach meeting (see EJ outreach summary in Section 4.2.14). Once the borrow pit excavation is completed and work ceases, the pits often fill with water over time and can attract alligators, increasing attack risks to children who are often attracted to these areas. Mitigation measures, such as pit enclosure or other means to limit access to pits should be considered to reduce impacts to safety risks.

### **6.14.3 Mitigation Plans**

There are no direct, indirect, or cumulative impacts to areas of EJ concern from the proposed mitigation plans. The mitigation sites are located in remote areas removed from human population, and therefore, there are no high, adverse disproportionate impacts to areas of EJ concern from the restoration of habitat.

## **6.15 CULTURAL, HISTORIC, AND TRIBAL TRUST RESOURCES**

### **6.15.1 No Action (PACR Alignment for Reach A)**

#### *Direct, Indirect, and Cumulative Impacts*

For the Reach A authorized PACR alignment, the potential for previously unrecorded cultural resources to be adversely affected does exist.

### **6.15.2 Proposed Action - Modified PACR Alignment for Reach A**

#### *Direct, Indirect, and Cumulative Impacts*

#### **Programmatic Features**

USACE has proposed to phase its historic property identification and evaluation following the guidelines in 36 CFR § 800.4(b)(2). In USACE's consultation when considering whether to phase or not, the Agency committed to documenting phasing in the Section 106 consultations, NEPA EA, and FONSI. The use of phasing was coordinated with SHPO and Federally recognized Tribes on 28 September 2023. Partial Phase I cultural resource survey has been completed for programmatic elements. A conclusion of No Historic Properties Affected has been shared with SHPO and Federally recognized Tribes, dated 15 December 2023.

### **Constructible Features**

For Reach A of the modified PACR alignment as described in the project description with off-site borrow only, Phase I cultural resources survey has been completed. A conclusion of No Historic Properties Affected has been shared with SHPO and Federally recognized Tribes, dated 15 December 2023.

## **6.15.3 Mitigation Plans**

### **BLH Swamp**

#### **Purchase of Mitigation Bank Credits (TSP for constructible features of Reach A)**

##### *Direct, Indirect, and Cumulative Impacts*

Mitigation Banks have been previously coordinated for compliance with the National Historic Preservation Act. Although a review and confirmation will always occur, no further coordination is necessary for use of a mitigation bank.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or Corps-constructed BLH mitigation will be considered, subject to supplemental NEPA evaluation (See below and Appendix E).

#### **Corps-Constructed Site – Amelia**

##### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for Amelia. Existing data does suggest that Amelia is a high probability area to contain historic properties. Further Section 106 coordination is required.

#### **Corps-Constructed Site – Gibson**

##### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for Gibson. Existing data does suggest that Gibson is a high probability area to contain historic properties. Further Section 106 coordination is required.

### **Fresh Intermediate Marsh**

## **Purchase of Mitigation Bank Credits**

### *Direct, Indirect, and Cumulative Impacts*

Mitigation Banks have been previously coordinated for compliance with the National Historic Preservation Act. Although a review and confirmation will always occur, no further coordination is necessary for use of a mitigation bank.

## **Corps-Constructed Site – Lake Salvador (TSP for constructible features of Reach A)**

### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for Lake Salvador. Existing data does suggest that Lake Salvador is a high probability area to contain historic properties. Further Section 106 coordination is required. The coordination letter for Section 106 compliance of the Reach A EA, stated that a phased approach for some activities would be employed, including for the mitigation of marsh loss due to construction. No objections to this approach were received from SHPO or Tribes. Furthermore, the definition of boundaries for the Lake Salvador mitigation site contains more acres than are necessary to mitigate for damages, thus ensuring that any cultural resource that may be located during survey could be easily avoided with no damages due to its use for marsh mitigation.

For the programmatic features of Reach A, the purchase of mitigation bank credits and/or construction at the above site or the following other sites will be considered, subject to supplemental NEPA evaluation (Appendix E).

## **Corps-Constructed Site – Delta Farms**

### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for Delta Farms. Existing data does suggest that Delta Farms is a high probability area to contain historic properties. Further Section 106 coordination is required.

## **Corps-Constructed Site – Avoca Island Cutoff**

### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for Avoca Island Cutoff. Existing data does suggest that Avoca Island Cutoff is a low probability area to contain historic properties. Further Section 106 coordination is required.

## **Corps-Constructed Site – GIWW**

### *Direct, Indirect, and Cumulative Impacts*

Cultural resources survey is not complete for GIWW. Existing data does suggest that GIWW is a low probability area to contain historic properties. Further Section 106 coordination is required.

## 6.16 CUMULATIVE EFFECTS ANALYSIS

The CEQ Regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR §Parts 1500-1508).

Cumulative effects are not caused by a single project but include the effects of a particular project in conjunction with other projects (past, present, and future) on the particular resource. Cumulative effects are studied to enable the public, decision-makers, and project proponents to consider the “big picture” effects of a given project on the community and the environment. In a broad sense, all impacts on affected resources are probably cumulative; however, the role of the analyst is to narrow the focus of the cumulative effects analysis to important issues of national, regional, and local significance (CEQ, 1997).

The CEQ issued a manual entitled Cumulative Effects under NEPA (CEQ, 1997). This manual presents an 11-step procedure for addressing cumulative impact analysis. The cumulative effects analysis concentrates on whether the actions proposed for this study, combined with the impacts of other projects, would result in a significant cumulative impact, and if so, whether this study’s contribution to this impact would be cumulatively considerable.

In Louisiana, the causes of coastal wetland degradation and loss have been researched extensively. Losses are expected to continue due to many different, and often interacting factors, including agriculture, nutrient enrichment, drainage, climate change, human development, pollution, invasive species, world-wide eustatic sea level rise, subsidence, navigation channels, oil and gas activities, saltwater intrusion, and tropical storms.

The gradual decline of marsh vegetation due to storm surge events, inundation, and saltwater intrusion eventually lead to complete loss of marsh vegetation. As this marsh vegetation is lost, underlying soils become more susceptible to erosion, leading to an increase in open water areas and preventing marsh regeneration. Without the accretion or deposition of sediments where erosion is occurring, it is not possible for marsh habitat to reestablish.

Rising sea levels in climate forecasting for the state of Louisiana are anticipated to expose additional shoreline areas to erosive forces. Levees, floodwalls, and other water resource management structures provide risk reduction to the human environment during flooding events from storm surge; aid in the reduction of flood risk and damages to residential, commercial, historic, cultural, and critical assets and infrastructure; limit economic damages and improve economic resiliency of the local economy and communities; convert flood zones to help minimize insurance expenses; and help reduce recovery time from high water events that make evacuation routes and other critical roadways impassable.

### Regional Projects and Programs

Since the 2005 hurricane season, significant resources and efforts focused on rebuilding southeast Louisiana. To quantify these regional efforts, a wide array of resources were canvassed to try to bring the impacts of as much of this rebuilding effort as practicable under one overarching evaluation of cumulative impacts due to regional actions. For the cumulative impact analysis, regional projects conducted by others in southeastern LA were broadly addressed through the following subheadings:

- Storm Damage Reconstruction Projects
- Coastal and Wetlands Restoration Projects
- Flood Risk Reduction Projects
- Transportation Projects

Past, present, and reasonably foreseeable future regional projects are listed in Appendices A and B. Regional projects considered in the cumulative effects analysis included projects under the Final Comprehensive Environmental Document, Louisiana Coastal Impact Assistance Program (CIAP) and the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA).

The Proposed Action includes construction of an approximately 7-mile segment of the larger 98-mile MTG levee system. Impacts from the construction of Reach A are not significant and would be an additive impact to other similar projects constructed in the past, present, and reasonably foreseeable future. As a result of historical trends of subsidence and sea level rise, wetlands in the vicinity of Reach A and across coastal Louisiana have experienced a decline. It is likely that this trend would continue into the future regardless of the Proposed Action. Minors Canal and GIWW floodgates would be closed during named storm events and over time would be closed more frequently due to sea level rise; However, these structures are necessary to provide flood risk reduction to the cities and communities inside the future MTG levee system.

## SECTION 7

# Compliance With Environmental Laws and Regulations

### 7.1 EXECUTIVE ORDER 12898, FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS DATED FEBRUARY 11, 1994;

Executive Order 12898 directs Federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations to the greatest extent practicable and permitted by law. No high adverse disproportionate impacts were identified. CEMVN also assessed the potential EJ impacts to the human environment, including impacts to access roads and to those who live along them and from noise. No impacts are expected.

On Wednesday, 19 July 2023 hybrid-style (in-person and WebEx) EJ engagement meetings were held at 1:00pm and 6:00pm at the Folklife Museum at, 317 Goode St. Houma, LA 70360. The purpose of the meetings was to describe the overall project, as well as the proposed borrow pits and access routes for levee reaches A & F. Public Outreach focused on civic and environmental organizations that served residents in Houma, Gibson, Bourg, Lockport, Dulac, Montegut, Larose, and Chauvin. Initial and follow up calls were made to 48 churches (20 of which agreed to inform their members of the meeting), seven local libraries, two food banks, four civic organizations, and three environmental non-profits. Tribes in the area were also made aware of the meetings, including, Grand Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw, Point-au-Chein Indian Tribe, Isle de Jean Charles, United Houma Nation, and Chitimacha Tribe of Louisiana. Letters received from several bayou tribes include, in part, the following questions:

1. Will borrow pits be located near housing, and will they be backfilled after excavation?
  - The group voiced concerns that post-excavation pits fill up with water/gators and pose a hazard/attractive nuisance to residents and children.
2. Do borrow pits weaken the surrounding lands and pose a greater flood risk for those nearby?
3. Can USACE provide the borrow pit trucking access routes and times of day hauling will occur?
4. How will local traffic be affected and for how long?
5. Will trucks be on the road during school drop-off and pick-up times?
  - The group voiced concerns that borrow pit trucking may tear up local roadway – how will this be addressed?



Some of these questions were answered during the EJ outreach meeting and all are answered in Section 2.4.2, Section 2.4.3, and Section 6.15. Further consideration of these request to minimize construction and truck impacts to areas of EJ concern will be considered if and when comments are received during the public release of the document or during construction of the project. At this time, borrow pits will not be enclosed and truck trips will not be limited to outside of school zone times.

## **7.2 EXECUTIVE ORDER 14008, TACKLING THE CLIMATE CRISIS AT HOME AND ABROAD DATED 27 JANUARY 2021, SEC 219: SECURING ENVIRONMENTAL JUSTICE AND SPURRING ECONOMIC OPPORTUNITY; OFFICE OF MANAGEMENT AND BUDGET MEMORANDUM M-21-28;**

Executive Order 14008, Sec 219, states that agencies shall make achieving environmental justice part of their missions by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, and climate-related impacts as well as the accompanying economic challenges of such impacts. An EJ assessment determined that no direct adverse, disproportionate impacts are expected to occur as a result of the Proposed Action. The assessment identified minor indirect human impacts that would occur during construction; However, it was determined that these impacts are not disproportionate to minority or low-income residents. Reach A will not cause induce flooding to areas of EJ concern south of the project area; However, the 2013 PACR/RPEIS did identify potential induced flooding, but it was not caused by Reach A. Supplemental NEPA will reevaluate H&H modeling and induced flooding potential. Additionally, areas of EJ concern are shown to benefit from flood risk reduction of the Proposed Action.

## **7.3 EXECUTIVE ORDER 14096: REVITALIZING OUR NATION'S COMMITMENT TO ENVIRONMENTAL JUSTICE FOR ALL**

Executive Order 14096 states that advancing environmental justice will require investing in and supporting culturally vibrant, sustainable, and resilient communities and that each agency should make achieving environmental justice part of its mission. The Proposed Action, as part of a larger Flood Risk Management system, benefits areas of EJ concern by reducing flood risk to those living in vulnerable communities and this EA and other public involvement allows for timely opportunities for members of the public to share information or concerns and participate in the decision-making process, consistent with the EO and NEPA.

## **7.4 EXECUTIVE ORDER 11988: FLOODPLAIN MANAGEMENT**

Executive Order 11988 directs Federal agencies to reduce flood loss risk; minimize flood impacts on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by flood plains. Agencies must consider alternatives to avoid adverse and incompatible development in the flood plain. If the only practical alternative requires action in the floodplain, agencies must design or modify their action to minimize adverse impacts. Some project features would extend into floodplains; however, the Proposed Action would not promote future development within the floodplain that otherwise would not occur. The Proposed Action is compliant with EO 11988.

## **7.5 EXECUTIVE ORDER 11990: PROTECTION OF WETLANDS**

Executive Order 11990 directs Federal agencies to assess the likely impacts to wetlands associated with any proposed action. This is met through the following: (a) avoid long and short term adverse impacts associated with the destruction or modification of wetlands; (b) avoid direct or indirect support of new construction in wetlands; (c) minimize the destruction, loss or degradation of wetlands; (d) preserve and enhance the natural and beneficial values served by wetlands; and (e) involve the public throughout the wetlands protection decision-making process. The proposed action was developed to avoid and minimize impacts to wetlands where practicable within the constructible reach. The programmatic features will be further refined through additional engineering and design in the future. Project designs would be developed with consideration of ways to avoid and minimize impacts to wetlands to the maximum extent possible and still meet the intended project purpose. The additional analysis would be assessed in subsequent NEPA documents and released to the public for comment. A mitigation plan has been developed to offset the impacts resulting from implementation of the constructible features. Reference 2.5.4 and 0 of this DPEA. Upon further engineering, design and analysis on the programmatic features, all unavoidable impacts would be mitigated as well.

## **7.6 CLEAN AIR ACT OF 1970, AS AMENDED**

The Clean Air Act sets goals and standards for the quality and purity of air. It requires the Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The project area is in Terrebonne Parish, Louisiana. Terrebonne Parish is in attainment of National ambient air quality standards (NAAQS). A general conformity determination is not required.

## **7.7 CLEAN WATER ACT OF 1972, AS AMENDED – SECTIONS 401, 402 AND 404**

The Clean Water Act (CWA) sets and maintains goals and standards for water quality and purity. Section 401 requires a Water Quality Certification (WQC) from the Louisiana Department of Environmental Quality (LDEQ) that a proposed project does not violate established effluent limitations and water quality standards. The application for the State WQC will be provided to the LDEQ on 01 March 2024 in accordance with LAC 33:IX. Coordination with LDEQ is on-going and WQC will be obtained prior to the signing of a FONSI.

As required by Section 402 of the CWA, Louisiana Pollution Discharge Elimination System (LPDES) permit coverage for the proposed action would be obtained prior to construction via the General Permit for Discharges of Storm Water from Construction Activities Five Acres or More from the LDEQ.

Section 404 of the CWA requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the United States, including wetlands. A draft 404(b)(1) evaluation will be released for a 30-day comment period beginning 01 March 2024.

## **7.8 COASTAL ZONE MANAGEMENT ACT**

The Coastal Zone Management Act requires that "each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." The USACE is currently in the process of coordinating the proposed action with the Louisiana Department of Natural Resource (LDNR). A consistency determination will be provided to LDNR on 01 March 2024 and would be obtained prior to signing of the FONSI.

## **7.9 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT**

The Magnuson-Stevens Fishery Conservation and Management Act, as amended, addresses the protection of EFH by NMFS in association with regional Fishery Management Councils. NMFS has a "findings" with the CEMVN on the fulfillment of coordination requirements under provisions of the Magnuson-Stevens Fishery Conservation and Management Act. In those findings, the CEMVN and NMFS have agreed to complete EFH coordination requirements for Federal civil works projects through the review and comment on National Environmental Policy Act documents prepared for those projects. See 50 CFR 600.920(f) (allowing use of existing environmental review procedures). This DPEA will be provided to NMFS on 01 March 2024 at the start of the 30-day public review. Consultation with NMFS is on-going and would be concluded prior to the signing of a FONSI.

## **7.10 ENDANGERED SPECIES ACT OF 1973**

The Endangered Species Act is designed to protect and recover T&E species of fish, wildlife, and plants. A biological assessment was prepared and submitted to the USFWS on 10 January 2024 and NMFS on 16 January 2024, as part of on-going coordination with NOAA and USFWS for listed T&E species, including the West Indian manatee and alligator snapping turtle, migratory shorebirds, and species of management concern (i.e., rare and very rare species) that are known to occur or are believed to occur within the area. In an email dated 22 January 2024, NMFS acknowledged receipt of the project information and assigned the project tracking number SERO-2024-0065-02587. NMFS stated they will assign a Consultation Biologist within the next 10 to 12 weeks. On 8 Feb 2024, NMFS requested a revised BA to correct missing and/or incorrect information. MVN submitted a revised BA to NOAA on 22 Feb 2024. Consultation under the Endangered Species Act is on-going and would be concluded prior to the signing of a FONSI.

## **7.11 FARMLAND PROTECTION POLICY ACT**

The Farmland Protection Policy Act of 1981 is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. The USDA-NRCS is responsible for designating prime or unique farmland protected by the act. Prime farmland is land with the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops that is available for these uses. It can be cultivated land, pastureland, forestland, or other land, but is not urban or built-up land or water areas. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops, such as

citrus, tree nuts, olives, and vegetables. Construction of the Proposed Action associated borrow areas would impact prime farmland. The overall potential impact to prime and unique farmland is not considered significant due to the overall benefits the Proposed Action would provide to remaining farmlands. Potential impacts to prime and unique farmland as a result of any project feature, including compensatory mitigation activities, would be coordinated with NRCS.

## 7.12 FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Coordination Act (FWCA) provides authority for the USFWS and NMFS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It requires Federal agencies that construct, license, or permit water resource development projects to first consult with the USFWS, NMFS, and state resource agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts. Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that details existing fish and wildlife resources in a study area, potential impacts due to a proposed project and recommendations for a project. Draft CAR recommendations were received on 5 January 2024 and CEMVN responses are set forth below. USFWS correspondence and the draft CAR are included in Appendix G.

The Service supports the MTG Reach A 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's mitigation policy (Federal Register, Volume 46, Number 15, pages 7656-7663, January 23, 1991) provides guidance to help ensure that the level of mitigation recommended by the Service is consistent with the value and scarcity of the fish and wildlife resources involved. In keeping with that policy, the Service usually recommends that losses of high-value habitats which are becoming scarce be avoided or minimized to the greatest extent possible. 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 features.

CEMVN Response: Concur. CEMVN has and will continue to consider measures that would avoid and/or minimize impacts to high-value habitats as is demonstrated by the adjustment in the alignment in the reach south of the GIWW. As a programmatic document, as pre-engineering and design progresses for Reach A, CEMVN will continue to look for ways to avoid and/or minimize impacts to high-value habitats and provide that analysis in subsequent supplementary NEPA documents. For the currently unavoidable habitat impacts, a compensatory mitigation plan has been developed as discussed in Section 2.5.4 and Appendix E.

2. If organic soils must be removed prior to levee construction, those organic 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.

CEMVN Response: CEMVN will work with USFWS to determine the feasibility of this recommendation prior to construction.

3. 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 an active or inactive eagle nest is discovered within 1,500 feet of the project footprint, then follow the bald and golden eagle guidelines to determine whether disturbance will occur and/or an incidental take permit is needed. 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.

CEMVN Response: Concur. CEMVN will avoid impacts to bald eagles and their nesting habitat to the extent possible. Reference Section 6.5 for the discussion on avoidance measures and Appendix J.

4. 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. For more detail on avoiding contact with manatee contact this office. Should a Proposed Action directly or indirectly affect the West Indian manatee, further consultation with this office will be necessary.

CEMVN Response: Concur. CEMVN will ensure that all personnel including contractors are informed regarding the potential presence of manatees, speed zones and collision avoidance to avoid injury to manatees. Reference Section 6.5 for the discussion on avoidance measures and Appendix J.

5. 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 undocumented nesting colonies during the nesting season (September 1 through February 15).

CEMVN Response: Concur. No active colonial nesting water bird rookeries were identified within 1,000 feet of the Proposed Action. Reference Section 6.5 for the discussion on nesting wading bird colonies.



6. 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.

CEMVN Response: Concur. Reference Section 6.5 for the discussion on alligator snapping turtles.

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.

8. 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.

CEMVN Response: NMFS has a “finding” with the CEMVN on the fulfillment of coordination requirements under provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). In those findings, the CEMVN and NMFS have agreed to complete EFH coordination requirements for Federal civil works projects through the review and comment on NEPA documents prepared for those projects. This DEA is being provided to NMFS during the public review to initiate coordination per the Magnuson-Stevens Act.

9. 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.

CEMVN Response: Concur. When constructing access roads that cross wetlands, we would design the access roads to include 24” culverts every 250’. There are no access roads that cross wetlands in the constructible features. Further engineering and design, modeling, and supplemental NEPA evaluation would occur on the programmatic features prior to construction.

10. 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 destruction of forested and emergent wetlands is avoided or minimized.

CEMVN Response: Concur. For the constructible feature of the proposed action, CEMVN has modified the alignment to avoid and minimize impacts to high-value habitat. As engineering, design, and analysis progresses on the programmatic features, avoidance and minimization measures would be considered to the greatest extent practicable allows the Proposed Action to meet the purpose and need.

11. North of the GIWW, the Service recommends that the levee alignment be adjusted slightly to avoid impacts to several areas of bald cypress swamp forest (0, Figure 5).

CEMVN Response: Concur. As further engineering, design, and analysis progresses on the programmatic features, including the alignment north of the GIWW, avoidance and minimization of impacts to the high-quality cypress swamp forest would be considered to the greatest extent practicable that allows the Proposed Action to meet the purpose and need. Supplemental NEPA document and coordination with the Resource Agencies would take place prior to construction of programmatic features.

12. To avoid impacts to swamp forest, the Service recommends that the western most levee reach be relocated onto agricultural lands rather in the swamp/wetlands (0, Figure 6).

CEMVN Response: Concur. As further engineering, design, and analysis progresses on the programmatic features, including the alignment north of the GIWW avoidance and minimization of impacts to the high-quality swamp and wetlands would be considered to the greatest extent practicable that allows the Proposed Action to meet the purpose and need. Supplemental NEPA document and coordination with the Resource Agencies would take place prior to construction of programmatic features.

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

CEMVN Response: Concur. CEMVN will continue to closely coordinate with the FWS and other Resource Agencies as engineering, design, modeling, and further NEPA analysis occurs.

14. Where wetlands would be enclosed with the Reach A levee, drainage evaluations should be conducted to ensure that moderate to heavy rainfall events do not result in prolonged elevated water level conditions resulting in adverse wetland impacts.

CEMVN Response: Concur. A hydraulic analysis was performed using HEC-RAS to model existing conditions and proposed conditions along Reach A. The 10 percent AEP rainfall event was run through the model to compare existing conditions to proposed conditions. The drainage structures along Reach A were designed to allow adequate flow to be exchanged across the levee for this event. The results showed interior water levels returning to normal water levels in a reasonable amount of time (3-5 days) for



this event. Plans are being proposed to include water level gages at locations along Reach A to better inform how the system would drain during actual rainfall events.

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.
  - 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.

CEMVN Response: Concur. Borrow for marsh mitigation sites would be obtained from outside the proposed mitigation area. See Appendix E, Attachment E5 for planning and engineering design of the proposed mitigation site. See Section 18 of 0 for the Mitigation Plan, Adaptive Management and Success Criteria.

16. With the new definition of the Waters of the United States (WOTUS, published Aug29, 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. Currently, the USACE is awaiting guidance on implementation of that new rule. The Service recommends the USACE coordinates with us once that guidance is received 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 NMFS' opinion that the enclosed wetlands in question should be exempt from redefinition implications.

CEMVN Response: The USACE will continue to work closely with the Service on this project and coordinate regarding implementation of the Proposed Action. Should there be additional impacts beyond what has been disclosed in this DPEA, a supplemental NEPA document would be prepared as appropriate prior to construction.

17. 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.

CEMVN Response: Concur. The draft operations plan for water control structures and floodgates is located in Appendix I. The gates would only be closed during impending named storm events in the Gulf.

18. The trigger for structure closures would be tropical storm events. Therefore, the project would not close the system more often due to higher day-to-day sea level rise impacts. If the sponsor/operator sees a higher level of sea level rise and starts to see increased soil saturation/flooding in developed areas, they may want to change the operations to

close the structures at high tides. A change in operations would be considered a separate project purpose and authorization and would require a new NEPA documentation and/or approval for this operational change. It is unknown at present how water levels within the system would be managed if a change in operation due to RSLR is realized. Hence, there is a potential for substantial additional indirect impacts to wetland habitat and fish and wildlife resources to occur. If the system is closed more often due to higher RSLR impacts, the Service recommends additional impacts be evaluated and mitigated.

CEMVN Response: Concur. The proposed project is presented at a programmatic level of engineering and design with enough detail to construct a segment of the levee in the South Reach of the GIWW. Supplemental NEPA documents will be prepared to assess the full project engineering and design details as they are developed and potential associated impacts resulting from the project. If the Operation plan for the water control structures and floodgate changes, the impacts resulting from that change would be assessed in a supplemental NEPA document. CEMVN will continue to coordinate closely with the Service as the project develops.

19. 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.

CEMVN Response: Concur. CEMVN will look for opportunities to minimize impacts to fisheries and aquatic organisms. To the maximum extent practicable, for flood protection water control structures, CEMVN will strive to maintain pre-project cross section width and depth. During detailed engineering and design of water control structures within a waterway consideration would be given toward the inclusion of shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure to enhance organism passage. In addition, CEMVN would consider various ramp designs. CEMVN has and will continue to coordinate with NMFS and other resource agencies as project develops.

20. Material from dredging or borrow pits should not be piled outside of the ROW.

CEMVN Response: Concur. CEMVN will not stockpile materials outside of the designated ROW. Any excess organic materials would be utilized in a method beneficial to the surrounding environment. Any excess waste materials would be removed and hauled to facilities designated to handle such materials.

21. 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 Service identified a

priority selection process and list for borrow sites in our November 15, 2023, Planning-aid letter to USACE (Appendix 1). That prioritization process should be utilized if additional borrow sites are needed (please contact Cathy Breau (337) 291-3122 for more information).

CEMVN Response: Concur. CEMVN has and will continue to coordinate with the USFWS regarding borrow sources. CEMVN is utilizing the Service's priority selection process for borrow sources.

22. 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.

CEMVN Response: Concur. CEMVN has and will continue to coordinate with the FWS if the proposed project changes in scope or location; new information becomes available that affects listed species or their designated habitat; the action is modified that cause effects to listed species or if new species become listed or their designated critical habitat.

### **7.13 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE**

The USACE is obligated under ER 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of Proposed Actions. ER 1165-2-132 provides that in the PED Phase that, for proposed project in which the potential for HTRW problems has not been considered, an HTRW initial assessment should be conducted as a priority. USACE HTRW policy is to avoid the use of project funds for HTRW removal and remediation activities. If the initial assessment indicates the potential for HTRW, testing, as warranted and analysis similar to a feasibility study should be conducted prior to proceeding with the project design. The NFS will be responsible for planning and accomplishing any HTRW response measures and will not receive credit for the costs incurred.

A Phase I Environmental Site Assessment (ESA) was conducted in accordance with the scope and limitations of ASTM Practice E 1527-13 for the Morganza to the Gulf, Reach A No Action and Proposed Action on 11 December 2023. Based on the environmental records review and inspections via an aerial fly over of the levee alignment on 4 May 2023, and a site visit to the borrow and staging areas on 29 November 2023, there is a low probability of encountering HTRW during construction of the project. No further investigation at the site is necessary. If the proposed project site areas change significantly, HTRW would need to be re-investigated under a new Phase I ESA.

## 7.14 MIGRATORY BIRD TREATY ACT, AS AMENDED

The MBTA is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits taking, killing, or possessing of migratory birds unless permitted by regulations promulgated by the Secretary of the Interior. The USFWS and the Department of Justice are the Federal agencies responsible for administering and enforcing the statute. The study area is known to support colonial nesting wading/water birds (e.g., herons, egrets, ibis, night-herons and roseate spoonbills) and shorebirds (terns and gulls). USFWS and USACE biologists would survey the Proposed Action areas before construction to confirm no nesting activity as suitable habitat and the potential for nesting exist within the area. If active nesting exists within 1,000 feet (water birds) or 1,300 feet (shorebirds) of construction activities then USACE, in coordination with USFWS, would develop specific measures to avoid adverse impacts to those species. A detailed nesting prevention plan may be necessary in order to deter birds from nesting within the aforementioned buffer zones of the area footprints in order to avoid adverse impacts to these species. If a nesting prevention plan is necessary, it would be prepared in coordination with USFWS.

The bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA. USFWS developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute “disturbance,” which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

<https://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf>.

These guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. During construction of the Proposed Action, 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 the USACE. If a bald eagle nest occurs or is discovered within 660 feet of the project footprint, then an evaluation must be performed to determine whether the construction and/or operation of the project is likely to disturb nesting bald eagles. An evaluation would be conducted in accordance with the procedures outlined by the USFWS at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, a determination would be made as to whether additional consultation is necessary or not. During nesting season, construction must take place outside of FWS/LDWF buffer zones. A USACE Biologist and an USFWS Biologist would survey for nesting birds prior to the start of construction.

## 7.15 NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to

comment on such undertakings. The procedures in 36 CFR Part 800 define how Federal agencies meet these statutory responsibilities. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, including the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) and any Tribe that attaches religious or cultural significance to historic properties that may be affected by an undertaking. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. NHPA consultation letters pursuant to Section 106 were mailed to SHPO on 15 December 2023 for 30-day review. These consultation letters reference earlier consultation that phasing of cultural resources survey would be utilized for some components of Reach A, including swamp mitigation (Lake Salvador). In an email dated 4 January 2024, SHPO concurred that the actions of this DPEA are determined as having no effect on historic properties. As per obligations stated in consultation, Phase I cultural resources survey of the Lake Salvador swamp mitigation site must be completed and any historic properties that may be discovered during that survey must be avoided or protected, before use of the mitigation site can begin. Sufficient acres of boundary for the Lake Salvador site exist, that avoidance can be easily undertaken. See Appendix D for documentation of National Historic Preservation Act Coordination.

### **Tribal Consultation**

It is the policy of the Federal government to consult with Federally recognized Tribal Governments on a Government-to-Government basis as required in E.O. 13175 ("Consultation and Coordination with Indian Tribal Governments;" U.S. President 2000). The requirement to conduct coordination and consultation with Federally recognized Tribes on and off of Tribal lands for "any activity that has the potential to significantly affect protected tribal resources, tribal rights (including treaty rights), and Indian lands" finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws (Table 7-1). The USACE Tribal Consultation Policy, 5 December 2023, specifically implemented this E.O. and later Presidential guidance. The 2023 USACE Tribal Consultation Policy and Related Documents provide definitions for key terms, such as tribal resources, tribal rights, Indian lands, consultation, as well as guidance on the specific trigger for consultation.

*Table 7-1. 2023 USACE Tribal Consultation Policy Definitions*

<b>Category</b>	<b>Definition</b>
Tribal rights:	Those rights legally accruing to a Federally recognized Tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaties, statutes, judicial decisions, executive orders or agreement and that give rise to legally enforceable remedies.
Tribal lands:	Any lands title to which is: either held in trust by the United States for the benefit of any Federally recognized Indian tribe or individual or held by any Federally recognized Indian tribe or individual subject to restrictions by the United States against alienation.
Protected tribal	Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Tribal lands, retained by, or reserved by or for, Federally

resources	recognized Tribes through treaties, statutes, judicial decisions, or executive orders.
-----------	--

While Terrebonne Parish has a long history of occupation by Native American communities, prior to its establishment and throughout its history, there are currently no protected tribal resources, tribal rights, or Indian lands that have the potential to be significantly affected by the Proposed Actions within in the watershed. However, in accordance with CEMVN's responsibilities under the NHPA Section 106 process and E.O. 13175, CEMVN has offered the following Federally recognized Indian tribes the opportunity to review and comment on the Proposed Action: 1) the Chitimacha Tribe of Louisiana, 2) the Coushatta Tribe of Louisiana, 3) the Jena Band of Choctaw Indians, 4) the Mississippi Band of Choctaw Indians, and 5) the Tunica-Biloxi Tribe of Louisiana. See Appendix H: NHPA Coordination for consultation letter date and response received from Seminole Nation of Oklahoma dated 15 June 2021 and the Choctaw Nation of Oklahoma dated 8 July 2021.

**NHPA Design Commitments FONSI Condition**

The following Design Commitment shall be placed into CEMVN's Finding of No Significant Impact and followed:

CEMVN has phased the identification and evaluation of historic properties following the guidelines in 36 CFR § 800.4(b)(2). CEMVN shall complete Phase I cultural resources survey and applicable consultation following the procedures of 36 CFR § 800 for the programmatic features and mitigation features before construction begins on any of these features (examples include the Lake Salvador swamp mitigation site and the Reach A alignment north of the GIWW). All non-mitigation constructible features have been subjected to Phase I cultural resources Survey.

**7.16 WILD AND SCENIC RIVERS ACT**

There are no Federally designated Wild and Scenic Rivers under the Federal Wild and Scenic Rivers Act, 16 U.S.C. §1271, *et seq* within the study area.



## SECTION 8

# Agency Coordination and Public Involvement

Public involvement is an important part of planning and decision-making. Agencies, nongovernmental organizations, and citizens provided valuable input for the final recommendation. NEPA provides people, organizations, and governments the opportunity to review and comment on proposed major Federal actions. Engaging and receiving input from the public, interested parties, stakeholders, government agencies, and nongovernmental organizations regarding the content of DPEA #598 in all stages is critical to achieving the USACE objective of enhancing trust and understanding with customers, stakeholders, teammates, and the public through strategic engagement and communication.

A Public Notice is being published on CEMVN website at

<https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/Project-Pages/Mississippi-River-and-Tributaries/> announcing the start of a 30-day public review and comment period beginning 01 March 2024 and ending on 31 March 2024.

Preparation of this DPEA and draft FONSI is being coordinated with appropriate Congressional, Federal, State, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, received copies of the DPEA and draft FONSI:

- Louisiana Department of Environmental Quality, Water Permits Division
- Louisiana Department of Natural Resources, Office of Coastal Management
- Louisiana Department of Wildlife and Fisheries
- Louisiana Office of Cultural Development, Louisiana State Historic Preservation Officer
- U.S. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Region
- U.S. Fish and Wildlife Service, Louisiana Ecological Services Field Office
- U.S. Environmental Protection Agency, Region VI
- U.S. Federal Emergency Management Agency, Region VI
- U.S. Natural Resources Conservation Service, State Conservationist



## SECTION 9

# Conclusion

The Proposed Action consists of a combination of both programmatic and constructible features for Reach A. As a whole, the Proposed Action consists of an approximately 7.16 miles earthen levee and 0.22 miles of floodwall designed to a +16.5-foot and +17-foot elevation (NAVD88), respectively; 11 environmental control structures; 2 collector canals; and 2 floodgates. The floodgates proposed are a 56-foot-wide barge type floodgate on the Minors Canal north of the GIWW, and a 125-foot to 225-foot sector gate on the GIWW west of Houma. Detailed design of the GIWW West floodgate would be evaluated in supplemental NEPA documents, as critical design details (i.e., width of the floodgate) have not yet been determined and/or finalized.

Constructible features of the Proposed Action include construction of approximately 3.26 miles of the 7.16-mile Reach A levee alignment and would result in an unavoidable loss of 145.7 acres (72.47 AAHUs) of fresh marsh and 1.76 acres (0.55 AAHUs). Impacts from the constructible features of the Proposed Action would be mitigated in-kind and concurrent with construction in accordance with the Clean Water Act, Section 404(b)(1) and the Water Resources Development Act of 1986, Section 906, as amended, and as detailed in the Compensatory Mitigation Plan (Appendix E). Direct impacts to BLH from implementation of the Proposed Action would be offset through the purchase of mitigation bank credits. Direct impacts to fresh marsh would be offset through construction of fresh marsh at the Lake Salvador mitigation site. CEMVN shall complete Phase I cultural resources survey and applicable consultation following the procedures of 36 CFR § 800 for the programmatic features and mitigation features before construction begins on any of these features. All non-mitigation constructible features have been subjected to Phase I cultural resources survey.

Initiation of construction for Reach A is critical to closing this gap in the existing local levees in the near-term and would support future construction of the entire Reach A and MTG levee system. Future project design and analysis of potential impacts of the programmatic features for Reach A to include further levee, floodwall, and floodgate (GIWW-W and Minors Canal) designs would occur in future supplemental NEPA documents prior to construction.

This office has assessed the environmental impacts of the Proposed Action and has determined that the Proposed Action would have no significant adverse impact on the human and natural environment with implementation of the compensatory mitigation plan and the mitigation meeting its success criteria.

### 9.1 VIEW OF THE NON-FEDERAL SPONSOR

As non-Federal Sponsors (NFSs), the State of Louisiana, represented by CPRAB, and the Terrebonne Levee and Conservation District (TLCD) support and recognize the importance for hurricane and storm risk reduction in Terrebonne and Lafourche Parishes. The NFSs have invested over \$1 billion to progress construction of levees and structure on the MTG alignment and continues to support the MTG through completing in-kind work and real

estate actions as part of their non-Federal obligations for MTG. The TLCD recognized the urgency of the construction of Reach A levee by the signing of the “Declaration of a State of Emergency—Imminent Threat of Flooding Due to the Reach A Gap in the Morganza to the Gulf Flood Risk Reduction System” on 17 May 2023.

## SECTION 10

# List of Preparers

This DEA #598 and the associated draft FONSI were prepared by Sandra Stiles, Shelby Barrett, and Elizabeth Manuel, as well as the those listed in Table 10-1.

*Table 10-1. List of Preparers*

Title/Topic	Team Member
Project Manager	Ashely Bransom, Captain, US Army
Sr. Project Manager	Lacy Shaw
<b>ENVIRONMENTAL ASSESSMENT AND PLANNING</b>	
Sr. Environmental Manager, Team Lead	Sandra Stiles, CEMVN-PDS
Environmental Manager	Shelby Barrett, CEMVM-PDS-R
Plan Formulation	Elizabeth Manuel, CEMVN-PDP-W
Air Quality, HTRW	Joseph Musso, CEMVN-PDC-CEC
Aquatic, Fisheries and Essential Fish Habitat	Geoffrey Udoff, CEMVM-PDS-R
Coastal Resources (Coastal Zone Consistency)	Shelby Barrett, CEMVM-PDS-R
Cultural Resources	Paul Hughbanks, CEMVN-PDN-NCR
Environmental Justice	Andrew Perez, CEMVN-PDN-NCR Quanita Kendrick, CEMVN-PDN-NCR
Soils and Prime and Unique Farmlands	Jordan Logarbo, CEMVM-PDS-R
Navigation	Grace Wieland, CEMVN-PDE-R
Mitigation Planning	Elizabeth Manuel, CEMVN-PDF-W Elizabeth Behrens, CEMVN-PDS-C Elizabeth Jarrell, CEMVN-PDS-C Jordan Logarbo, CEMVN-PDS-R Wyatt Bagwell, CEMVN-PDN-CEP
Socioeconomics	Grace Wieland, CEMVN-PDE-R
Threatened and Endangered Species (BA)	Kristin Gunning, CEMVN-PDS Tammy Gilmore, CEMVN-PDS
Transportation	Grace Wieland, CEMVN-PDE-R
Tribal Liaison	Brian Ostahowski, CEMVN-PDN-NCR
Water Quality (Section 404(b)(1); 401)	David Day, CEMVN-PDC-CEC
Wetland Resources	Kristin Gunning, CEMVN-PDS-C
Wildlife Resources	Thomas Sevvick, CEMVM-PDS-R

	Wyatt Bagwell, CEMBN-PDS-C
<b>ENGINEERING</b>	
Engineering – H&H	Cameron Broussard, CEMVN-ED-H
Civil Engineering	Daniel Marsalone, CEMVN-ED
Lead Structural Engineering	Charles Brandstetter, CEMVN-ED
<b>REAL ESTATE</b>	
Real Estate Specialist	Stephanie Robins, CEMVN-REA
<b>TECHNICAL EDITOR</b>	
Tech Editor/Writer	Jennifer Darville, CEMVN-PD-QCA
Tech Editor/Writer	Amanda Jones, CEMVN-PD-QCA
<b>DISTRICT QUALITY CONTROL</b>	
District Quality Control Lead	Brandon Davis
NEPA Specialist	Josh Koontz

## SECTION 11

# References and Resources

- Coastal Protection and Restoration Authority of Louisiana. 2023. 2023: Louisiana's Comprehensive Master Plan for a Sustainable Coast.
- Conner, Wouldiam H. and John W. Day, Jr. 1976. American Journal of Botany. Vol. 63, No. 10 (Nov. – Dec. 1976), pp. 1354-1364.
- Chabreck, R.H. 1982. The effect of coastal alteration on marsh plants. pp. 92-98 In: D.F. Boesch ed., Conference on Coastal Erosion and Wetland Modification in Louisiana: Causes, Consequences, and Options. FWS/OBS-82/59. U.S. Fish and Wildlife Service, Washington, DC.
- Gulf of Mexico Fishery Management Council (GMFMC). 2016. Final Report 5-Year Review of Essential Fish Habitat Requirements. Including Review of Habitat Areas of Particular Concern and Adverse Effects of Fishing and Non-Fishing in the Fishery Management Plans of the Gulf of Mexico.
- Herke, W.H. 1995. Natural fisheries, marsh management, and mariculture: complexity and conflict in Louisiana. *Estuaries* 18:10-17.
- Herke, W.H. 1971. Use of natural, and semi-impounded, Louisiana tidal marshes as nurseries for fishes and crustaceans. Ph.D. Dissertation, Louisiana State University, Baton Rouge, LA.
- Hodges, J. D. 1997. Development and ecology of bottomland hardwood sites. *Forest Ecology and Management*, 90(2-3), 117-125. doi:10.1016/s0378-1127(96)03906-0
- Kiem, R.F., Dean, T.J., and Chambers, J.L., 2013. Flooding effects on stand development in cypress-tupelo. Proceedings, 15th Biennial Southern Silvicultural Research Conference: U.S. Dept. of Agriculture Forest Service General Technical Report SRS-175, p. 431-437.
- McDaniel, D.R. and G.J. Trahan. 2007. Soil Survey of Terrebonne Parish, Louisiana.
- United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with Louisiana Agricultural Experiment Station and Louisiana Soil and Water Conservation Committee.
- Matthews, S.D. 1984. Soil Survey of Lafourche Parish, Louisiana. U.S. Soil Conservation Service. Washington, DC.
- Natural Resources Conservation Service. 2011. Major Land Resource Areas in Louisiana. [www.mo15.nrcs.usda.gov/technical/mlra\\_la.html](http://www.mo15.nrcs.usda.gov/technical/mlra_la.html), accessed July 2011.

- National Marine Fisheries Service. 2022. Annual Commercial Landings Statistics. National Oceanic and Atmospheric Administration. United States Department of Commerce. Silver Spring, Maryland. Queried 8/31/23.  
[http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual\\_landings.html](http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html)
- Rogers, D.R., B.D. Rogers, J.A. deSilva, and V.L. Wright. 1997. Effectiveness of four industry designed bycatch reduction devices in Louisiana's inshore waters. *Fishery Bulletin* 95(3): 552-565.
- Rogers, D.R., B.D. Rogers, J.A. de Silva, and V.L. Wright. 1994. Evaluation of shrimp trawls designed to reduce bycatch in inshore waters of Louisiana. School of Forestry, Wildlife, and Fisheries, Louisiana State University Agricultural Center, Final Report submitted to NMFS, St. Petersburg, FL. NOAA Award No. NA17FF0375-01, 230 p. Available from LSU Library.
- Rogers, D.R., B.D. Rogers, and W.H. Herke. 1992. Effects of a marsh management plan on fishery communities in coastal Louisiana. *Wetlands* 12(1): 53-62.
- U.S. Army Corps of Engineers. 2010. Final Integrated Feasibility Study and Environmental Impact Statement for the Convey Atchafalaya River Water to Northern Terrebonne Marshes and Multipurpose Operation of Houma Navigation Lock Lafourche, Terrebonne, St. Mary Parish, Louisiana. New Orleans District.
- Shaffer, G. P., Wood, W. B., Hoepfner, S. S., Perkins, T. E., Zoller, J., & Kandalepas, D. 2009. Degradation of baldcypress–water tupelo swamp to marsh and open water in southeastern Louisiana, USA: an irreversible trajectory? *Journal of Coastal Research*, (10054), 152-165.
- Shaffer, G. P., Day, J. W., Kandalepas, D., Wood, W. B., Hunter, R. G., Lane, R. R., & Hillmann, E. R. (2016). Decline of the Maurepas Swamp, Pontchartrain Basin, Louisiana, and approaches to restoration. *Water*, 8(3), 101.
- U.S. Army Corps of Engineers. 2011. Barataria Basin Barrier Shoreline Restoration, Draft Construction Report and Draft Environmental Impact Statement. New Orleans District.
- U.S. Army Corps of Engineers. 2010. Final Integrated Feasibility Study and Environmental Impact Statement for the Convey Atchafalaya River Water to Northern Terrebonne Marshes and Multipurpose Operation of Houma Navigation Lock Lafourche, Terrebonne, St. Mary Parish, Louisiana. New Orleans District.
- Wakeley, J. S., & Roberts, T. H. (1996). Bird distributions and forest zonation in a bottomland hardwood wetland. *Wetlands*, 16(3), 296-308.
- Zoller, J. A. (2004). Seasonal differences in bird communities of a Louisiana swamp and manipulation of the breeding density of Prothonotary Warblers. Southeastern Louisiana University

## SECTION 12

# List of Acronyms and Abbreviations

AAHU	Average Annual Habitat Unit
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ACTT	Alabama-Coushatta Tribe of Texas
ADCIRC	Advanced Circulation Model
AEP	Annual Exceedance Probability
AMM	Alternatives Milestone Meeting
APE	Area of Potential Effects
AQCR	Air Quality Control Region
ASA(CW)	Assistant Secretary of the Army for Civil Works
ASCII	American Standard Code for Information Exchange
ASTM	American Society for Testing Materials
BBA	Bipartisan Budget Act
BCR	Benefit to Cost Ratio
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BLH	Bottomland Hardwood
CAA	Clean Air Act
CAR	Coordination Act Report
CDP	Census Designated Place
CEMVN	USACE New Orleans District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFS	Cubic Feet Per Second
CNO	Choctaw Nation of Oklahoma
CO	Carbon Monoxide
CPRA	Coastal Protection and Restoration Authority
CPRAB	Coastal Protection and Restoration Authority Board
CSRM	Coastal Storm Risk Management
CSRA	Cost Schedule Risk Analysis
CT	Coushatta Tribe of Louisiana
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DIFR	Draft Integrated Feasibility Report
EAD	Estimated Annual Damages
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement



EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
EQ	Environmental Quality
ER	Engineer Regulation
ESA	Endangered Species Act
FCSA	Federal Cost Share Agreement
FDR	Federal Discount Rate
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIFR	Final Integrated Feasibility Report
FLOAT	Flood Loss Outreach and Awareness Taskforce
FRM	Flood Risk Management
FWCA	Fish and Wildlife Coordination Act
FWCAR	Coordination Act Report
FWS	Fish and Wildlife Services
FWOP	Future With Out Project
GIS	Geographic Information System
GOMESA	Gulf of Mexico Energy Security Act
H&H	Hydraulics and Hydrology
HEC-FDA	The Flood Damage Reduction Analysis
HEC-RAS	Hydrologic Engineering Center- River Analysis System
HMGP	Hazard Mitigation Grant Program
HSDRR	Hurricane & Storm Damage Risk Reduction
HTRW	Hazardous, Toxic, and Radioactive Waste
HQUSACE	Headquarters United States Army Corps of Engineers
IER	Individual Environmental Report
IFR	Integrated Feasibility Report
IUCN	International Union for Conservation of Nature
JBCI	Jena Band of Choctaw Indians
LACPR	Louisiana Coastal Protection and Restoration
LADOTD	Louisiana Department of Transportation and Development
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDOA	Louisiana Division of Archaeology
LDRIPs	Long Term Disaster Recovery Investment Plans
LDWF	Louisiana Department of Wildlife and Fisheries
LERRD	Lands, Easements, Rights-of-way, Relocations and Disposal Areas
LIDAR	Light Detection and Ranging
LPP	Locally Preferred Plan
LSRA	Louisiana Scenic Rivers Act
LWCF	Land and Water Conservation Fund

LWFMP	Louisiana Statewide Comprehensive Water Based Floodplain
MAV	Mississippi Alluvial Valley
MBCI	Mississippi Band of Choctaw Indians
MBTA	Migratory Bird Treaty Act
MCACES	Micro-Computer Aided Cost Estimating System
MDAH	Mississippi Division of Archives and History
MSA	Metropolitan Statistical Area
MSC	Major Subordinate Command
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
MVD	Mississippi Valley Division
NAAQS	National Ambient Air Quality Standards
NAWMP	North American Waterfowl Management Plan
NB	Nature Based
NBEM	National Bald Eagle Management
NCDC	National Climatic Data Center
NED	National Economic Development
NEPA	National Environmental Policy Act
NFS	Non- Federal Sponsor
NGVD	National Geographic Vertical Datum
NHL	National Historic Landmarks
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NLAA	Not Likely to Adversely Affect
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHD	National Register of Historic District
NRHP	National Register of Historic Places
NS	Nonstructural
O&M	Operation and Maintenance
OCD	Office of Community of Development
OMRR&R	Operations, Maintenance, Repair, Rehabilitation, and Replacement
OSE	Other Social Effects
O3	Ozone
PA	Public Assistance
PA	Programmatic Agreement
Pb	Lead
PPA	Project Partnership Agreement
PBF	Physical Biological Features

P&G	Principles and Guidelines
PED	Pre-Construction Engineering and Design
PDT	Project Delivery Team
Phase 1 ESA	Phase 1 Environmental Site Assessment
PM	Particulate Matter
PMP	Project Management Plan
PPA	Project Partnership Agreement
PPT	Parts Per Thousand
RCRA	Resource Conservation and Recovery Sites
REC	Recognized Environmental Condition
RED	Regional Economic Development
REP	Real Estate Plan
ROD	Record of Decision
RMP	Risk Management Plan
ROE	Right of Entry
ROM	Rough Order of Magnitude
ROW	Right-of-Way
RPEDS	Regional Planning and Environment Division South
RSLC	Relative Sea Level Change
RSLR	Relative Sea Level Rise
S	Structural
SELA	Southeast Louisiana Urban Flood Control Project
SHPO	State Historic Preservation Officer
SLC	Sea Level Change
SMART	Specific Measurable Attainable Risk Informed Timely
SO <sub>2</sub>	Sulfur Dioxide
STLDCD	St. Tammany Levee, Drainage and Conservation District
STPG	St. Tammany Parish Government
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TBTL	Tunica-Biloxi Tribe of Louisiana
TCP	Traditional Cultural Property
TIF	Tag Image File Format
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSP	Tentatively Selected Plan
URA	Uniform Relocation Assistance Act
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
VRAP	Visual Resources Assessment Procedure

WBDHU12	U.S. Geological Survey Watershed Boundary Dataset Hydrologic Unit 12
WIIN	Water Infrastructure Improvement Act for the Nation
WSE	Water Surface Elevation
WMA	Wildlife Management Area
WQC	Water Quality Certification
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act
WVA	Wetland Value Assessment