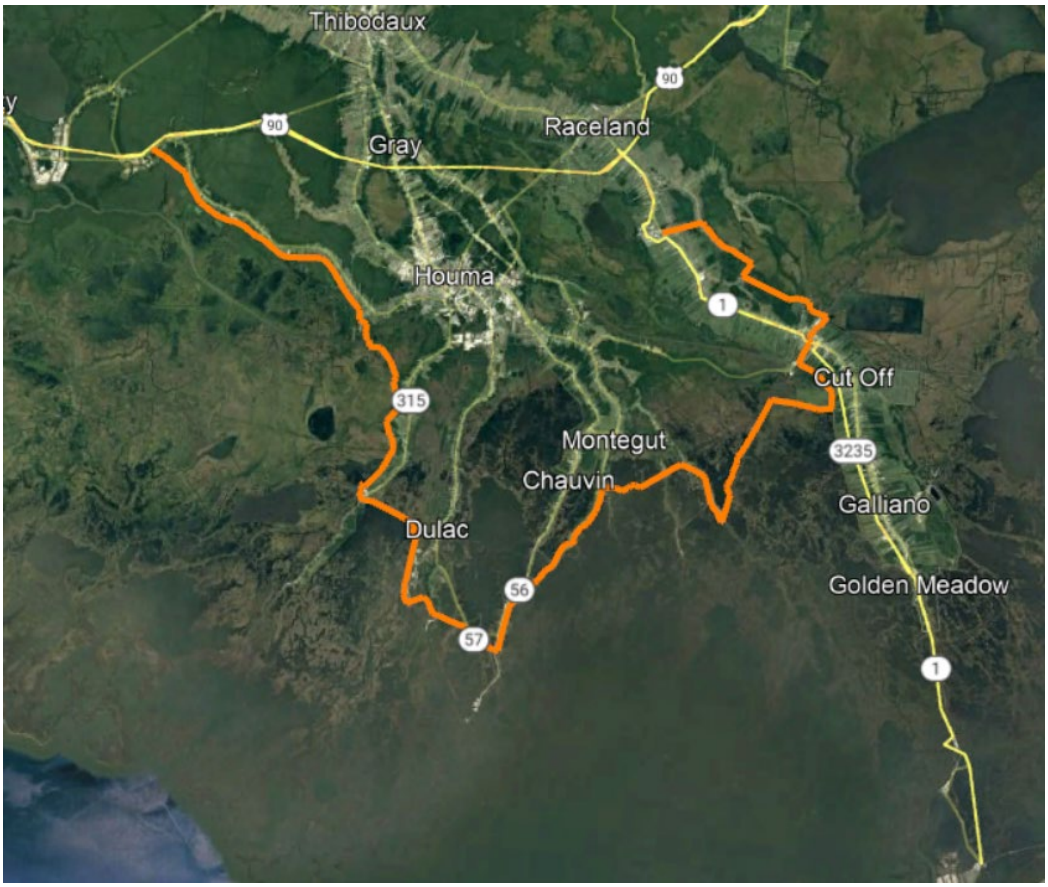
FINAL ENVIRONMENTAL ASSESSMENT

MORGANZA TO THE GULF PROJECT
SURVEYS AND BORINGS ANALYSIS
TERREBONNE AND LAFOURCHE PARISHES, LOUSIANA

EA # 597



APRIL 8, 2024

U.S. Army Corps of Engineers
Mississippi Valley Division
Regional Planning and Environment Division South
New Orleans District

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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 Environmental Assessment #597 (EA #597) titled "Morganza to the Gulf Project, Surveys and Borings Analysis" to evaluate the potential impacts from the proposed geotechnical investigations to include surveys, borings, and cone penetration tests (CPTs) necessary to investigate geophysical and environmental conditions over the Morganza to the Gulf (MTG), Louisiana Project, and includes most of Terrebonne Parish and a portion of Lafourche Parish. The data from these activities is necessary to facilitate the design of the levees and structural features, including but not limited to drainage structures and floodgates. To inform the design of the authorized project, the proposed geotechnical investigations would occur within the authorized alignment as well as in areas that are being considered as potential modifications to the authorized alignment.

Construction of the Morganza to the Gulf of Mexico, Louisiana, a hurricane and storm damage reduction project is authorized by Section 1001 (24) of the Water Resources Development Act of 2007, (WRDA 2007), Public Law (P.L.) 110-114, at a total cost of $886.7 million. In accordance with the Post Authorization Change Report and Revised Programmatic Environmental Impact Statement (PACR/RPEIS) dated 2013, the project was reauthorized by Section 7002(3) of the Water Resources Reform and Development Act of 2014 (WRRDA 2014). The project is designed to provide hurricane and storm damage reduction benefits while ensuring navigational passage and tidal exchange.

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. 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 is incorporated by reference.

EA #597 has been prepared in accordance with the National Environmental Policy Act of 1969, (NEPA), and the Council on Environmental Quality's (CEQ) Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation (ER) 200-2-2 (33 CFR §230). EA #597 provides sufficient information on the potential adverse and beneficial environmental effects to allow the USACE Commander of the New Orleans District CEMVN, to make an informed decision on the appropriateness of drafting an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

Study Area

The study area for the MTG project 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.

Project Name and Location

Project Name: Morganza to the Gulf, Surveys and Borings Analysis.

Project Location: The project is located approximately 60 miles southwest of New Orleans, Louisiana, and includes most of Terrebonne Parish and the portion of Lafourche Parish between the Terrebonne Parish eastern boundary and Bayou Lafourche.

The proposed surveys and borings will be in the following project locations: Gulf Intracoastal Waterway (GIWW) – East Floodgate; GIWW – East T-Wall and Levee; GIWW – West Floodgate; Reach A Levee – South of GIWW; Reach A Levee – North of GIWW; Minors Canal Floodgate; Shell Canal East Floodgate; Reach F Levee; Reach J2 Levee; Lockport to Larose (L2L) Reach 1.

Authority

The MTG Project was initially authorized for federal construction by Section 1001(24) of the WRDA of 2007, P.L. 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.

> *"(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 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) of the WRRDA of 2014, P.L. 113-121, in accordance with the Report of the Chief of Engineers dated 8 July 2013, at an updated total cost of $10.3 billion.

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
5. 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 Engineering Documentation Report (EDR) was developed to document the refinements to the MTG Project, including the adaptive design criteria that make up the current design. In addition, the EDR incorporated the increased nonfederal sponsor (NFS) construction cost share as proposed by the NFSs, 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.

Non-Federal Sponsors

Pursuant to the Project Partnership Agreement (PPA) that was executed on 28 December 2021, the 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).

Purpose and Need for the Proposed Action

The purpose of the overall MTG project is to provide hurricane and storm damage risk reduction for the communities located within the levee system. The project consists of the construction of 98 miles of levees, approximately 84 miles of which would overlay existing hydrologic barriers such as natural ridges, roadbeds, and existing levees (Figure 1, Appendix B). The features are described in the Final PACR/RPEIS dated May 2013. Some of the borings and surveys work would fall outside of the original project alignment proposed in the PACR.

Borings are needed to facilitate the design of project features such as levees, drainage structures, and floodgates. Surveys provide comprehensive topographic, hydraulic, and subterranean maps to define the project baseline alignments, create necessary cross sections of levees and channels, locate specific features, and identify any utilities within the project work area.

The Geotechnical Branch of USACE, or an approved contractor, would perform the soil borings and Cone Penetration Tests (CPTs), while USACE, or an approved contractor, would perform the survey work.

History of the MTG Project

The Morganza, Louisiana, to the Gulf of Mexico Reconnaissance Study was authorized by a resolution Docket 2376, and WRDA of 1996 (P.L. 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 (P.L. 103-316) authorized the Morganza, Louisiana, to the Gulf of Mexico feasibility study. The Act directed the USACE to give particular attention to the interrelationships of the various ongoing studies in the area and consider improvements for the Houma Navigation Canal (HNC).

Section 425 of WRDA of 96 (P.L. 104-303) required the USACE to develop a study of the HNC lock as an independent feature of the Morganza to the Gulf project. That study was completed in 1997.

In 1998, Congress authorized the USACE to initiate detailed design of the multipurpose lock in the HNC. The Pre-Construction, Engineering and Design (PED) phase on the HNC Lock Complex was initiated in advance of the PED phase for the Morganza to the Gulf of Mexico, Louisiana Project. The PED Agreement for the lock was signed on January 13, 2000.

The Morganza to the Gulf Feasibility Study and Final Programmatic Environmental Impact Statement (FPEIS) were completed in March 2002. The FPEIS was filed in the Federal Register on 2002 May 3, though a Record of Decision (ROD) was not signed.

In accordance with the 2002 and 2003 reports of the Chief of Engineers, the Morganza project is authorized as a feature of the Mississippi River and Tributaries (MR&T). Section 1001 of WRDA of 2007 (P.L. 110-114) authorized construction for the project however Congress had not appropriated any construction funds.

WRDA of 2007 authorized the Morganza to the Gulf of Mexico, Louisiana project for hurricane and storm damage risk reduction at a total cost of $886.7 million.

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 of 2014 authorized MTG Project at $10.3 billion in accordance with the Chief of Engineers Report dated 8 July 2013.

In 2021, an 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 1999) 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.

Prior Reports and NEPA Documents

In addition to the above referenced reports and the documents, the following prior reports and NEPA documents have been prepared in conjunction with this authorized project:

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.

1994 - USACE completed the Morganza to the Gulf reconnaissance report (USACE, 1994).

2002 - The Morganza to the Gulf feasibility study and PEIS were completed in March 2002. 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.

2003 - USACE issued a supplemental Chief of Engineers report (USACE, 2003), which made changes to the non-Federal sponsor's in-kind services.

EA #406 – Morganza to the Gulf Reach J1 Levee. Terrebonne Parish, Louisiana. FONSI: 29 July 2005

2013 - A PACR was completed and recommended an increase in the TPC to $10.3 billion and recommended that USACE take future action to pursue adaptive criteria to reduce costs. The PACR was approved by the Chief of Engineers on 8 July 2013.

EIS 13-01 - Mississippi River and Tributaries, Final Post Authorization Change Report and Revised Programmatic Environmental Impact Statement, Morganza to the Gulf of Mexico, ROD: 9 December 2013

EA #583 – Morganza to the Gulf, Humble Canal Pre-load constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site. FONSI: 3 April 2022

SEA #583A – 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: 21 December 2023.

Public Concerns

As expressed in previous NEPA documents, public concerns focus primarily on the importance of providing effective hurricane and storm damage risk reduction for

businesses and residences and the avoidance of induced flooding. Other concerns include potential adverse impacts to existing marshes, improvement of marsh habitat both inside and outside the levee system, maintaining or improving ingress and egress of marine organisms for the benefit of commercial fisheries, and avoiding adverse water quality impacts.

2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

The proposed action consists of conducting surveys and borings for the authorized MTG Project in the eleven locations identified in this EA. The data collected from the proposed action is necessary to investigate geophysical and environmental conditions along the MTG project to facilitate the design of the levees and structural features. Due to the purpose of the proposed action, only the No Action Alternative (Future without Project Action) was considered.

Design Criteria

In accordance with direction from the Assistant Secretary of the Army (Civil Works), USACE is applying the Hurricane and Storm Damage Risk Reduction System, (HSDRRS), guidelines to all hurricane levee system work in the New Orleans District, including the MTG PACR project. Lessons learned from Hurricane Katrina and other storms were incorporated into the HSDRRS design guidelines. These peer reviewed guidelines provide a comprehensive collection of best practices, and were developed to provide redundancy, resiliency, and robustness of the interfaces between structures, materials, and members of the public for the desired level of risk reduction.

Description of the 1% AEP Post-Authorization Project

The MTG post-authorization 1 percent (1%) annual exceedance probability (AEP), based on post-Katrina HSDRRS criteria, consists of 98 miles of grass-covered earthen levees tying into US 90 near the town of Gibson in Terrebonne Parish and Hwy 1 near Lockport, LA in Lafourche Parish. Levee elevations for base conditions range from 10.5- to 24-ft, and final levee elevations range from 15- to 26.5-ft with final levee widths from 282- to 725-ft.

Structures include a lock on the HNC, 22 floodgates on navigable waterways (3 on federally maintained navigation channels and 19 on other canals and bayous), 23 environmental water control structures, 9 road gates, and fronting protection for 4 existing pumping stations. Structures on federally maintained navigation channels include the HNC lock and floodgate (250-ft sector gate) and two floodgates on the GIWW (i.e., GIWW East, a 125-ft sector gate east of Bayou Lafourche, and GIWW West, a 125-ft sector gate west of Houma). Fourteen 56-ft sector gates and five 20- to 30-ft stop log gates are located on various waterways that cross the levee system. Levees would be covered in grass to increase resilience in the case of wave overtopping. All the transitions between levees and floodwalls would be armored with reinforced concrete scour protection.

Proposed Action

The proposed action consists of conducting surveys and borings along 11 locations of the authorized MTG Project. The locations include the following: GIWW – East Floodgate; GIWW – East T-Wall and Levee; GIWW – West Floodgate; Reach A Levee – South of GIWW; Reach A Levee – North of GIWW; Minors Canal Floodgate; Shell Canal East Floodgate; Reach F Levee; Reach J2 Levee; L2L Reach 1. Figures of the locations are provided in Appendix B. Implementation of the proposed action would take approximately 2 months at each location.

General to All Locations

2.1.1 Borings and Cone Penetration Tests

Borings and Cone Penetration Tests (CPTs) are needed to facilitate the design of the levees and accompanying structural features (i.e., drainage structures, floodgates, etc.). A CPT consists of using hydraulic pressure to push an approximate 1.5-inch (in) diameter, cone tipped rod into the ground. The CPTs would be performed to an approximate depth of between 80-feet (ft) and 125-ft below the ground surface using an electronic piezocone penetrometer with a 10-centimeter (cm), 2 cross-sectional area. The holes from this process would be approximately 1.50-in diameter with no material removal and would close on their own with no adverse impacts to the existing soil.

A soil boring is normally a 5-in diameter cylinder of soil (can be 3-in diameter for shallow borings for access road design) acquired by using an instrument called a Thin Wall Shelby Tube which is attached to a rotating shaft and functions like a drill but has a hollow center. The tube would be rotated into the ground 3-ft at a time and then retrieved and the undisturbed soil sample removed. All 5-in soil borings would be drilled to an approximate depth of between 80-ft and 180-ft below the existing ground surface with a rotary drill rig. The holes created by the borings would be backfilled with a Bentonite clay slurry to return the soil to its pre-drilled volume.

2.1.2 Surveys and Survey Methods

USACE, or a contractor for USACE, would perform the survey work on the proposed locations as presented below. The surveys are topographical and would include identifying the centerline of the levees and/or structures and then using established vertical (elevation) and horizontal datums along with high tech GPS enabled equipment to create 2D images with specific locations and shapes to be used by the contractors to design and build the flood risk reduction structures. Topographical surveys capture the features of the landscape and any nearby utilities.

Survey protocol would follow the guidelines of the least invasive method(s) necessary to complete the task. For the necessary survey points in any marsh areas, survey data would be collected from pre-determined transects within the work area and would be primarily accessed by foot or airboat. If the data cannot be obtained with either of these methods, the surveyors would use an 8-ft wide Marsh Master vehicle to reach the sites. More detailed descriptions of access routes are provided in the sections below.

Other Surveys - Other surveys include topographical surveys to locate features and utilities, define the project baseline alignment, and define Right of Way (ROW) extent; as well as those necessary to complete cross-sections, Hazardous, Toxic and Radioactive Waste (HTRW) assessments, cultural resource investigations, and environmental surveys. Small vehicles (such as all-terrain vehicles or similar small 4x4s), small boats, air boats, and marsh buggies would be allowed to operate within the approximately 600-ft ROW surrounding the clearing and grubbing corridor. Foot traffic would also be permitted. Cross-sectional surveys would occur at intervals between 50 and 300-ft.

Environmental surveys would include vegetative surveys, such as plant identification and measurements. HTRW assessments would include traversing the area to identify potential HTRW concerns. If any suspected HTRW concerns are noticed, soil and/or water samples may be taken. Environmental surveys and HTRW assessments would be performed by two- to four-person crews that would traverse the area.

2.1.3 Work Zones

Marine work zones would be confined to the Class 70 Elevating Boat. Marsh work zones would include the use of an airboat for surveys and would be confined to the track and footprint of the Cargo Buggy but may extend approximately 30-ft beyond the back of the Cargo Buggy, during drilling of soil borings. Work zones for the CPT rig mounted on the Cargo Buggy would be confined to the Cargo Buggy. For borings and CPTs, the Cargo Buggy would track as directly as possible from location to location, minimizing impact to existing marsh.

2.1.4 Equipment Tables

Survey Equipment

Table 3: Hydrographic and Topographic Survey Equipment

MARINE AND MARSH EQUIPMENT	TRACK	LENGTH	WIDTH	ESTIMATED WEIGHT / DRAFT	SELF-PROPELLED	TRACK WIDTH	COMMENTS
Airboat	-	20’	9’	7,800 lbs /0”	Y	-	Will ferry crew for marsh locations
Marsh Master II	Y	18’	8’	12,000 lbs /18”	Y	24”	Will ferry crew for marsh locations or haul water for explorations

Borings Equipment

Table 4: Geotechnical Exploration Equipment (General)

RIG MAKE	TRUCK MOUNT	TRACK	LENGTH	WIDTH	HEIGHT	EST WEIGHT	TRACK SPEED	TRACK WIDTH	DESCRIPTION
CME 55	Y	-	30’ 9”	8’ 6”	12’ 6”	33,000 lbs	-	-	Truck mounted drill rig mounted on elevating boat for marine explorations and Cargo Buggy for the marsh
Vertek CPT	-	Y	17’ 10”	8’ 5”	10’	30,000 lbs	2 mph	27.5”	Mounted on Cargo Buggy for marsh explorations

Table 5: Geotechnical Exploration Equipment (Support)

MARINE AND MARSH EQUIPMENT	TRACK	LENGTH	WIDTH	HEIGHT	ESTIMATED WEIGHT / DRAFT	TRACK WIDTH	COMMENTS
Cargo Buggy	Y	34’	19’	12’	72,000 lbs /4’	5’	Unit can float and track- Drilling rig and CPT rig will be mounted on cargo buggy
Airboat	-	20’	9’	-	7,800 lbs /0”	-	Will ferry crew for marsh locations
Crew Boat	-	29’	8’	-	18”	-	Will ferry crew to and from elevating boat
Class 70 Elevating Boat	-	65’	24’	-	4’	-	Marine based explorations

Proposed Action Locations

2.1.5 GIWW East Floodgate

The GIWW East Floodgate project area is located at Mile 33.6 of the GIWW, between the Mississippi River and the Gulf of Mexico, in Lafourche Parish, Louisiana. This project feature consists of a 125-ft sector gate, six (6) 16-ft sluice gates, and tie-in levees on the north and south sides of the GIWW. The nearest town of Larose is approximately 0.1 miles southeast of the project area.

2.1.5.1 Surveys

The surveys would be conducted within the work zone(s) outlined in Figures 2 and 3, Appendix B. Red lines perpendicular to the centerline of the T-Walls indicate cross section transects that measure between 1,100-ft and 660-ft long by 8-ft wide and are placed at 50-ft increments. The access route is identified by the blue line.

The Contractor would be responsible for ensuring that all personnel and work equipment remain within the designated work zone(s).

2.1.5.2 Borings

Three (3) soil borings and three (3) CPTs would be taken at the approximate locations shown on the below figures. All soil borings are located withing the PACR alignment. One (1) boring and one (1) CPT would be performed with a drill or CPT mounted Cargo Buggy and two (2) borings and two (2) CPTs would be performed with a drill mounted elevating boat in the waterway. The proposed exploration locations and depths are shown in Table 4. The Contractor would be responsible for ensuring that all personnel and work equipment remain within the designated work zone(s) (Figures 4 and 5, Appendix B).

2.1.5.3 Access Routes

The survey work zone would be accessed from the GIWW. Equipment would launch from a commercial dock in the Houma/Berwick area and float along the GIWW to the project

site. Other equipment consisting of a crew boat and airboat would launch from public launch at the corner of Mercer Rd. and Hwy 657, about ¾ mile south of the project site. From there, the surveyors would proceed within the specified work zone by foot, airboat, or Marsh Master to complete the work.

For the soil borings, the Cargo Buggy and Elevating Boat would launch from a commercial dock in the Houma/Berwick area. The specific dock would depend on where marsh/marine equipment is available and rented. The equipment would float along the GIWW to the project site. Other equipment consisting of a crew boat and airboat would launch from a public launch at the corner of Mercer Rd. and Hwy 657, about ¾ mile south of the project site.

Table 6: GIWW East Floodgate – Boring and CPT Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGWE-22-01C	CPT	29° 35' 29.96" N	90° 22' 17.28" W	200
MTGWE-22-02U	5-in.	29° 35' 30.22" N	90° 22' 14.00" W	200
MTGWE-22-03C	CPT	29° 35' 28.16" N	90° 22' 15.39" W	200
MTGWE-22-04C	CPT	29° 35' 28.66" N	90° 22' 11.36" W	200
MTGWE-22-05U	5-in.	29° 35' 26.72" N	90° 22' 12.72" W	200
MTGWE-22-06U	5-in.	29° 35' 25.84" N	90° 22' 08.56" W	200

2.1.6 GIWW East T-Wall and Levee Alignment

The GIWW East T-Wall and Levee Alignment project area is located at Mile 33.6 of the GIWW, approximately 1.5 miles north of the intersection of the GIWW and Bayou Lafourche, Louisiana. The nearest town of Larose is approximately 0.1 miles southeast of the project area.

2.1.6.1 Survey

The surveys would be conducted within the work zone(s) shown in Figures 6, 7, and 8, Appendix B. Red lines perpendicular to the centerline of the T-Walls indicate cross section transects of 8-ft wide by varying lengths and are placed at 50-ft to 100-ft increments. The access route is identified by the blue line. The Contractor would be responsible for ensuring that all personnel and work equipment remain within the designated work zone(s).

2.1.6.2 Borings

Seven (7) soil borings and six (6) CPTs would be taken at the approximate locations shown on the below figures. Marsh explorations would be performed with boring and CPT rigs mounted on a Cargo Buggy. Marine explorations would be performed with boring and CPT equipment mounted on an elevating boat. Land explorations would be performed with boring equipment mounted on a truck or a track driven CPT rig. The proposed exploration locations and depths are shown in Table 5. The Contractor would be

responsible for ensuring that all personnel and work equipment remain within the designated work zone(s) (Figures 9 and 10, Appendix B).

2.1.6.3 Access Routes

The survey work zone would be accessed from the GIWW and East 3rd Street as shown with the light blue line on Figures 11 through 15, Appendix B. The airboat would launch from the public launch at the corner of Mercer Rd. and Hwy 657, about ¾ mile south of the project site. From there, the surveyors would proceed within the specified work zone by foot, airboat, or Marsh Master to complete their work.

Soil boring equipment would launch from a commercial dock in the Houma/Berwick area and float along the GIWW to the project site or be driven to the site by truck along East 3rd Street.

Table 7: GIWW East Floodgate– Proposed Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGWE-22-07C	CPT	29° 35' 23.41" N	90° 22' 03.63" W	80
MTGWE-22-08U	5-in.	29° 35' 21.93" N	90° 21' 58.18" W	80
MTGWE-22-09C	CPT	29° 35' 20.45" N	90° 21' 52.78" W	80
MTGWE-22-10UV	5-in.	29° 35' 20.32" N	90° 21' 52.84" W	80
MTGWE-22-11U	5-in.	29° 35' 17.77" N	90° 21' 50.59" W	80
MTGWE-22-12C	CPT	29° 35' 14.84" N	90° 21' 52.61" W	80
MTGWE-22-13U	5-in.	29° 35' 11.45" N	90° 21' 54.76" W	200
MTGWE-22-14C	CPT	29° 35' 11.79" N	90° 21' 59.68" W	200
MTGWE-22-15U	5-in.	29° 35' 13.19" N	90° 22' 05.10" W	200
MTGWE-22-16C	CPT	29° 35' 14.79" N	90° 22' 10.44" W	200
MTGWE-22-17U	5-in.	29° 35' 14.51" N	90° 22' 14.64" W	200
MTGWE-22-18C	CPT	29° 35' 10.56" N	90° 22' 16.10" W	200
MTGWE-22-19UV	5-in.	29° 35' 10.51" N	90° 22' 16.20" W	200

2.1.7 GIWW West Floodgate

The GIWW West Floodgate project area is located near Mile 66.0 of the GIWW, between the Mississippi and Atchafalaya Rivers, within Terrebonne Parish, and is approximately 5 miles southwest of the city of Houma, Louisiana. This project consists of a 225-ft sector gate, and levee tie-ins on the north and south sides of the GIWW.

2.1.7.1 Survey

The surveys would be conducted within the work zone(s) shown in Figures 11 and 12, Appendix B. Red lines perpendicular to the centerline of the T-Walls indicate cross section transects that measure between 1,700-ft and 1,500-ft long by 8-ft wide and are placed at 50-ft to 100-ft increments. The Contractor would be responsible for ensuring that all personnel and work equipment remain within the designated work zone(s).

2.1.7.2 Borings

Most of the borings required for this project already exist, but additional borings are needed in the GIWW waterway near the end of the proposed dolphin structure at the NW corner of the floodgate. The boring location is indicated in Figure 13, Appendix B and listed in Table 6.

2.1.7.3 Access Routes

The crew boat, airboat, and the Marsh Master vehicle would launch from Amelia, LA. The Marsh Master would be carried to the site using a twin-engine outboard support boat. For the soil boring, the elevating boat would also launch from a marina in Amelia, LA.

Table 8: GIWW West Floodgate– Proposed Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGWW-23-04U	5-in	29° 32' 09.28" N	90° 47' 37.37" W	200

2.1.8 Reach A Levee - South of GIWW

The Reach A Levee – South of the GIWW project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and is positioned on a North-South path between the GIWW and Theriot, Louisiana.

2.1.8.1 Surveys

Ongoing and future surveys would be conducted within the work zone(s) outlined in Figures 14, 15, and 16, Appendix B. A portion of Reach A begins at the tie-in to the floodgate on the GIWW. Survey transects extend 300-ft from each centerline (depicted in green) and occur every 200-ft. The access route is identified by the blue line.

2.1.8.2 Borings

Thirty-four (34) soil borings and twenty-eight (28) CPTs would be taken at the approximate locations shown in Figures 17 and 18, Appendix B. All soil borings are located along the proposed levee centerline and occur every 500-ft, with some slight modifications for difficult terrain. The coordinates and depths of the proposed exploration locations are shown in Table 7.

2.1.8.3 Access Routes

The Geotechnical and survey crews would stage their equipment on a private road off Bayou Dularge Rd, approximately one mile northwest of Theriot, Louisiana. (Figure 16, Appendix B) From that staging area, the crews would survey and perform soil boings on the proposed levee centerline on a northeast track for approximately one mile and then follow the levee centerline on a mostly northwest track to complete the surveys and soil borings along the PACR levee alignment. When completed, crews would backtrack along same route.

Table 9: Reach A Levee - South of GIWW - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGA-23-019U	5-in.	29° 31' 59.13" N	90° 47' 34.27" W	80
MTGA-23-019C-V	CPT	29° 31' 59.13" N	90° 47' 34.27" W	80
MTGA-23-020U	5-in.	29° 31' 56.59" N	90° 47' 31.46" W	80
MTGA-23-021C	CPT	29° 31' 56.65" N	90° 47' 25.80" W	80
MTGA-23-022U	5-in.	29° 31' 56.71" N	90° 47' 20.14" W	80
MTGA-23-023C	CPT	29° 31' 56.77" N	90° 47' 14.48" W	80
MTGA-23-024U	5-in.	29° 31' 56.83" N	90° 47' 08.82" W	80
MTGA-23-025C	CPT	29° 31' 56.91" N	90° 47' 01.06" W	80
MTGA-23-026U	5-in.	29° 31' 56.98" N	90° 46' 56.30" W	80
MTGA-23-027C	CPT	29° 31' 55.76" N	90° 46' 52.50" W	80
MTGA-23-028U	5-in.	29° 31' 51.99" N	90° 46' 48.83" W	80
MTGA-23-029U	5-in.	29° 31' 48.22" N	90° 46' 45.16" W	80
MTGA-23-029C-V	CPT	29° 31' 48.22" N	90° 46' 45.16" W	80
MTGA-23-030U	5-in.	29° 31' 44.45" N	90° 46' 41.49" W	80
MTGA-23-031C	CPT	29° 31' 33.15" N	90° 46' 30.48" W	80
MTGA-23-032U	5-in.	29° 31' 29.38" N	90° 46' 26.81" W	80
MTGA-23-033U	5-in.	29° 28' 22.23" N	90° 46' 07.95" W	80
MTGA-23-034C	CPT	29° 28' 25.44" N	90° 46' 03.64" W	80
MTGA-23-035U	5-in.	29° 28' 28.94" N	90° 45' 59.66" W	80
MTGA-23-036C	CPT	29° 28' 32.70" N	90° 45' 55.99" W	80
MTGA-23-037U	5-in.	29° 28' 36.92" N	90° 45' 53.23" W	80
MTGA-23-038C	CPT	29° 28' 40.99" N	90° 45' 50.77" W	80
MTGA-23-039U	5-in.	29° 28' 45.56" N	90° 45' 51.17" W	80
MTGA-23-040C	CPT	29° 28' 49.79" N	90° 45' 49.42" W	80
MTGA-23-041U	5-in.	29° 28' 53.58" N	90° 45' 46.00" W	80
MTGA-23-042U	5-in.	29° 28' 58.33" N	90° 45' 41.72" W	80
MTGA-23-042CV	CPT	29° 28' 58.33" N	90° 45' 41.72" W	80
MTGA-23-043U	5-in.	29° 29' 02.22" N	90° 45' 38.21" W	80
MTGA-23-044C	CPT	29° 29' 06.61" N	90° 45' 35.92" W	80
MTGA-23-045U	5-in.	29° 29' 11.47" N	90° 45' 34.85" W	80
MTGA-23-046C	CPT	29° 29' 16.18" N	90° 45' 36.24" W	80
MTGA-23-047U	5-in.	29° 29' 20.86" N	90° 45' 38.08" W	80
MTGA-23-048C	CPT	29° 29' 25.54" N	90° 45' 39.93" W	80
MTGA-23-049U	5-in.	29° 29' 30.21" N	90° 45' 41.78" W	80
MTGA-23-050C	CPT	29° 29' 34.89" N	90° 45' 43.62" W	80
MTGA-23-051U	5-in.	29° 29' 39.57" N	90° 45' 45.47" W	80

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGA-23-052U	5-in.	29° 29' 44.25" N	90° 45' 47.32" W	80
MTGA-23-052CV	CPT	29° 29' 44.25" N	90° 45' 47.32" W	80
MTGA-23-053U	5-in.	29° 29' 48.93" N	90° 45' 49.16" W	80
MTGA-23-054C	CPT	29° 29' 53.61" N	90° 45' 51.01" W	80
MTGA-23-055U	5-in.	29° 29' 58.29" N	90° 45' 52.86" W	80
MTGA-23-056C	CPT	29° 30' 02.97" N	90° 45' 54.70" W	80
MTGA-23-057U	5-in.	29° 30' 07.64" N	90° 45' 56.55" W	80
MTGA-23-058C	CPT	29° 30' 12.32" N	90° 45' 58.40" W	80
MTGA-23-059U	5-in.	29° 30' 17.00" N	90° 46' 00.24" W	80
MTGA-23-060C	CPT	29° 30' 21.67" N	90° 46' 02.11" W	80
MTGA-23-061U	5-in.	29° 30' 26.18" N	90° 46' 04.45" W	80
MTGA-23-062U	5-in.	29° 30' 30.69" N	90° 46' 06.78" W	80
MTGA-23-062CV	CPT	29° 30' 30.69" N	90° 46' 06.78" W	80
MTGA-23-063U	5-in.	29° 30' 35.35" N	90° 46' 06.86" W	80
MTGA-23-064C	CPT	29° 30' 40.12" N	90° 46' 05.33" W	80
MTGA-23-065U	5-in.	29° 30' 44.88" N	90° 46' 03.81" W	80
MTGA-23-066C	CPT	29° 30' 49.65" N	90° 46' 02.28" W	80
MTGA-23-067U	5-in.	29° 30' 54.22" N	90° 46' 03.42" W	80
MTGA-23-068C	CPT	29° 30' 58.68" N	90° 46' 05.86" W	80
MTGA-23-069U	5-in.	29° 31' 03.15" N	90° 46' 08.29" W	80
MTGA-23-070C	CPT	29° 31' 07.62" N	90° 46' 10.73" W	80
MTGA-23-071U	5-in.	29° 31' 12.09" N	90° 46' 13.16" W	80
MTGA-23-072U	5-in.	29° 31' 16.55" N	90° 46' 15.60" W	80
MTGA-23-072CV	CPT	29° 31' 16.55" N	90° 46' 15.60" W	80
MTGA-23-073U	5-in.	29° 31' 20.79" N	90° 46' 18.44" W	80
MTGA-23-074C	CPT	29° 31' 25.33" N	90° 46' 22.87" W	80

2.1.9 Reach A Levee - North of GIWW

The Reach A Levee – North of the GIWW project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and is positioned on a North-South path between the GIWW and Bayou Black, Louisiana.

2.1.9.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figures 19 and 20, Appendix B. Survey work is indicated by the area outlined in red. Transects extend approximately 300-ft on either side of the centerline and are spaced at 200-ft intervals. Access routes are identified by the blue lines. Survey access would be performed by foot or by airboat if possible. If necessary, an 8-ft wide Marsh Master would be used to access the survey locations.

2.1.9.2 Borings

Twelve (12) soil borings and eleven (11) CPTs would be taken at the approximate locations shown in Figure 21, Appendix B. All soil boring sites are located within the current levee footprint and would not extend outside the toe of the existing levee. The proposed exploration locations and depths are shown below in Table 8.

Table 10: Reach A Levee - North of GIWW - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGA-23-001C	CPT	29°33'40.40"N	90°48'45.72"W	80
MTGA-23-002U	5-in.	29°33'35.98"N	90°48'43.74"W	80
MTGA-23-003C	CPT	29°33'31.06"N	90°48'43.46"W	80
MTGA-23-004U	5-in.	29°33'27.18"N	90°48'40.62"W	80
MTGA-23-005C	CPT	29°33'22.39"N	90°48'39.34"W	80
MTGA-23-006U	5-in.	29°33'17.51"N	90°48'39.55"W	80
MTGA-23-007C	CPT	29°33'12.66"N	90°48'38.41"W	80
MTGA-23-008U	5-in.	29°33'7.81"N	90°48'37.28"W	80
MTGA-23-009CV	CPT	29°33'2.91"N	90°48'36.49"W	80
MTGA-23-009U	5-in.	29°33'2.91"N	90°48'36.49"W	80
MTGA-23-010U	5-in.	29°32'58.01"N	90°48'35.72"W	80
MTGA-23-011C	CPT	29°32'53.15"N	90°48'34.71"W	80
MTGA-23-012U	5-in.	29°32'48.57"N	90°48'35.03"W	80
MTGA-23-013C	CPT	29°32'45.29"N	90°48'35.53"W	80
MTGA-23-014U	5-in.	29°32'40.49"N	90°48'34.39"W	80
MTGA-23-015C	CPT	29°32'35.58"N	90°48'33.75"W	80
MTGA-23-016U	5-in.	29°32'30.64"N	90°48'33.34"W	80
MTGA-23-017C	CPT	29°32'25.69"N	90°48'33.26"W	80
MTGA-23-018U	5-in.	29°32'20.74"N	90°48'33.26"W	80

2.1.9.3 Access Routes

Survey and boring crews would access the areas west of Minors Canal by way of Sportsman's Court off Highway 182. Survey crews would traverse by foot or airboat while the boring crew would use a boring rig mounted on a Cargo Buggy to access the sites. Intrusion into the marsh on the west side of the Canal would be very minimal. The survey and borings on the east side of the Canal would require the crews to follow Rue De La Manson off Highway 182 until it dead ends. From there, the survey crews would use an airboat. Boring crews would "float in" a Cargo Buggy with the boring rig mounted on it and an excavator to access the work zone from the waterway, avoiding a long trek across the marsh.

2.1.10 Minors Canal Floodgate

The Minors Canal Floodgate project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and is positioned along the Minors Canal approximately 1.0 mile north of the intersection with

the navigable GIWW near mile marker 66.0 and just north of the Mandalay National Wildlife Refuge. The town of Houma, Louisiana is approximately 4 miles northeast of the project area.

2.1.10.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figures 22 and 23, Appendix B. Transects extend 180-ft from the PACR Alignment base (shown as a green line) at 50-ft increments. Work zones would be accessed from existing roads, across agricultural land, and navigable waterways shown by the blue lines.

2.1.10.2 Borings

Six (6) 5-in soil borings, five (5) 3-in soil borings, and two (2) CPTs would be taken at the site of the barge floodgate and tie-in levee walls. Four (4) of the 5-in soil borings would be performed with marsh equipment. The two (2) remaining 5-in soil borings and both CPTs would be performed with a rotary drill rig mounted on a shallow draft elevation boat in the waterway.

The five (5) 3-in soil borings would be performed along the PACR alignment from the floodgate location to the nearest existing roadway to provide the geotechnical data necessary to construct an access road to the floodgate. Three (3) of these 3-in soil borings would be performed from marsh equipment. The two (2) remaining 3-in soil borings are in agricultural land and can be accessed by a truck boring rig. The boring locations are shown in Figures 24 and 25, Appendix B and the coordinates are listed in Table 9.

Table 11: Minors Canal – Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
M-1G	3-in.	29°33’5.43” N	90°48’8.07” W	6
M-2G	3-in.	29°33’5.40” N	90°48’4.47” W	6
M-3G	3-in.	29°33’5.41” N	90°48’1.52” W	6
M-4G	3-in.	29°33’5.42” N	90°47’59.24” W	6
M-5G	3-in.	29°33’5.39” N	90°47’57.12” W	6
M-6U	5-in.	29°33’5.25” N	90°47’54.85” W	150
M-7U	5-in.	29°33’4.75” N	90°47’53.24” W	150
M-8U	5-in.	29°33’4.93” N	90°47’52.01” W	150
M-8C	CPT	29°33’4.93” N	90°47’52.01” W	150
M-9U	5-in.	29°33’4.20” N	90°47’51.68” W	180
M-10C	CPT	29°33’3.54” N	90°47’51.54” W	150
M-11U	5-in.	29°33’3.61” N	90°47’49.65” W	150
M-12U	5-in.	29°33’3.07” N	90°47’47.73” W	150

2.1.10.3 Access Routes

The work zone(s) can be accessed from Hwy 182, approximately 4 miles west of Houma, LA. From Hwy 182, take Sportsman's Court south for approximately ¾ mile to access the west side of the site. For access to the east side of the site, take Rue De La Manson south for approximately ½ mile to the dead end at the marsh area. From there, the site is approximately 1,800 ft through the marsh. The survey crew would access the site on foot and with an airboat.

To perform the borings work, the Boring rig and the Cone Penetrometer rig would be loaded onto marine equipment and floated to the site. The Boring drill rig would be loaded onto an elevating boat at the Shallow Draft Elevating Boat Inc. dock in Braithwaite, Louisiana, (1035 LA-39, Braithwaite, LA 70040). From there, they would be pushed to the site via the GIWW and Minors Canal. The Cone rig would be loaded onto a Cargo Buggy and would launch from Amelia, LA (10671 LA-182 Frontage, Morgan City, Louisiana 70380) and be towed to the site via the GIWW and Minors Canal. The Cargo Buggy would enter the marsh area from the canal and proceed straight to the boring sites and return along the same track.

2.1.11 Minors Canal Floodgate (Alternate Alignment)

The Minors Canal Floodgate (Alternate Alignment) project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and is positioned across Minors Canal at the intersection with the GIWW near waterway mile marker 66.0 and just north of the Mandalay National Wildlife Refuge. The town of Houma, Louisiana is approximately 4 miles northeast of the project area.

2.1.11.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figure 26, Appendix B. Surveys would be performed on foot, or using an airboat along the transects (red lines). The transects extend 300-ft from the project centerline and are spaced at 200-ft intervals. For water access, an airboat would launch in Houma and travel the navigable waterway to the site (blue line).

2.1.11.2 Borings

Four (4) 5-in diameter soil borings and four (4) CPTs would be performed at the site location of the barge floodgate and tie-in levee walls. Seven (7) of the soil borings would be performed with marsh equipment. The remaining soil boring would be performed with a rotary drill rig on top of a shallow draft elevation boat in the waterway. The borings project area is shown in Figure 27, Appendix B. Table 10 lists the latitude and longitude of each boring location.

2.1.11.3 Access Routes

The work zone(s) can only be accessed from the GIWW, and all personnel and equipment would need to be brought in by way of boat or barge.

Table 12: Minors Canal (Alternate Alignment) - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
MTGA-23-022U	5-in.	29°32'10.96" N	90°48'23.04" W	150
MTGA-23-023C	CPT	29°32'12.42" N	90°48'17.46" W	150
MTGA-23-024U	5-in.	29°32'13.35" N	90°48'11.82" W	150
MTGA-23-025C	CPT	29°32'14.15" N	90°48'06.20" W	150
MTGA-23-026U	5-in.	29°32'14.19" N	90°48'00.54" W	150
MTGA-23-027C	CPT	29°32'13.51" N	90°47'54.84" W	150
MTG-Minors-1 Alt.	5-in.	29°32'13.06" N	90°47'48.81" W	150
MTGA-23-017C	CPT	29°32'12.61" N	90°47'43.77" W	150

2.1.12 Shell Canal East Floodgate

The Shell Canal East Floodgate project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and the structure would be positioned in the canal between Shell Oil Pipeline Company and Empire Midstream approximately five miles southeast of Gibson, Louisiana.

2.1.12.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figures 28 and 29 Appendix B. Crews would attempt to perform surveys on foot and using an airboat across the marsh. If these methods prove unsuccessful, the crews would utilize a Marsh Master II for access. The Contractor would ensure that all personnel and work equipment are remain in the designated work zone(s).

2.1.12.2 Borings

Ten (10) 5-in soil borings and three (3) CPTs would be taken at the location of the barge floodgate. Five (5) of the borings would be performed on dry land, three (3) from a rig mounted on an elevating boat in the waterway, and five (5) in the marsh area. The proposed exploration locations and access paths are shown in Figure 30, Appendix B. The proposed exploration locations and depths are identified in Table 11.

2.1.12.3 Access Routes

The crew boat/air boat would launch from Bob's Bayou Black Marina located at 164 Marina Drive in Gibson, Louisiana 70356 and traverse the Shell Canal to access the Shell site. The elevating boat and cargo buggy would launch from EBI Liftboats LLC's facility in Houma, Louisiana on the Intracoastal Waterway and travel west via the Shell Canal to access the Shell site.

Table 13: Shell Canal East - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
S-1U	5-in.	29°37'33.52" N	90°56'01.53" W	125
S-2U	5-in.	29°37'31.87" N	90°55'59.40" W	125
S-2C	CPT	29°37'31.87" N	90°55'59.40" W	125
S-3U	5-in.	29°37'32.39" N	90°55'57.76" W	150
S-4U	5-in.	29°37'31.61" N	90°55'57.09" W	180
S-5U	5-in.	29°37'30.58" N	90°55'56.48" W	150
S-6U	5-in.	29°37'31.65" N	90°55'54.75" W	125
S-7U	5-in.	29°37'31.60" N	90°55'52.24" W	125
S-8U	5-in.	29°37'27.92" N	90°55'52.25" W	125
S-8C	CPT	29°37'27.07" N	90°55'51.01" W	125
S-9U	5-in.	29°37'26.24" N	90°55'46.77" W	80
S-9C	CPT	29°37'25.68" N	90°55'40.87" W	100
S-10U	5-in.	29°37'23.55" N	90°55'35.48" W	125

2.1.13 Reach F Levee

The Reach F Levee project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins. The project levee is approximately four miles long and is situated on a north-south track along the Houma Navigation Channel beginning at Falgout Canal Road on the north end. The city of Houma, Louisiana is approximately 12 miles to the north.

2.1.13.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figure 31, Appendix B. The north end of Reach F is accessible via the Falgout Canal Road and the south section is accessible by boat from T-Irv's Marina. There are no encroachments into marsh area, however the contractor would ensure that all personnel and work equipment remain in the designated work zone(s).

2.1.13.2 Borings

Thirty (30) soil borings and thirty-one (31) CPTs would be taken at the approximate locations shown in the Figures below. All soil boring sites are located within the current non-federal sponsor (NFS) constructed levee footprint and would not extend outside the toe of the existing levee. The proposed exploration locations and depths are shown below in Figures 32, 33, and 34, Appendix B and listed in Table 11.

Table 14: Reach F Levee - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
B-1U	5-in.	29°22'59.77"N	90°43'52.50"W	80
CPT-1	CPT	29°22'57.43"N	90°43'55.20"W	80
CPT-2	CPT	29°22'55.21"N	90°43'53.53"W	80
B-2U	5-in.	29°22'49.99"N	90°43'54.05"W	80
B-3U	5-in.	29°22'47.51"N	90°43'56.25"W	80
CPT-3	CPT	29°22'45.05"N	90°43'54.26"W	80
B-4U	5-in.	29°22'40.41"N	90°43'55.86"W	80
CPT-4	CPT	29°22'39.29"N	90°43'58.73"W	80
CPT-5	CPT	29°22'35.74"N	90°43'57.69"W	80
B-5U	5-in.	29°22'30.85"N	90°43'58.52"W	80
B-6U	5-in.	29°22'29.12"N	90°44'1.13"W	80
CPT-6	CPT	29°22'25.91"N	90°43'59.29"W	80
B-7U	5-in.	29°22'21.01"N	90°43'59.54"W	80
CPT-7	CPT	29°22'18.46"N	90°44'1.86"W	80
CPT-8	CPT	29°22'16.05"N	90°43'59.84"W	80
B-8U	5-in.	29°22'11.14"N	90°44'0.24"W	80
B-9U	5-in.	29°22'8.55"N	90°44'2.48"W	80
CPT-9	CPT	29°22'6.20"N	90°44'0.53"W	80
B-10U	5-in.	29°22'1.28"N	90°44'0.82"W	80
CPT-10	CPT	29°21'59.22"N	90°44'3.04"W	80
CPT-11	CPT	29°21'56.32"N	90°44'1.27"W	80
B-11U	5-in.	29°21'51.46"N	90°44'1.96"W	80
CPT-12	CPT	29°21'49.23"N	90°44'4.55"W	80
CPT-13	CPT	29°21'46.51"N	90°44'2.86"W	80
B-12U	5-in.	29°21'41.61"N	90°44'3.81"W	80
B-13U	5-in.	29°21'39.77"N	90°44'6.61"W	80
CPT-14	CPT	29°21'36.85"N	90°44'5.33"W	80
B-14U	5-in.	29°21'32.07"N	90°44'6.67"W	80
CPT-15	CPT	29°21'30.14"N	90°44'9.66"W	80
CPT-16	CPT	29°21'27.26"N	90°44'8.14"W	80
B-15U	5-in.	29°21'22.32"N	90°44'8.49"W	80
B-16U	5-in.	29°21'20.19"N	90°44'11.14"W	80
CPT-17	CPT	29°21'17.34"N	90°44'9.09"W	80
B-17U	5-in.	29°21'12.51"N	90°44'9.74"W	80
CPT-18	CPT	29°21'10.34"N	90°44'12.18"W	80
CPT-19	CPT	29°21'7.54"N	90°44'10.31"W	80
B-18U	5-in.	29°21'2.65"N	90°44'10.46"W	80
B-19U	5-in.	29°21'0.47"N	90°44'12.95"W	80
CPT-20	CPT	29°20'57.69"N	90°44'10.90"W	80
B-20U	5-in.	29°20'52.78"N	90°44'11.20"W	80
CPT-21	CPT	29°20'50.39"N	90°44'13.60"W	80

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
CPT-22	CPT	29°20'47.75"N	90°44'11.44"W	80
B-21U	5-in.	29°20'42.81"N	90°44'11.84"W	80
B-22U	5-in.	29°20'41.77"N	90°44'15.18"W	80
CPT-23	CPT	29°20'38.75"N	90°44'14.93"W	80
B-23U	5-in.	29°20'27.83"N	90°44'13.92"W	80
CPT-24	CPT	29°20'24.97"N	90°44'14.47"W	80
CPT-25	CPT	29°20'23.06"N	90°44'12.38"W	80
B-24U	5-in.	29°20'18.20"N	90°44'10.92"W	80
B-25U	5-in.	29°20'14.89"N	90°44'11.11"W	80
CPT-26	CPT	29°20'13.48"N	90°44'9.05"W	80
B-26U	5-in.	29°20'9.02"N	90°44'7.11"W	80
CPT-27	CPT	29°20'6.26"N	90°44'7.29"W	80
CPT-28	CPT	29°20'4.22"N	90°44'5.14"W	80
B-27U	5-in.	29°19'59.59"N	90°44'3.16"W	80
B-28U	5-in.	29°19'56.70"N	90°44'3.48"W	80
CPT-29	CPT	29°19'55.01"N	90°44'1.06"W	80
B-29U	5-in.	29°19'50.67"N	90°43'58.26"W	80
CPT-30	CPT	29°19'47.67"N	90°43'57.87"W	80
CPT-31	CPT	29°19'46.43"N	90°43'55.34"W	80
B-30U	5-in.	29°19'44.86"N	90°43'51.94"W	80

2.1.13.3 Access Routes

Forty-five (45) of the sites would be accessed by Falgout Canal Road while the remaining sixteen (16) sites would be reached by water using a boat to ferry crew, supplies, and equipment from T-Irv's Marina at 9499 Grand Caillou Road in Dulac, Louisiana across the Houma Navigation Canal (HNC) to a landing site at the Grand Caillou Floodgate structure. From there, an existing levee access path would be used to move the equipment onto the existing levee. The equipment would be unloaded from the boat and all work would be performed on the existing levee.

2.1.14 Reach J2 Levee

The Reach J2 Levee project area is located within Terrebonne Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and approximately 2.0 miles south of the city of Montegut, Louisiana.

2.1.14.1 Survey

The surveys would be conducted within the work zone(s) shown in Figures 35 and 36, Appendix B. The work zone follows the path of the existing levee and is accessible from Montegut Road, (Hwy 55), at the west end of the levee and from Pointe aux Chenes Road, (Hwy 665), at the east end of the levee. The Contractor would ensure that all personnel and work equipment remain in the designated work zone(s).

2.1.14.2 Borings

Sixty-five (65) soil borings and sixty-three (63) CPTs would be taken at the approximate locations shown below in Figures 37 through 40, Appendix B. All soil boring sites are located within the current NFS constructed levee footprint and would not extend outside the toe of the existing levee. The proposed exploration locations and depths are shown in Table 13.

Table 15: Reach J2 Levee - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
B-1U	5-in.	29°26'15.48"N	90°33'47.86"W	80
CPT-1	CPT	29°26'13.71"N	90°33'46.41"W	80
CPT-2	CPT	29°26'12.39"N	90°33'44.04"W	80
CPT-3	CPT	29°26'11.09"N	90°33'41.95"W	80
B-2U	5-in.	29°26'08.20"N	90°33'40.96"W	80
B-3U	5-in.	29°26'07.64"N	90°33'37.54"W	80
CPT-4	CPT	29°26'08.76"N	90°33'34.89"W	80
B-4U	5-in.	29°26'09.98"N	90°33'32.59"W	80
B-5U	5-in.	29°26'10.04"N	90°33'29.66"W	80
CPT-5	CPT	29°26'09.83"N	90°33'26.88"W	80
CPT-6	CPT	29°26'10.23"N	90°33'24.09"W	80
CPT-7	CPT	29°26'10.78"N	90°33'21.36"W	80
B-6U	5-in.	29°26'10.33"N	90°33'18.38"W	80
B-7U	5-in.	29°26'09.94"N	90°33'15.74"W	80
CPT-8	CPT	29°26'10.51"N	90°33'12.74"W	80
B-8U	5-in.	29°26'10.92"N	90°33'10.22"W	80
B-9U	5-in.	29°26'10.37"N	90°33'07.10"W	80
CPT-9	CPT	29°26'09.51"N	90°33'04.42"W	80
CPT-10	CPT	29°26'10.14"N	90°33'01.41"W	80
CPT-11	CPT	29°26'10.36"N	90°32'58.74"W	80
B-10U	5-in.	29°26'08.83"N	90°32'56.03"W	80
B-11U	5-in.	29°26'07.50"N	90°32'53.53"W	80
CPT-12	CPT	29°26'07.31"N	90°32'50.71"W	80
B-12U	5-in.	29°26'06.63"N	90°32'47.43"W	80
B-13U	5-in.	29°26'04.64"N	90°32'45.98"W	80
CPT-13	CPT	29°26'02.70"N	90°32'44.12"W	80
CPT-14	CPT	29°26'02.56"N	90°32'40.76"W	80
CPT-15	CPT	29°26'04.50"N	90°32'38.52"W	80
B-14U	5-in.	29°26'05.15"N	90°32'35.85"W	80
B-15U	5-in.	29°26'06.06"N	90°32'32.91"W	80
CPT-16	CPT	29°26'07.98"N	90°32'31.24"W	80
B-16U	5-in.	29°26'09.89"N	90°32'29.26"W	80

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
B-17U	5-in.	29°26'10.58"N	90°32'26.50"W	80
CPT-17	CPT	29°26'10.84"N	90°32'24.20"W	80
CPT-18	CPT	29°26'11.81"N	90°32'23.33"W	80
B-63U	5-in.	29°26'11.37"N	90°32'21.42"W	125
CPT-19	CPT	29°26'13.68"N	90°32'19.50"W	80
B-18U	5-in.	29°26'14.94"N	90°32'17.58"W	80
B-19U	5-in.	29°26'17.04"N	90°32'15.72"W	80
CPT-20	CPT	29°26'19.60"N	90°32'15.10"W	80
B-20U	5-in.	29°26'22.36"N	90°32'14.60"W	80
B-21U	5-in.	29°26'23.06"N	90°32'11.76"W	80
CPT-21	CPT	29°26'22.75"N	90°32'08.52"W	80
CPT-22	CPT	29°26'23.57"N	90°32'06.12"W	80
CPT-23	CPT	29°26'24.71"N	90°32'03.20"W	80
B-22U	5-in.	29°26'23.94"N	90°32'00.52"W	80
B-23U	5-in.	29°26'22.52"N	90°31'58.12"W	80
CPT-24	CPT	29°26'22.28"N	90°31'55.26"W	80
B-24U	5-in.	29°26'22.08"N	90°31'52.19"W	80
B-25U	5-in.	29°26'20.26"N	90°31'50.05"W	80
CPT-26	CPT	29°26'18.55"N	90°31'44.71"W	80
B-26U	5-in.	29°26'19.13"N	90°31'39.47"W	80
B-27U	5-in.	29°26'20.25"N	90°31'36.72"W	80
B-28U	5-in.	29°26'23.71"N	90°31'32.56"W	80
B-29U	5-in.	29°26'24.58"N	90°31'30.06"W	80
CPT-29	CPT	29°26'25.54"N	90°31'27.34"W	80
CPT-31	CPT	29°26'29.33"N	90°31'23.26"W	80
B-30U	5-in.	29°26'30.19"N	90°31'20.70"W	80
B-31U	5-in.	29°26'31.28"N	90°31'17.53"W	80
B-32U	5-in.	29°26'35.05"N	90°31'13.71"W	80
B-33U	5-in.	29°26'35.87"N	90°31'11.24"W	80
CPT-33	CPT	29°26'37.14"N	90°31'07.97"W	80
CPT-34	CPT	29°26'38.85"N	90°31'06.69"W	80
CPT-35	CPT	29°26'40.76"N	90°31'04.72"W	80
B-34U	5-in.	29°26'41.52"N	90°31'02.08"W	80
B-35U	5-in.	29°26'42.48"N	90°30'59.14"W	80
CPT-36	CPT	29°26'44.47"N	90°30'57.16"W	80
B-36U	5-in.	29°26'46.29"N	90°30'55.24"W	80
B-37U	5-in.	29°26'47.52"N	90°30'53.03"W	80
CPT-37	CPT	29°26'47.90"N	90°30'51.23"W	80
B-64U	5-in.	29°26'48.79"N	90°30'50.59"W	125
CPT-38	CPT	29°26'50.29"N	90°30'48.74"W	80
CPT-39	CPT	29°26'51.92"N	90°30'46.32"W	80
B-38U	5-in.	29°26'52.51"N	90°30'43.75"W	80

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
B-39U	5-in.	29°26'53.48"N	90°30'41.02"W	80
CPT-40	CPT	29°26'55.31"N	90°30'39.05"W	80
B-40U	5-in.	29°26'57.25"N	90°30'37.32"W	80
B-41U	5-in.	29°26'58.14"N	90°30'34.41"W	80
CPT-41	CPT	29°26'59.52"N	90°30'31.47"W	80
CPT-42	CPT	29°27'01.20"N	90°30'29.85"W	80
CPT-43	CPT	29°27'03.27"N	90°30'27.80"W	80
B-42U	5-in.	29°27'04.08"N	90°30'25.35"W	80
B-43U	5-in.	29°27'05.06"N	90°30'22.73"W	80
CPT-44	CPT	29°27'06.90"N	90°30'20.80"W	80
B-44U	5-in.	29°27'08.87"N	90°30'18.67"W	80
B-45U	5-in.	29°27'09.83"N	90°30'16.22"W	80
CPT-45	CPT	29°27'11.21"N	90°30'13.27"W	80
CPT-46	CPT	29°27'12.86"N	90°30'11.66"W	80
CPT-47	CPT	29°27'14.82"N	90°30'09.67"W	80
B-46U	5-in.	29°27'15.84"N	90°30'07.26"W	80
B-47U	5-in.	29°27'17.21"N	90°30'04.26"W	80
CPT-48	CPT	29°27'18.76"N	90°30'02.66"W	80
B-48U	5-in.	29°27'20.58"N	90°30'00.71"W	80
B-49U	5-in.	29°27'21.62"N	90°29'58.05"W	80
CPT-49	CPT	29°27'22.83"N	90°29'55.23"W	80
CPT-50	CPT	29°27'24.49"N	90°29'53.41"W	80
CPT-51	CPT	29°27'26.25"N	90°29'51.74"W	80
B-65U	5-in.	29°27'26.01"N	90°29'49.14"W	125
B-50U	5-in.	29°27'27.31"N	90°29'48.81"W	80
B-51U	5-in.	29°27'28.59"N	90°29'45.85"W	80
CPT-52	CPT	29°27'30.24"N	90°29'44.20"W	80
B-52U	5-in.	29°27'32.20"N	90°29'42.16"W	80
B-53U	5-in.	29°27'33.08"N	90°29'39.60"W	80
CPT-53	CPT	29°27'34.39"N	90°29'36.52"W	80
CPT-54	CPT	29°27'36.08"N	90°29'34.80"W	80
CPT-55	CPT	29°27'37.61"N	90°29'32.55"W	80
B-54U	5-in.	29°27'37.84"N	90°29'29.23"W	80
B-55U	5-in.	29°27'37.31"N	90°29'26.46"W	80
CPT-56	CPT	29°27'38.00"N	90°29'24.05"W	80
B-56U	5-in.	29°27'38.51"N	90°29'21.46"W	80
B-57U	5-in.	29°27'38.05"N	90°29'18.42"W	80
CPT-57	CPT	29°27'36.44"N	90°29'16.29"W	80
CPT-58	CPT	29°27'36.25"N	90°29'13.21"W	80
CPT-59	CPT	29°27'35.94"N	90°29'10.65"W	80
B-58U	5-in.	29°27'33.58"N	90°29'08.50"W	80

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
B-59U	5-in.	29°27'31.14"N	90°29'06.24"W	80
CPT-60	CPT	29°27'30.56"N	90°29'03.35"W	80
B-60U	5-in.	29°27'30.33"N	90°29'00.47"W	80
B-61U	5-in.	29°27'28.16"N	90°28'58.35"W	80
CPT-61	CPT	29°27'26.48"N	90°28'56.72"W	80
CPT-62	CPT	29°27'26.13"N	90°28'53.42"W	80
CPT-63	CPT	29°27'25.95"N	90°28'50.77"W	80
B-62U	5-in.	29°27'23.85"N	90°28'48.74"W	80

2.1.14.3 Access Routes

All the boring and survey sites would be accessed by Montegut Road (Hwy 55) at the west end of the work zone and by Pointe Aux Chenes Road (Hwy 665) at the east end of the work zone. The Contractor would ensure that all personnel and work equipment are to remain in the designated work zone(s).

2.1.15 L2L Reach 1 Levee

The L2L Reach 1 project area is located within Lafourche Parish in southeastern Louisiana between the Mississippi and Atchafalaya River basins and is positioned just North of Louisiana Highway 1 between the cities of Lockport and Larose. The levee reach identified in this assessment request is based on the scope of work (SOW) and runs from STA 56+00 to STA 127+00 on the western end of the reach and from STA0+00 to 56+00 on the eastern end of the reach. The western and eastern ends of the levee reach are separated by a small canal (name unknown).

2.1.15.1 Surveys

The surveys would be conducted within the work zone(s) shown in Figures 41 and 42, Appendix B. Red line parallel to the baseline indicate the pathways the surveyor may take to the next survey point. Access routes are shown by blue lines. The Contractor would ensure that all personnel and work equipment remain in the designated work zone(s).

2.1.15.2 Borings

Twelve (12) soil borings and twelve (12) cone penetration test would be taken at the approximate locations shown on Figures 43, 44, and 45, Appendix B. All soil boring sites are located along the proposed SOW levee footprint. The proposed exploration locations and depths are shown in the Table 14. The Contractor is to ensure that all personnel and work equipment are to remain in the designated work zone(s).

Table 16: L2L Levee Reach 1 - Boring Locations

DESIGNATION	TYPE	LATITUDE	LONGITUDE	DEPTH (FT)
L-1U	5-in.	29°35'30.32" N	90°22'17.51" W	150
L-2U	CPT	29°35'33.24" N	90°22'22.08" W	125
L-3U	5-in.	29°35'36.16" N	90°22'26.65" W	150
L-4U	CPT	29°35'39.08" N	90°22'31.22" W	125
L-5U	5-in.	29°35'42.00" N	90°22'35.79" W	150
L-6U	CPT	29°35'44.92" N	90°22'40.36" W	125
L-7U	5-in.	29°35'47.85" N	90°22'44.94" W	150
L-8U	CPT	29°35'50.77" N	90°22'49.51" W	125
L-9U	5-in.	29°35'53.69" N	90°22'54.08" W	150
L-10U	CPT	29°35'56.61" N	90°22'58.65" W	125
L-11U	5-in.	29°35'59.53" N	90°23'03.21" W	150
L-12U	CPT	29°36'02.44" N	90°23'07.78" W	125
L-13U	5-in.	29°36'03.98" N	90°23'13.15" W	150
L-14U	CPT	29°36'05.32" N	90°23'18.60" W	125
L-15U	5-in.	29°36'06.66" N	90°23'24.05" W	150
L-16U	CPT	29°36'08.01" N	90°23'29.50" W	125
L-17U	5-in.	29°36'09.36" N	90°23'34.95" W	150
L-18U	CPT	29°36'10.70" N	90°23'40.41" W	125
L-19U	5-in.	29°36'11.46" N	90°23'45.90" W	150
L-20U	CPT	29°36'10.63" N	90°23'51.48" W	125
L-21U	5-in.	29°36'09.79" N	90°23'57.05" W	150
L-22U	CPT	29°36'08.96" N	90°24'02.65" W	125
L-23U	5-in.	29°36'08.12" N	90°24'08.22" W	150
L-24U	CPT	29°36'07.28" N	90°24'13.80" W	125
L-25U	5-in.	29°36'06.62" N	90°24'18.27" W	150

2.1.15.3 Access Routes

The work zone would be accessed by Hamilton Street from Louisiana Highway 308 just West of Larose, Louisiana. A staging area would be set up near the levee where Hamilton Street turns from an almost due North route to the East. From there, the surveyors would proceed with their work on foot, airboat, or Marsh Master to complete their work along the entire levee reach.

For the soil borings, the crews would use a truck mounted rig or Cargo Buggy for the western end of the work zone that follows the PACR Alignment. For the eastern end of the levee reach work zone that lies within the SOW Alignment, a Cargo Buggy would either cross the small canal from the western end of the levee reach to access the eastern section or would access the work zone from the GIWW.

No Action Alternative (Future without Proposed Action)

NEPA requires that in analyzing alternatives to a proposed action, a federal agency must consider an alternative of taking "No Action." The Future Without Proposed Action conditions apply when the proposed action would not be implemented and the predicted additional environmental gains (e.g., flood risk reduction) would not be achieved.

The proposed surveys and borings activities consists of actions necessary to obtain data that would aid in the design and construction of levees, gates, water control structures, and other features approved in the 2013 PACR/RPIES. Should the proposed action not occur, then the most recent data would not be available, and the previous borings analysis, performed in 2008, would be utilized.

3 AFFECTED ENVIRONMENT

The President's Council on Environmental Quality (CEQ) regulations (40 CFR Part 1500 *et seq*.), promulgated to implement NEPA; provide guidance for the preparation of environmental impact statements. Section 1502.15 of the CEQ regulations provides direction for preparing the Affected Environment section and states that this section shall contain data and analysis "commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced."

The affected environment section describes the climate, geology, and historic and existing conditions for significant environmental resources including: soils; water quality; vegetative resources; wildlife resources (including birds, mammals, amphibians, and reptiles); fisheries; essential fish habitat (EFH); water bottoms; threatened and endangered species (T&E); historic and cultural resources; socioeconomic and human resources (population; infrastructure; employment and income); aesthetics (visual resources); recreation; and air quality. In addition, noise and hazardous, toxic, and radioactive waste (HTRW) are also considered. A resource is considered important if it is recognized by statutory authorities including laws, regulations, executive orders, policies, rules, or guidance; if it is recognized as important by some segment of the public; or if it is determined to be important based on technical or scientific criteria.

Description of the Proposed Action Areas

The areas in which the surveys and borings are taking place are located across the southern end of the Terrebonne Basin, beginning in Lockport, Louisiana, and running along the southern boundary of the estuary, before ending in Gibson, Louisiana. The areas contain a complex of habitat types and varying elevations, including natural levees, lakes, swamps, marshes, and bayous formed from sediments of abandoned Mississippi River deltas. Near Houma, the largest city in the area, the elevation is approximately 10 feet (NGVD 88). The elevation along the bayou ridges is four to five feet (NGVD 88) and less than one foot (NGVD 88) along the southern portion near the Gulf of Mexico.

3.1.1 Climate

The climate in southeast Louisiana is semitropical, primarily influenced by the movement of warm, moist air over the Gulf of Mexico. Average monthly temperatures vary from 51.2 °F in January to 82.0 °F in July. Winter nighttime lows below freezing are common, as are summer daytime highs in the mid-90s. Normal annual precipitation for the area is 61 inches, although for the period 1980 through 1991 rainfall averaged 64 inches a year. The wettest month is December with an average monthly normal rainfall of 6.14 inches. October is the driest month averaging 3.50 inches. High cumulative rainfall events (e.g., 6 inches or more in less than 72 hours) over large areas are caused under two typical scenarios: slow moving cold fronts encountering warm moist coastal air in late-winter or early spring; and slow-moving tropical storms in summer or early fall. Snow is uncommon (Dance et al. 1968; NOAA 2015).

Hurricanes and tropical storms typically occur in the area between June and November. Summer thunderstorms are common, and tornadoes strike occasionally. These storms

are of short duration and are quite variable in the amount and location of damage incurred. The occurrence of tropical depressions, tropical storms, and hurricanes bring heavy rains that last up to several days. These storms typically cause alterations to the hydrologic regimes causing damage and loss of property and contribute to coastal land loss.

Climate and Climate Change

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. (Emissions Scenarios: RCPs | Climate Data Canada).

The climate Study Area where the Morganza to the Gulf Project is located is mild, humid, and primarily subtropical with abundant precipitation. The summers are long and hot, and the winters are short and mild. 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 two eight-digit Hydrologic Unit Codes (HUC): HUC 08090301 - East Central Louisiana Coastal and HUC 08090302 West Central Louisiana Coastal. The annual 1-day temperature projection shows a steady increase of temperature within the study area (Figures 46 through 51, Appendix B).

The average annual rainfall in the 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 (Figures 52 and 55, Appendix B) shows a steady decrease of annual precipitation while the Drought Indicator: Annual-Maximum of Number of Consecutive Dry Days (Figures 53 and 56, Appendix B) show a steady increase of drought like conditions within the study area. Precipitation for one day events (Figures 54 and 57, Appendix B) show a steady increase.

3.1.2 Geology and Soils

The study area lies within the Mississippi Deltaic Plain, which is comprised of highly organic soils with floating marshes and peat deposits also prevalent in the area. It contains natural levee ridges, man-made levees, forested wetlands, lakes and bays, barrier islands, estuaries, and fresh, intermediate, brackish, and saline marshes. Subsidence rates are one of the most critical problems in this area.

Most of the present landmass of southeast Louisiana was formed by deltaic processes of the Mississippi River. Over the course of 7,000 years, the Mississippi River deposited massive volumes of sediment in five deltaic complexes: Teche, Atchafalaya, Lafourche, Plaquemines, and St. Bernard. The geology of the area is heavily influenced by the Mississippi River and the complex of abandoned and active deltas.

Three of four abandoned delta complexes shaped Terrebonne and Lafourche parishes as sediments were deposited on the Pleistocene Prairie. The Mississippi River laid down sediments from 100 to 200 meters thick at each delta (Penland *et al*. 1988). The abandoned deltas were formed generally from the west to the east in chronological sequence starting about 9,000 years before present and ending less than 100 years ago (Sevier 1990). The most recent sediments of an abandoned delta were laid down as part of the Lafourche delta.

After delta abandonment occurs, sediments slowly deteriorate as they subside under their own weight. In addition, sea level has been rising throughout this time by about 5 to 8 meters (Mossa *et al*. 1990). Historically, the cycle of delta growth and destruction took about 5,000 years (Gosselink and Sasser 1991). However, because of a variety of factors (most notably human), delta destruction is taking place in a few human generations rather than over thousands of years.

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 Mississippi River Delta 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 2022). 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 five feet below sea level in the former marshes and swamps that have been drained.

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.

Relevant Resources

The resources described in this section are those recognized as significant by laws, executive orders, regulations, and other standards of federal, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the public.

Table 15 provides summary information of the institutional, technical, and public importance of resources located in the project area. Table 16 contains a list of the relevant resources located in the project area and describes those resources that would be impacted, directly or indirectly, by construction.

Table 17: Relevant Resources and Their Institutional, Technical, and Public Importance

RESOURCE	INSTITUTIONALLY IMPORTANT	TECHNICALLY IMPORTANT	PUBLICLY IMPORTANT
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	They are a 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.
Wetlands	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., Executive Order 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 nonconsumptive 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.
Soils and Water Bottoms	Fish and Wildlife Coordination Act, Marine Protection, Research, and Sanctuaries Act of 1990	State and federal agencies recognize the value of water bottoms for the production of benthic organisms.	Environmental organizations and the public support the preservation of water quality and fishery resources.
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.
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.
Threatened and Endangered 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.
Cultural Resources	National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979	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 for their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.
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.
Aesthetics	USACE Engineer Regulation 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	Visual resources are technically important because of the high value placed on the preservation of unique, geological, botanical and cultural features that may be an asset to a study area.	Aesthetic resources are publicly important in that 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.

RESOURCE	INSTITUTIONALLY IMPORTANT	TECHNICALLY IMPORTANT	PUBLICLY IMPORTANT
Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Management Act of 1972, and Louisiana State and 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.
Noise	USACE Engineer Regulation 1105-2-100, and National Environmental Policy Act of 1969, Noise Control Act of 1972, Quiet Communities Act of 1978	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.
Environmental Justice	Executive Order 12898 of 1994, Department of Defense Strategy on Environmental Justice of 1995	This resource is technically significant because the social and economic welfare of minority and low-income populations may be positively or disproportionately impacted by the proposed actions.	This resource is publicly significant because of public concerns about the fair and equitable treatment of all people with respect to environmental and human health consequences of federal laws, regulations, policies, and actions.

Table 18: Relevant Resources in and Near the Project Area

Relevant Resource	Impacted	Not Impacted
Aquatic Resources/Fisheries	X	
Wetlands	X	
Essential Fish Habitat	X	
Wildlife	X	
Threatened and Endangered Species	X	
Cultural		X
Recreational		X
Visual (Aesthetics)		X
Air Quality	X	
Water Quality	X	
Noise	X	
Environmental Justice		X
HTRW		X

3.1.3 Aquatic Resources/Fisheries

Existing Conditions

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.

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).

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).*

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).

3.1.4 Wetlands

Existing Conditions

Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 C.F.R. § 328.3[b]) (Regulatory Programs of the Corps of Engineers 1986).

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 bottomland hardwood forests, swamps, and marsh (fresh, intermediate, brackish and saline).

Bottomland Hardwoods

Bottomland hardwoods (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).

Swamps

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).

Marsh

Freshwater marsh is found surrounding bodies of open water and is in the northern portion of the study area along the Gulf Intracoastal Waterway (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.

Brackish marsh has salinities of 5-18 ppt and the vegetation within a brackish marsh includes camphorweed (*Heterotheca subaxillaris*), coastal water-hyssop (Bacopa *monnieri*), deer pea (*Vicia ludoviciana*), leafy three-square (*Schoenoplectus robustus*), three-cornered grass (*Scirpus olneyi*), saltmeadow cordgrass (*Spartina patens*), and seashore saltgrass (*Distichlis spicata*). Waterfowl thrive in this habitat, as well as many invertebrate and fish. This type is more prevalent in the study area around Dulac.

Saline marsh is located on the southern end of the study area and is highly influenced by tidal cycles flooding the marsh with salt water (18-30 ppt). Plant communities commonly found include black needlerush (*Juncus roemerianus*), leafy three-square, seashore saltgrass, saltmarsh cordgrass (*Spartina alterniflora*), saltmeadow cordgrass, and seashore saltgrass. Because salt marshes are frequently submerged by the tides and contain a lot of decomposing plant material, soils are often hypoxic which produce the sulfurous smell often associated with marshes and mud flats.

Salt marshes provide essential food, refuge, or nursery habitat for more than 75 percent of fisheries species, including shrimp, blue crab, and many finfish. In addition, salt marshes protect shorelines from erosion by buffering wave action and trapping sediments. They reduce flooding by slowing and absorbing rainwater and protect water quality by filtering runoff, and by metabolizing excess nutrients.

3.1.5 Essential Fish Habitat

Existing Conditions

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 essential fish habitat (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 (GFMPs) (GMFMC 2016). The estuarine waters in the proposed project area include EFH for several federally managed species (Table 17).

Table 19: EFH Species Found in the Study Area

Common Name	Life Stage	EFH
Red Drum	Adult	Gulf of Mexico & estuarine mud bottoms, oyster reef
	Juvenile	SAV, estuarine mud bottoms, marsh/water interface
	Larvae/Post Larvae	all estuaries planktonic, SAV, sand/shell/soft bottom, emergent
Brown Shrimp	Adult	Gulf of Mexico <110 m, silt sand, muddy sand
	Juvenile	marsh edge, SAV, tidal creeks, inner marsh
	Larvae/Post Larvae	planktonic, sand/shell/soft bottom, SAV, emergent marsh, oyster reef
White Shrimp	Adult	Gulf of Mexico <33 m, silt, soft mud
	Juvenile	marsh edge, SAV, marsh ponds, inner marsh, oyster reef
	Larvae/Post Larvae	planktonic, soft bottom, emergent marsh
Gray Snapper	Adult	Gulf of Mexico & estuarine mud bottoms
Lane Snapper	Late and Early Juvenile	SAV, estuarine mud bottoms, marsh/water interface

Table 18 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 20: Highly Migratory Species EFH found in the Study Area

COMMON NAME	LIFE STAGE	EFH STATE WATERS ECO-REGION 4
Blacktip Shark	Neonate & Juvenile	Estuarine waters of Galveston, Terrebonne and Timbalier Bays; all nearshore and offshore waters
	Adult	Estuarine waters of Vermilion, Atchafalaya, Terrebonne and Timbalier Bays; all nearshore and offshore waters
Bull Shark	Neonate	All estuarine waters; nearshore waters Freeport to mouth of Sabine Lake; nearshore waters off west Cameron Parrish
	Juvenile	All estuarine waters; nearshore waters Freeport to mouth of Sabine Lake; nearshore waters off west Cameron Parrish; Terrebone Bay to Mississippi River delta
Spinner Shark	Neonate	Galveston Bay (including East, West and Trinity Bays) and nearshore waters off Brazoria, Galveston, and Chambers Counties; Terrebonne Bay and estuarine and nearshore waters to Grand Isle
	Juvenile	Galveston Bay (including East, West and Trinity Bays) all nearshore waters (ex. off mouth of Mermentau River and between Vermillion and Atchafalya Bays); Terrebone and Barataria Bays and the Mississippi birdfoot delta
Finetooth Shark	Neonate	Lower Galveston Bay, West Bay and nearshore waters off Galveston Island and Boliver Peninsula; 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 Freeport to the mouth of the Mississippi, Christmas Bay, Galveston Bay (incl. West, Trinity and East Bays), Vermillion, West Cote Blance, Atchafalaya, lower Terrebone and Timbalier Bays and Barataria Bay
	Juvenile	All nearshore and offshore waters Freeport to the mouth of the Mississippi, Christmas Bay, West Bay, lower Terrebonne and Timbalier Bays
	Adult	All nearshore and offshore waters Freeport to the mouth of the Mississippi, Christmas Bay, Galveston Bay (incl. West, Trinity and East Bays), lower Terrebonne and Timbalier Bays and Barataria Bay

3.1.6 Wildlife

Existing Conditions

Louisiana serves as a permanent or temporary home to over 900 species of vertebrate animals and an unknown number of invertebrates (Lester et al. 2005). From its coastal marshes to its interior pine-dominated landscapes, the state offers habitat to a variety of wildlife in numbers seldom exceeded elsewhere. The abundance of individual species varies regionally and is influenced by prevailing environmental conditions (e.g., salinity regimes, water depth, tidal fluctuations, and vegetational communities). Natural and human-induced changes produce drastic changes in habitat and the species composition of animal communities using them (Chabreck 1988).

Biologically diverse as the area may be, many of the species and habitats critical to wildlife are declining. Research indicates that hunting data show that hunters are not the cause of this decline. Rather, habitat loss is the true source of the decline of these species and numerous nongame species (Lester et al. 2005). Factors that threaten habitat also influence populations of these declining species, and these threats must be addressed to stop the declines (Lester et al. 2005).

There are a variety of habitats in the study area for wildlife species use including: open fields used for foraging, forested wetlands, fresh marsh, lines of trees and shrubs along drainage ditches and denser tree growth along waterways that provide cover and connectivity. Over time, the study area has undergone extensive artificial modifications resulting in common fauna within the study area primarily being species that can tolerate a wide range of disturbed habitats.

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

Mississippi Flyway

Starting in central Canada and stretching to the Gulf of Mexico, the Mississippi Flyway is the name given to the route followed by birds migrating from their breeding grounds in North America to their wintering grounds in the south. As the name suggests, the Mississippi Flyway follows the route of the Mississippi River in the United States – North America’s largest river system. More than 2,300 miles long with a watershed of more than 1.5 million square miles, the Mississippi River is North America's greatest waterway and the most heavily used migration corridor for geese, ducks, shorebirds, sparrows, blackbirds, thrushes and warblers, the majority of which cut across the Gulf of Mexico, providing excellent birding opportunities along the coasts of Louisiana and Texas.

This flyway is composed of the states of Alabama, Arkansas, Indiana, Illinois, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, Tennessee, and Wisconsin, as well as the Canadian provinces of Saskatchewan, Manitoba, and Ontario. Louisiana is part of the Mississippi Flyway and provides important winter habitat for waterfowl that are produced in the Prairie Pothole Region and Great Lakes states. In most years, the coastal marshes of Louisiana regularly hold half of the wintering duck population of the Mississippi Flyway. South Louisiana comprises an important portion of the Gulf Coast.

Historically, coastal marshes of Louisiana provided reliable, high-quality habitat for millions of pintails, gadwalls, wigeon and green-winged teal.

Birds

As the study area is located within the Mississippi Flyway, it experiences significant seasonal migrations of waterfowl species, which are of particular interest to recreational hunters. Numerous species of birds utilize the study area marshes, including migratory waterfowl which winter there. Small openings in project area cypress-tupelo swamps may provide habitat for puddle ducks like mallard and gadwall. Other ducks that occur in the study area include northern pintail, blue-winged teal, green-winged teal, American wigeon, wood duck, and northern shoveler. The resident mottled duck also utilizes project area coastal marshes. Diving ducks prefer larger ponds, lakes, and open water areas. Common diving duck species include lesser scaup, canvasback, redhead, ring-necked duck, red-breasted merganser, and hooded merganser. Other migratory game birds found in coastal marshes include the king, Virginia, and sora rails along with the American coot, purple moorhen, common moorhen, and common snipe.

Marshes and associated shallow open water areas in the project area provide habitat for a number of wading birds, shorebirds, and other nongame birds. Flooded fields are especially valuable to wildlife when they are located adjacent to flooded bottomland hardwood forests because they provide nocturnal roosting sites for many species. The resident mottled duck, which nests in fresh to brackish marshes, is found throughout the year. Common wading bird species which utilize the project area include the little blue heron, the great blue heron, green-backed heron, yellow-crowned night heron, black-crowned night heron, great egret, snowy egret, cattle egret, white-faced ibis, white ibis and roseate spoonbill. Mudflats and shallow-water areas provide habitat for numerous species of shorebirds and seabirds. Shorebirds include the killdeer, black-necked stilt, and common snipe. Wading bird nesting colonies may occur within in the study. Other nongame birds such as boat-tailed grackle, red-winged blackbird, northern harrier, bald eagle, belted kingfisher, and sedge wren also utilize coastal marsh areas.

Forested wetlands and scrub-shrub areas provide habitats for songbirds such as the mockingbird, yellow-billed cuckoo, northern parula, yellow-rumped warbler, prothonotary warbler, white-eyed vireo, Carolina chickadee, and tufted titmouse. Additionally, these areas also provide important resting and feeding areas for songbirds migrating across the Gulf of Mexico. Other avian species found in forested wetlands include the American woodcock, common flicker, brown thrasher, white-eyed vireo, belted kingfisher, pileated

woodpecker, red-headed woodpecker, downy woodpecker, common grackle, and common crow. Numerous other bird species use forested wetlands throughout the study area.

Forested habitats and associated waterbodies also support raptors such as the red-tailed hawk, red-shouldered hawk, Mississippi kite, northern harrier, screech owl, great horned owl, and barred owl. Wading bird colonies typically occur in cypress swamp and scrub-shrub habitat. Species found in those nesting colonies include great egret, white ibis, black-crowned night heron, tricolored heron, little blue heron, snowy egret, white-faced ibis, and glossy ibises. Waterfowl species found in forested wetlands and adjacent waterbodies in the project area include, but are not limited to, wood duck, mallard, green-winged teal, gadwall, and hooded merganser.

Many migratory birds of conservation concern require large blocks of contiguous habitat to successfully reproduce and survive. The construction of levees and borrow canals can result in temporary and/or permanent impacts to migratory birds and the habitats upon which they depend for various life requisites. The Service has concerns regarding the direct and cumulative impacts resulting from the loss and fragmentation of forest and grassland habitats, and the direct and indirect impacts that these losses would have upon breeding migratory birds of conservation concern within the Mississippi Alluvial Valley Bird Conservation Region. (https://fws.gov/media/birds-conservation-concern-2021).

In Louisiana, the primary nesting period for forest-breeding migratory birds occurs between April 15 and August 1. Some species or individuals may begin nesting prior to April 15 or complete their nesting cycle after August 1, but the vast majority nest during this period. The proposed project may directly impact migratory birds of conservation concern because habitat clearing that occurs during the primary nesting period may result in unintentional take of active nests (i.e., eggs and young) despite all reasonable efforts to avoid such take. The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing incidental take, the Service recognizes that some birds may be taken during project construction/operation even if all reasonable measures to avoid take are implemented.

In addition to the direct loss of grassland and forested habitat, the proposed project may indirectly impact migratory birds of conservation concern because construction of large-scale projects within forested habitats typically results in habitat fragmentation. Forest fragmentation may contribute to population declines in some avian species because fragmentation reduces avian reproductive success (Robinson et al. 1995). Fragmentation can alter the species composition in a community because biophysical conditions near the forest edge can significantly differ from those found in the center or core of the forest. As a result, edge species could recruit to the fragmented area and species that occupy interior habitats could be displaced. The fragmentation of intact forests could have long-term adverse impacts on some forest interior bird species.

The primary impact to forest habitat conditions from the proposed project would result from the conversion of forest habitat to levees and open water borrow sites. We recommend that the Corps avoid impacts to forested areas (particularly those containing a hardwood species component) to the maximum extent practicable.

Mammals

The study area provides important habitat for several species of mammals, reptiles and amphibians. Mammals occurring within the study area include nutria *(Myocastor coypus)*, muskrat *(Ondatra zibethicus)*, American mink *(Neovison vison)*, river otter *(Lontra canadensis)*, and raccoon *(Procyon lotor)*, all of which are commercially important furbearers. Game mammals associated with the study area include feral hogs, eastern cottontail *(Sylvilagus floridanus)*, swamp rabbit *(Sylvilagus aquaticus)*, gray squirrel *(Sciurus carolinensis*), fox squirrels *(Sciurus niger)*, and white-tailed deer *(Odocoileus virginianus)*. Other mammals found in forested wetlands include striped skunk *(Mephitis mephitis)*, coyote *(Canis latrans)*, Virginia opossum *Didelphis virginiana)*, bobcat *(Lynx rufus)*, nine banded armadillo *(Dasypus novemcinctus)*, gray fox *(Urocyon cinereoargenteus)*, and red bat *(Lasiurus borealis)*. Smaller mammal species serve as forage for both mammalian and avian carnivores and include the cotton rat, marsh rice rat (*Oryzomys palustris)*, white-footed mouse *(Peromyscus leucopus)*, eastern wood rat *(Neotoma floridana)*, harvest mouse *(Micromys minutus)*, least shrew *(Cryptotis parva*), and southern flying squirrel *(Glaucomys volans)*.

Reptiles and Amphibians

Reptiles and amphibians are fairly common in the low-salinity brackish marshes found within the study area and include the American alligator *(Alligator mississippiensis)*, western cottonmouth *(Agkistrodon piscivorus leucostoma)*, water snakes, mud snake, speckled kingsnake *(Lampropeltis getula)*, ribbon snake *(Thamnophis sauritus)*, rat snake, red eared turtle *(Trachemys scripta elegans)*, common snapping turtle *(Chelydra serpentine)*, eastern mud turtle *(Kinosternon subrubrum)* and soft shell turtles.

Reptiles which utilize study area bottomland hardwoods, cypress swamps, and associated shallow water include the American alligator *(Alligator mississippiensis)*, ground skink *(Scincella lateralis)*, five-lined skink *(Plestiodon fasciatus)*, broad-headed skink *(Plestiodon laticeps)*, green anole *(Anolis carolinensis)*, Gulf coast ribbon snake *(Thamnophis proximus)*, yellow-bellied water snake *(Nerodia erythrogaster)*, speckled kingsnake *(Lampropeltis getula)*, southern copperhead *(Agkistrodon contortrix)*, western cottonmouth *(Agkistrodon piscivorus leucostoma)*, pygmy rattlesnake *(Sistrurus miliarius)*, broad-banded water snake *(Nerodia fasciata confluens)*, diamond-backed water snake *(Nerodia rhombifer)*, spiny softshell turtle *(Apalone spinifera)*, red-eared turtle *(Trachemys scripta elegans)*, southern painted turtle *(Chrysemys picta)*, Mississippi mud turtle *(Kinosternon subrubrum)*, stinkpot (*Sternotherus odoratus)*, common snapping turtle *(Chelydra serpentina*) and alligator snapping turtle *(Macrochelys temmincki)*, in addition to numerous other species.

Some of the amphibians believed to be in study area forested wetlands include dwarf salamander (*Eurycea quadridigitata)*, three-toed amphiuma (*Amphiuma tridactylum)*,

lesser western siren (*Siren intermedia)*, central newt (*Notophthalmus viridescens)*, Gulf coast toad (*Incilius valliceps)*, eastern narrow-mouthed toad (*Gastrophryne carolinensis)*, green treefrog (*Hyla cinerea)*, squirrel treefrog (*Hyla squirella)*, pigfrog (*Lithobates grylio)*, bullfrog (*Lithobates catesbeianus)*, southern leopard frog (*Lithobates sphenocephalus)*, bronze frog (*Rana clamitans)*, upland chorus frog (*Pseudacris feriarum)*, southern cricket frog (*Acris gryllus)*, spring peeper (*Pseudacris crucifer)* sirens, and several species of toads.

3.1.7 Threatened, Endangered and Protected Species

Existing Conditions

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, 11 occur in Lafourche and/or Terrebonne Parishes (Table 19).

Table 21: T&E Species Occurring in Lafourche and/or Terrebonne Parishes

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

* https://www.fws.gov/office/louisiana-ecological-services/species (accessed August 15, 2023)
T = Threatened; E = Endangered; PT = Proposed Threatened; C = Candidate; CH = Critical habitat (includes those areas occupied by the species)

T&E species known or believed to occur within the project area include: West Indian manatee (*Trichechus manatus*), eastern black rail (*Laterallus jamaicensis ssp. 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 USFWS if their action will jeopardize the continued existence of a proposed species.

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.

Eastern Black Rail (*Laterallus jamaicensis ssp. 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 and Lafourche Parishes are rare; Therefore, it is unlikely they would be present in the project area. No critical habitat has been designated for this species.

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.

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.

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.

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*), and white ibises (*Eudocimus albus*), glossy ibises (*Plegadis falcinellus*), and white-faced ibises (*Plegadis chihi*). Geologic subsidence, erosion, storm surge, and sea level rise will 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.

3.1.8 Water and Sediment Quality

Existing Conditions

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 LDEQ divides waterbodies into classifications for water quality assessment purposes. Eight designated uses were established for surface waters in Louisiana: Primary Contact Recreation (swimming), Secondary Contact Recreation (boating), Fish and Wildlife Propagation (fishing), Drinking Water Supply, Outstanding Natural Resource, Oyster Propagation, Agriculture, Limited Aquatic Life and Wildlife.

Once the waterbodies are classified for designed uses, the waterbodies are then labeled as with the following classifications:

- Fully Supporting - the assessed water body is fully supporting the designated use,
- Not Supporting - the assessed water body is not fully supporting the designated use,
- Insufficient Data - there is insufficient data to make a reliable determination if the water body supports the designated use,
- No Data Collected - data was not collected on the assessed water body to determine if the water body supports the designated use,
- Not a Use - the designated use on the map does not apply to that assessed water body.

This labeling helps classify which of the nine Integrated Report Category (IRC) the waterbodies should be labeled as. The categories are explained in Table 20.

Table 22: Integrated Report Categories

IR Category	IR Category Description
IRC 1	Specific Water body Impairment Combination (WIC) cited on a previous §303(d) list is now attaining all uses and standards. Also used for water bodies that are fully supporting all designated uses.
IRC 2	Water body is meeting some uses and standards but there is insufficient data to determine if uses and standards associated with the specific WIC cited are being attained.
IRC 3	There is insufficient data to determine if uses and standards associated with the specific WIC cited are being attained.
IRC 4a	WIC exists and a TMDL has been completed for the specific WIC cited.
IRC 4b	WIC exists and control measures other than a TMDL are expected to result in attainment of designated uses associated with the specific WIC cited.
IRC 4c	WIC exists and a pollutant (anthropogenic source) does not cause the specific WIC cited.

IR Category	IR Category Description
IRC 5	WIC exists for one or more uses and a TMDL is required for the specific WIC cited. IRC 5 and its subcategories of IRC 5RC and IRC 5-Alt represent Louisiana's §303(d) list.
IRC 5RC (Revise Criteria)	WIC exists for one or more uses and a TMDL is required for the specific WIC cited; LDEQ will investigate revising criteria due to the possibility that natural conditions may be the source of the water quality criteria impairments. IRC 5RC WICs are on Louisiana's §303(d) list.
IRC 5-Alt (Alternative)	WIC exists for one or more uses and a TMDL is required for the specific WIC cited; however, based on the §303(d) long-term vision protocol an alternative approach is expected to achieve water quality goals. IRC 5-Alt WICs are on Louisiana's §303(d) list.

Within Louisiana, there are 12 watershed basins that are categorized by LDEQ:

Atchafalaya River Basin
Barataria Basin
Calcasieu River Basin
Lake Pontchartrain Basin
Mermentau River Basin
Vermilion-Teche Basin
Mississippi River Basin
Ouachita River Basin
Pearl River Basin
Red River Basin
Sabine River Basin
Terrebonne Basin

Figure 58 in Appendix B outlines the 12 watershed basins within Louisiana.

Water Quality Study Area

The study area focuses on two watershed basins: Terrebonne and Barataria drainage basins and are labeled as one 4-digit Hydrologic Unit: Lower Mississippi-0809.

According to LDEQ, the Terrebonne and Barataria basins are located within southern Louisiana and is located West of the Mississippi River. The basins can be broken into two 8-digit Hydrologic Units; West Central Louisiana Coastal-08090302 and East Central Louisiana Coastal- 08090301.

The project area consists of two parishes within Louisiana: Terrebonne Parish and Lafourche Parish. Within this parishes, there are three 12-digit Hydrologic Units; Marmande Canal-080903020208, Hanson Canal-Intracoastal Waterway-080903020308, and Bayou La Carpe-Houma Navigation Canal-080903020601, Houma Navigation Canal-Bayou Grand Caillou- 080903020605, Houma Navigation Canal- 080903020606, Sweetwater Pond-Bayou Sale-080903020604, Lake Boudreaux-Lake Quitman-080903020603, Lake Tambour-080903020707, Wonder Lake-Town of Montegut-080903020703, Saint Louis Canal-Bayou Pointe au Chien- 080903020702, Town of Larose-Bayou Blue-080903020704, Forty Arpent Canal-Bayou Lafourche-080903010308, Bayou L'Eau Bleu-080903020504.

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, LA120508_00- Houma Navigation Canal, LA120704_00-Bayou Terrebonne, LA120602_00- Bayou Terrebonne, LA120605_00- Bayou Pointe au Chien, LA020801_00- Intracoastal Waterway, LA020304_00- Lake Salvador.

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.

LA120508_00- Houma Navigation Canal

The 2022 LDEQ report states that one portion of this subsegment is labeled as Fully Supporting for Secondary Contact Recreation (boating) while Primary Contact Recreation (swimming), Fish and Wildlife Propagation (fishing) and Oyster Propagation are labeled as Not Supporting. There is one cause of impairment for Primary Contact Recreation

(swimming): Enterococcus. There is one cause of impairment for Oyster Propagation: Fecal Coliform. For both subsegments, there are two IR categories for the suspected causes: IRC-4a and IRC-5. The suspected causes for the impairments that resulted in the IRC categories are Livestock (grazing or feeding operations), On-site treatment systems, sewage discharges in unsewered areas.

LA120704_00- Bayou Terrebonne

The 2022 LDEQ report states that two portions of this subsegment are labeled as Fully Supporting for Secondary Contact Recreation (boating) and Fish and Wildlife Propagation (fishing) while Primary Contact Recreation (swimming) and Oyster Propagation are labeled as Not Supporting. There is one cause of impairment for Primary Contact Recreation (swimming): Enterococcus. There is one cause of impairment for Oyster Propagation: Fecal Coliform. For both segments, there is one IR category for the suspected cause: IRC-5. The suspected causes for the impairments that resulted in the IRC categories are Marina/Boating Sanitary on-vessel discharges and Sewage discharges in unsewered areas.

LA120602_00- Bayou Terrebonne

The 2022 LDEQ report states that one portion of this subsegment is labeled as Fully Supporting for Secondary Contact Recreation (boating) while Primary Contact Recreation (swimming), Fish and Wildlife Propagation (fishing), and Oyster Propagation are labeled as Not Supporting. There are two causes of impairments for Fish and Wildlife Propagation (fishing); Dissolved Oxygen and Non-Native Aquatic Plants. There is one cause of impairment for Oyster Propagation: Fecal Coliform. There is one cause of impairment for Primary Contact Recreation (Swimming): Enterococcus. For the impaired subsegments, there are three IR Categories: 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, Marina/Boating Sanitary On-Vessel Discharges, Municipal Point Source Discharges, On-Site Treatment Systems, Package Plant or Other Permitted Small Flows Discharges.

LA120605_00- Bayou Pointe au Chien

The 2022 LDEQ report states that one portion of this subsegment is labeled as Fully Supporting for Secondary Contact Recreation (boating) while Primary Contact Recreation (swimming) and Fish and Wildlife Propagation (fishing) are labeled as Not Supporting. There are seven causes of impairments for Fish and Wildlife Propagation (fishing): Chloride, Dissolved Oxygen, Nitrate/Nitrite, Non-Native Aquatic Plants, Phosphorus, Sulfate, Total Dissolved Solids. There is one cause impairment for Primary Contact Recreation (swimming): Enterococcus. For the impaired subsegments, there are three IR Categories: IRC-4a, IRC-4b, and IRC-5. The suspected causes for the impairments that resulted in the IR categories are Natural Sources, Silviculture Harvesting, Unknown Sources, Introduction of Non-Native Organisms, On-Site Treatment Systems, Package Plant or Other Permitted Small Flows Discharges, Agriculture.

LA020801_00- Intracoastal Waterway

The 2022 LDEQ report states that one portion of this subsegment is labeled as Fully Supporting for Secondary Contact Recreation (boating) while Primary Contact Recreation (swimming) and Fish and Wildlife Propagation (fishing) are labeled as Not Supporting. There is one cause impairment for Primary Contact Recreation (swimming): Enterococcus. There is one cause impairment for Fish and Wildlife Propagation (fishing): Turbidity. For the impaired subsegments, there are two IR Categories: IRC-5 and IRC-5RC. The suspected cause for the impairments that resulted in the IR categories is Unknown Point Sources.

LA020304_00- Lake Salvador

The 2022 LDEQ report states that one portion of this subsegment is labeled as Fully Supporting for Secondary Contact Recreation (boating) while Primary Contact Recreation (swimming) and Fish and Wildlife Propagation (fishing) are labeled as Not Supporting. There are two causes impairments for Fish and Wildlife Propagation (fishing): Non-Native Aquatic Plants, and Turbidity. For the impaired subsegments, there are two IR Categories: IRC-4b and IRC-5RC. The suspected causes for the impairments that resulted in the IR categories are introduction of non-native organisms, and unknown sources.

3.1.9 Cultural Resources

Existing Conditions

Cultural Resources surveys have been conducted in lower Terrebonne Parish since 1926. 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). Portions of the Survey and Borings area have been examined by Phase I cultural resources survey, but most areas have not been so examined. A coordination letter with conclusion of “no historic properties affected,” for the activities described within this EA, has been sent to SHPO and federally recognized Tribes for their comment. The 30-day comment period will end on 4 December 2023. Meanwhile, knowing that activities of survey and boring are likely precedent to construction activities that may have greater effects upon cultural resources, cultural resources surveys that will provide data to be addressed before construction of any individual Reach elements discussed in this EA, are currently underway. Results of cultural resources surveys currently underway, will be coordinated in future correspondence and documents related to construction activity.

GIWW East Floodgate

The GIWW East Floodgate requires approximately 380 acres of Area of Potential Effect (APE). The GIWW itself has been surveyed by Gagliano et al. (1975), at the

reconnaissance and archival level. More recent cultural surveys investigated two pipelines that cross the GIWW near the proposed work (Boyko et al. 2019; Kelley et al. 2019). Additionally, there are at least 4 other cultural surveys (Heller et al. 2020; McIntire 1979; McIntire et al. 1981; Stout and Muller 1983; 22-6462) that cover portions of the area, although none have surveyed the eastern end of the proposed project area. These cultural surveys led to discovery of only one cultural resource within the alignment geotechnical APE. Site 16LF76 was recorded in 1975 and reported as a limited rangia shell deposit. Further testing in 1981 reported it as destroyed by development (CEI 1981). Site 16LF76, and two sites reported as prehistoric mounds but not within the current APE (16LF35 and 16LF36) indicate the need for further investigation in this area of MTG before any construction begins. However, no intact cultural resources exist within the APE for geotechnical survey and borings.

GIWW West Floodgate

The GIWW West APE is approximately 680 acres. It is within the Mandalay National NWR and is bisected by the GIWW. Aside from the survey of the GIWW following its construction (Gagliano et. al. 1975), no cultural resource surveys have occurred in this area. As a result, there are no archaeological sites recorded in this location. However, predictive modeling studies and archival studies have been conducted for nearby to the APE, and do not give high probability to cultural resources within the current marshy environment of the APE. Prehistoric sites 16TR213 and 16TR197 (3 loci of site) are within one mile distant of the APE but are not within it. These sites indicate the need for further investigation in this area of MTG before any construction begins. However, no intact cultural resources exist within the APE for geotechnical survey and borings.

Reach A Levee South of GIWW

Several cultural resources field investigations of the sites in the survey area (McGimsey 2001; Weinstein and Kelley 1989), as well as predictive modeling of the northern and southern portions of the proposed survey and borings location, have occurred (Brown et al. 2000; Moreno et al. 2011). There are three recorded sites in the vicinity of the geotechnical survey and borings area: Site 16TR3 (shell midden - destroyed), 16TR19 (NRHP eligible Mound site with Historic and Prehistoric components) and 16TR218 (Plaquemine village site and historic cemetery) are in the access areas that have been identified by their frequent and heavy use for previous agricultural activity, but would not be impacted as long has the current gravel roads are not augmented for the survey and borings. Continued use of the access areas as they currently exist, will not impact 16TR3, 16TR19, or 16TR218. Cultural resources survey currently underway will provide data to be coordinated should any expansion of the current access footprints be planned.

Reach A Levee North of GIWW

Approximately 50% of the Reach A North of GIWW for geotechnical survey and borings, overlaps previously cultivated land and has been previously disturbed. Although the northern portion of the reach has not been cultivated, a 2-track road enters that area from modern urbanization near Bayou Black. Also, this northern portion of the APE is slightly

overlapped by Land Use Study conducted by Goodwin and Associates (Draughton et al. 1999).

Sites 16TR213 and 16TR215 exist within a mile to the east, and so there is known potential that other cultural resources may exist Cultural resources survey currently underway will inform if potential effects will occur during construction of the Reach A Levee, North of GIWW. Findings of the Phase I survey will be coordinated with SHPO and federally recognized Tribes.

Minors Canal Floodgate

Two cultural resource records investigations as well as predictive modeling of this proposed survey location have occurred (Brown et al. 2000; Moreno et al. 2011). Additionally, historic map analysis suggest that a natural ridge (Bayou Mauvais Bois) exists west of the project area although it is not within the current APE. Site 16TR215 exists on this ridge to the north, and Site 16TR213 exists to the south. A cultural resources survey is underway that includes Reach A, North of GIWW.

Shell Canal East Floodgate and Levee

A reconnaissance-level land use study (Draughton et al. 1999) reviewed the area as part of a USACE channel improvement project. While no archaeological sites were recorded within the footprint of the survey area, the historic and maintained Live Oak Cemetery is located nearby and its boundaries would not be affected by survey and borings. The central portion of the survey area appears disturbed due to the development of the Shell refinery, but both the eastern and western portions appear minimally disturbed.

Reach F

There are two cultural resource surveys including Phase I examination (Kelley et al. 2009; Parrish et al. 2009), as well as another three reports of reconnaissance or predictive effort (Brown et al. 2000; Moreno et al. 2011; DeMarcay et al. 2016), that include the footprint of the proposed survey and borings location. There are no recorded archaeological sites in the footprint.

There is 100% Phase I cultural resources survey coverage of the current Reach F APE, and no further cultural resource investigations are identified as necessary within the APE at this time.

Reach J2 Levee

Two cultural resources records investigations as well as predictive modeling of this proposed survey locations have occurred (Brown et al. 2000; Moreno et al. 2009). There are no recorded sites in the footprint of the geotechnical survey and boring area. However, there are historic archaeological sites (16TR353 and Dugas Cemetery) located to the northwest straddling the Bayou Terrebonne levee ridge, and prehistoric archaeological sites (16TR310, 16TR33, and 16TR337) located to the southeast straddling the Bayou Pointe au Chien levee ridge. These sites indicate the need for further investigation in this

area of MTG before any construction begins, but they are not within the current APE for geotechnical survey and borings.

L2L Reach 1 Levee

Although no Phase I cultural resources survey has fully encompassed the APE of the survey and borings area, there are 3 separate Phase I surveys that have touched upon portions of the APE (Boyko et al 2019; Kelley and Julngelblut 2019; Williams et al. 1998). No historic properties were recorded within the APE.

3.1.10 Recreational Resources

Existing Conditions

The project areas include southern portions of Lafourche and Terrebonne parishes (south of Houma) and is within Region 3 of the Louisiana State Comprehensive Outdoor Recreation Plan (SCORP). Major bodies of water located in the study area include Lake Boudreaux, Lake Felicity, Bayou Terrebonne, Bayou Pointe aux Chenes, Bayou du Large, and many others including numerous oil field canals. The Mandalay NWR and the Pointe aux Chenes Wildlife Management Area (WMA) are located within the study area. The Lower Atchafalaya Basin and the Wisner Wildlife Management areas are also located in the vicinity. Most of the study area is comprised of brackish and saline marshes with some forested wetlands and uplands. Recreational facilities include camps, marinas, boat launch ramps, and small neighborhood parks.

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 in1996 in Terrebonne Parish, Louisiana, is accessible only by boat and has a beautiful freshwater marsh with ponds, levees, and manmade canals. The 34,488-acre Pointe aux Chenes WMA, managed by the LDWF, is in Terrebonne and Lafourche parishes approximately 15 miles southeast of Houma.

The extensive swamp and marsh habitats within the project areas have traditionally supported substantial consumptive and non-consumptive recreational uses. The most prominent recreational activities within the study 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.

Like much of coastal southeast Louisiana, much of the study area has experienced substantial coastal erosion, loss of wetlands, and increasing salinity levels. These conditions are due to numerous factors, such as extensive oil and gas exploration via a maze of canals and pipelines, subsidence, and coastal storm surges. Although the study area has traditionally provided excellent saltwater fishing, in recent years, because of the increased salinity levels, anglers have been able to catch saltwater species much farther inland than in the past.

Factors contributing to the high proportion of boating activity for fishing include the high quality of the recreational fishery, especially an abundance of red fish 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 the two parishes. In 2019, within the parishes of Lafourche and Terrebonne, there were 26,666 registered boats, 52,487 resident fishing licenses, and nearly 9,510 resident hunting licenses issued by the State of Louisiana.

Tables 21 through 23 below show the number of fishing licenses, hunting licenses, and boat registrations, respectively, within the study 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 August 2023).

Table 23: Fishing Licenses Sold in the Vicinity of Project Area - Fiscal Year 2019

Parish	Resident Freshwater	Resident Saltwater	Non-resident Freshwater	Non-resident Saltwater
Lafourche	12,071	11,085	52	48
Terrebonne	14,960	14,371	89	87
State / Parish Average	5,049	3,106	37	29

Table 24: Active Boat Registrations in the Vicinity of the Project Area - Fiscal Year 2019

Parish	Boat Registrations
Lafourche	12,010
Terrebonne	14,656
State / Parish Average	4,716

Table 25: Hunting Licenses Sold in the Vicinity of the Project Area - Fiscal Year 2019

Parish	Resident	Non-resident	Resident Duck Only	Non-resident Duck Only
Lafourche	2,821	1	1,549	1
Terrebonne	3,216	2	1,924	2
State / Parish Average	2,032	3	682	2

3.1.11 Visual Resources (Aesthetics)

Existing Conditions

The study area includes southern portions of Lafourche and Terrebonne parishes (south of Houma) and is within three sub-ecoregions which define the study area's landscape visual characteristics. These ecoregions include the Southern Holocene Meander Belts, the Inland Swamps Ecoregion, and the Deltaic Coastal Marshes and Barrier Islands (Daigle *et al*. 2006).

The Southern Holocene Meander Belts Ecoregion includes developed land along the numerous bayous formed from sediments of abandoned Mississippi River deltas. These

bayou ridges, or river terraces, are a prevalent landform and are considered high ground in the study area. Most of the communities in the study area are located along these landforms and adjacent roadways. Land use here includes cultivated crops, pastureland, marine industry, and rural residential development. Primary vistas within the study area are from these roadways which include U.S. Highway 90, State Highways 315, 57, 56, 55, 665, and Highway 1.

The landscape and vegetation between these waterways are primarily forested wetlands and uplands north of the Gulf Intracoastal Waterway with brackish and saline marshes south of the Gulf Intracoastal Waterway. Here, the Inland Swamps Ecoregion and the Deltaic Coastal Marshes and Barrier Islands Ecoregion are primarily viewed by boat. Access is limited to a few roadways 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.

The communities within the study area are very much connected to the water evidenced by the way many waterfront residents extend personal property into the waterways in the forms of docks, piers, camps, and homes. Water resources in the study area include the Intracoastal Waterway, Bayou Black, Bayou du Large, Bayou Grand Caillou, Bayou Petit Caillou, Bayou Terrebonne, Bayou Pointe aux Chenes, Bayou Lafourche, Bayou Blue, and Houma Navigation Canal. Other significant water resources located within the study area include Lake Boudreaux and Lake Quitman, located south of Houma between Bayou Grand Caillou and Bayou Petit Caillou. In addition to these major water features, hundreds of smaller natural bayous and manmade canals are located within the study area.

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 Houma Historic District consists of the city's central business district and two related residential areas including 118 buildings. The Houma Historic District Terrebonne Parish Courthouse Square, surrounded by mature live oak trees, is the historic district center. Most of the commercial buildings are located along Main Street, which parallels Bayou Terrebonne. In its central portions, Main Street has a two-story scale consisting mainly of typical early-twentieth century commercial buildings with commercial space downstairs and residential space above. Historic residences of the district are primarily shotgun houses, bungalows, or cottages.

- Mandalay 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. A portion of Reach A would intersect this NWR.

- Pointe aux Chenes WMA is approximately 15 miles southeast of Houma. This area includes 34,488 acres. Access to the interior is limited to boat travel. The only timber stands are located on the Point Farm Unit of the area, or areas adjacent to natural bayous and older oil and gas canals. Recreation use includes nature study, camping, and picnicking.

- The Wetlands Cultural 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 NWR. 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.

3.1.12 Air Quality

Existing Conditions

The EPA, Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards, (NAAQS), for six principal pollutants, called "criteria" pollutants. Table 24 lists these pollutants, which are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide (SO_2). 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 USEPA 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 Lafourche Parish and Terrebonne Parish are currently in attainment for all Federal NAAQS pollutants.

Table 26: Primary and Secondary NAAQS for Seven Contaminants Established by EPA

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

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.
(2) The level of the annual NO_2 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_3 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_3 standards.
(4) The previous SO_2 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_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

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

3.1.13 Noise

Existing Conditions

Noise pollution adversely affects the lives of millions of people. Inadequately controlled noise presents a growing danger to the health and welfare of the nation's population and

studies have shown that there are direct links between noise and health, particularly in urban areas. Noise Induced Hearing Loss (NIHL) is the most common and often discussed health impact, but research has shown that exposure to constant or high levels of noise can cause countless adverse health impacts, including but not limited to sleep disturbances, stress, mood changes, emotional imbalance, mental fatigue, headaches, cognitive and learning disorders, cardiovascular effects, and high blood pressure. (US EPA)

The Noise Control Act of 1972 establishes a national policy to regulate and promote an environment for all Americans free from noise that jeopardizes their health or welfare and the Occupational Safety and Health Administration Standards (29 CFR Part 1910) set standards regarding protection against the effects of noise exposure. The Act also serves to:

1. Establish a means for effective coordination of federal research and activities in noise control.
2. Authorize the establishment of federal noise emission standards for products distributed in commerce.
3. Provide information to the public respecting the noise emission and noise reduction characteristics of such products.

The Science of Sound

Sound is often generated by activities as a part of everyday life. Human response to sound varies depending on the type and characteristics of the sound, distance between the source and the receptor, sensitivity of the receptor, and the time of day the disturbance takes place. Sound becomes unwanted, referred to as noise, when it either interferes with normal activities, such as sleeping or conversation, or has a negative impact on the quality of life.

At a scientific level, sound and noise are technically the same. Both are vibrations in the air (or in water) that are picked up by the ear, converted to electrical impulses, and sent to the brain to be processed. The larger the waves, the stronger the vibrations, and the louder the sound. Sounds can be used to communicate, warn, navigate, and as a form of entertainment. Alternatively, noise is defined as any sound that is undesirable or disturbing because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. So, while all noise is sound, not all sound is noise.

Sound varies by both intensity and frequency and the human ear responds differently to different frequencies. Hertz, (Hz), is the standard unit of frequency in the International System of Units (SI), and it is equal to one cycle per second. Sound intensity, described in decibels (dB), is the amount of energy in a confined space. Loudness refers to how audible sounds are perceived, but it is not directly proportional to sound intensity. How loud something sounds differs from the actual intensity of that sound, and even if two sounds have equal intensity, it does not mean they are equally loud. A sound that seems loud in a quiet room might not be noticeable while amid heavy traffic. The risk of hearing damage increases with the intensity of the sound, not the loudness of sound.

A-weighing, described in *a-weighted decibels* (dBA), is a noise metric that describes steady noise levels. Since very few noises are, in fact, constant; a noise metric, A-weighted Day-night Sound Level (ADNL) was developed. Day-night Sound Level (DNL) is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 P.M. to 7 A.M.). DNL is a useful descriptor for noise because (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (Leq) is often used to describe the overall noise environment. Leq is the average sound level in dB.

Sounds encountered in daily life and their approximate levels in dBA are provided in Table 25:

Table 27: Common Noise Levels

Sound Level (dBa)	Indoor	Outdoor	Human Response
0	The softest sound that can be heard		Sounds at these levels typically don't cause any hearing damage.
10	Normal breathing	A leaf in the wind	
20	Ticking watch	Leaves rustling	
30	Whisper	Soft music	
40	Library	Babbling brook	
50	Refrigerator	Gentle rainfall	
60	Sewing Machine	Normal Conversation	
70	TV Audio	Freeway Traffic (50ft)	Some annoyance
80	Ringing Telephone	Downtown (large city)	Elevated annoyance
85	Blender	Gas lawnmower	Damage to hearing possible after 2 hours of exposure
90	Indoor concert	Motorcycle	

Natural factors such as topography and vegetation can help reduce noise levels over long distances. When ground cover or normal unpacked earth exists between the source and receptor, the ground becomes absorptive of noise energy. Refraction of sound waves occurs when sound passes through vegetative barriers and bends around plant structures. Leaves, twigs, and branches on trees, shrubs, and herbaceous growth absorb and deflect sound energy.

The study area is primarily rural, but does include areas with urban and industrial development, including Houma, Thibodeaux, Raceland, and LaRose Metropolitan Statistical Areas (MSAs). Ambient noise in the area is generated by a broad range of sources, both natural and anthropogenic. Natural noise sources include climatic sources, such as thunder, wind, and precipitation. Potential sources of anthropogenic sound include commercial shipping, dredging and construction activities, agricultural activities, industrial activities, outdoor recreation (e.g., hunting and fishing), and commercial and residential waterborne and highway traffic. No ambient noise monitoring appears to have been conducted in the study area; consequently, no quantitative data on noise levels within the study area are available for analysis.

4 ENVIRONMENTAL CONSEQUENCES

Environmental consequences, or impacts, are defined as any change to the environment whether adverse of beneficial, wholly or partially resulting from an activity, product or service. Effects can be direct, indirect, or cumulative and can be temporary (short-term) or permanent (long-term). Effects can vary in degree, ranging from only a slight discernable change to a drastic change in the environment. For this EA, short-term effects are defined as occurring during the construction phase. Long-term effects are caused by operations that would remain longer.

Impacts to Relevant Resources

This chapter of the EA provides a description of the potential impacts that could result from implementation of the proposed action as well as the potential impacts that could result should the no action alternative be implemented.

4.1.1 Aquatic Resources/Fisheries

Future Conditions with No Action

Under the no action alternative conditions, surveys and borings for the proposed project would not be conducted and no additional fisheries impacts would occur outside those described in the Final PACR/RPEIS dated May 2013. The construction of the levee, floodgates, control structures, and other features in the proposed right of way would still occur, directly and permanently converting 3,443 acres of 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 habitats include bottomland hardwood 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.

Future Conditions with the Proposed Action

The proposed action would consist of surveys and borings and related activities necessary to inform design of project features (levees, drainage structures, and floodgates) for the Morganza to the Gulf project.

Direct impacts from boring and cone penetration tests would likely cause minor habitat degradation while surveys are occurring. Additionally, sessile aquatic organisms could be injured or killed during the surveys, and motile organisms would be temporarily displaced. These effects would be minor and temporary, and aquatic resources/fisheries would quickly recover.

Indirect impacts would come in the form of minor increases in turbidity while surveys are conducted due to boat access and the removal of sediment cores. This would cause minor and temporary negative effects to aquatic resources/fisheries, and the habitat would quickly recover.

4.1.2 Wetlands

Future Conditions with No Action

Under the no action alterative conditions, surveys and borings for the proposed project would not be conducted and no additional wetlands impacts would occur outside the impacts described in the Final PACR/RPEIS dated May 2013 which identified direct impacts to approximately 3,443 acres of wetlands, including bottomland hardwood forest; swamp; fresh, intermediate, brackish, and salt marshes; and shallow open water, through their conversion to uplands and open water under the intermediate sea level rise (SLR) scenario. Table 26 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 28: Direct Impacts to Wetlands from Implementation of 1% AEP Storm Surge Risk Reduction System

Feature	Low RSLR Scenario			Intermediate RSLR Scenario			High RSLR Scenario		
Wetlands	**Tidal**	**Force Drain**	**Total Wetland**	**Tidal**	**Force Drain**	**Total Wetland**	**Tidal**	**Force Drain**	**Total Wetland**
Constructable Features	645	26	671	644	26	670	643	26	669
Programmatic Features (Total Alignment – Constructable 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 no action alternative through Louisiana Coastal Area (LCA), Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and other Federal, state, and local restoration programs.

Future Conditions with the Proposed Action

Direct Impacts

The USACE certified wetland value assessment model for fresh/intermediate marsh Wetland Value Assessment, (WVA), version 2.0, Swamp WVA version 2.0 and BLH version 1.2 was utilized to assess the potential impacts resulting from implementation of the proposed action.

In order to conduct the assessment, assumptions were made on how potential impacts might occur. The team was assumed that impacts would occur within a 15-foot-wide swath created by equipment traversing along the anticipated levee centerline. For the is analysis it was also assumed that trees less than 6-in diameter at base height (dbh) would be run over by the equipment or killed, and the equipment would track around trees greater than 6-in dbh. To avoid and minimize impacts to wetlands, surveys and borings protocol would follow the least invasive method(s) necessary to complete the work. This would include collecting survey data from pre-determined transects, accessing most areas by foot or airboat, and tracking the Cargo Buggy as directly as possible from location to location. Holes created by the borings would be backfilled to return the soil to its pre-drilled volume. Impacts to vegetation disturbed during these activities would likely be temporary as they would be allowed to regrow in areas that are not converted to other uses (such as levee).

A total of 19.150 acres (-8.900 Average Annual Habitat Units (AAHUs)), of wetlands would be directly impacted by the proposed action. This includes approximately 0.793 acres of direct, negative impacts to swamp habitats (approximately 0.240 AAHUs), approximately 0.855 acres of direct, negative impacts to BLH habitats (approximately 0.080 AAHUs), and approximately 17.502 acres of direct, negative impacts to marsh habitats (approximately 8.580 AAHUs). All borings along Reaches F and J2 would occur on existing levees and no work would be conducted off-levee in wetlands. Therefore, no wetland impacts would occur within those reaches. Total wetland impacts from the proposed action are described in Table 27 below. A description of the WVA methodology, analysis, and assumptions can be found in Appendix D.

Table 29: Total Direct Wetland Impacts Associated with the Proposed Action

Reach	Swamp		BLH		Marsh	
	Acres	AAHU	Acres	AAHU	Acres	AAHU
Reach A*	0.793	-0.240	0.679	-0.040	12.468	-6.130
Reach F	0	0	0	0	0	0
Reach J2	0	0	0	0	0	0
L2L – Reach 1	0	0	0	0	2.02	-1.14
GIWW East Floodgate	0	0	0	0	2.30	-1.00
Shell Canal Floodgate	0	0	0.176	-0.040	0.714	-0.31
Total	0.793	-0.240	0.855	-0.080	17.502	-8.580

*Reach A impacts include those associated with the Minors Canal Floodgate and the West GIWW Floodgate.

Indirect Impacts

The proposed action could have minor indirect impacts to local vegetation resources due to altered hydrology. The nature of these impacts is not known but is expected to be minor due to the relatively small area with would be disturbed.

All impacts to wetlands would be offset through either the purchase of mitigation bank credits or the construction of new, restored or enhanced habitats to replace the lost habitats in accordance with the Clean Water Act, Section 404(b)(1) and the Water Resources Development Act of 1986, Section 906, as amended.

4.1.3 Essential Fish Habitat

Future Conditions with No Action

Under the no alternative action conditions, surveys and borings for the proposed project would not be conducted and no additional fisheries impacts would occur outside those described in the Final PACR and the RPEIS dated May 2013. The construction of the levee, floodgates, control structures, and other features in the proposed right of way would directly and permanently convert 3,443 acres of 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 bottomland hardwood forest; swamp; and fresh, intermediate, brackish, and salt marshes.

Construction activities in the proposed right of way 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.

Future Conditions with the Proposed Action

The proposed action would consist of surveys and borings and related activities necessary to inform design of project features (levees, drainage structures, and floodgates) for the Morganza to the Gulf project.

Boring and cone penetration tests would likely cause minor habitat degradation while surveys are occurring. Additionally, minor increases in turbidity are expected while surveys are conducted due to boat access and the removal of sediment cores. This would cause minor and temporary negative effects to EFH, and the habitat would quickly recover.

4.1.4 Wildlife

Future Conditions with No Action

Under the no action alternative, if the surveys and borings are not conducted, the activities approved in the 2013 PACR/RPEIS would still take place. Construction of the levee, floodgates, control structures, and other features would directly and permanently impact a total of approximately 3,443 acres of habitat, which would result in unfavorable conditions for wildlife nesting, foraging and other activities. This habitat conversion would be influenced by relative sea level rise and the time when the project feature is constructed. Affected wetland habitats include bottomland hardwood forest; swamp; and fresh, intermediate, brackish, and salt marshes.

During construction, it is expected that any wildlife present would relocate to avoid construction activities and would return to those areas that have not been converted to other land uses after construction has ended.

Future Conditions with the Proposed Action

Impacts associated with the proposed surveys and borings activities would be similar to the impacts associated with the PACR EIS activities, but to a much lesser degree. Wildlife species using the marsh and open water habitat in the project area could easily avoid disturbances associated with surveys and borings activities. Birds would have ample alternative locations available for use. Mammals or reptiles that may inhabit the areas containing the proposed surveys and borings locations would likely react to disturbances by relocating to adjacent marsh or open water habitats. Once the activities have been completed, wildlife are highly likely to return to the area.

4.1.5 Threatened and Endangered Species

Future Conditions with No Action

Under the no action alternative, the project as described in the PACR and PEIS, dated May 2013, would be constructed. A Biological Assessment (BA) prepared by the CEMVN associated with the 2002 feasibility report 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 2002 BA concluded the proposed action is not likely to adversely affect any listed species under USFWS or NMFS' purview for any of the plan alternatives. 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.

Future Conditions with the Proposed Action

BAs associated with the proposed action were prepared by CEMVN and submitted to NMFS and USFWS on 17 October 2023 and 17 November 2023, 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 the NMFS, would be implemented (Appendix C).

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 (Appendix C).

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 (Appendix C).

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 (Appendix C). 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

Potential indirect impacts from the proposed action would primarily consist of effects from boring operations, notably turbidity. However, although the rise in turbidity could immediately reduce water quality in the project area, those effects would be temporary and would be reduced by movement of the tides. Any manatees or turtles in the area would be free to relocate during construction since the project area encompasses only a small area.

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.

4.1.6 Water and Sediment Quality

Future Conditions with No Action

Under FWOP, the 2013 PACR alignment would be constructed within the project ROW. The construction of set features within the PACR include the construction of 98 miles of levee at various heights and widths, floodgates, tidal exchange structures and locks. Excavation of borrow sites, dredging and dredge material placement would also occur within the proposed ROW. For the proposed construction, excavation, and dredging, there is a potential for an increase in localized turbidity plumes resulting from 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, Storm Water Prevention Plan, Section 401, Section 402, and Section 404 (b) (1) are to 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 features 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 outlines 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 study area.

Future Conditions with the Proposed Action

With implementation of the proposed action, there would be minimal, temporary effects to water quality within the surrounding water bodies during the surveying and soil boring of the subject ROW. The temporary impacts to the water quality include the temporary increase of localized turbidity within the water bodies due to data collection methods for surveying and soil boring. Examples of factors that could cause turbidity would be soil runoff due to ground disturbance, soil disturbance while moving equipment throughout water bodies, personnel moving throughout water bodies.

A draft of the CWA Section 404 (b) (1) was drafted on 19 January 2024, by the USACE Hydrology, Hydraulics, and Coastal Engineering Branch and was released for review with a draft copy of the FONSI and EA. The final 404(b)(1) evaluation, stating the proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines, was signed on 5 March 2024 and can be found within Appendix G.

A Water Quality Certificate (WQC) application was submitted to Louisiana Department of Environmental Quality (LDEQ) on 22 September 2023 in accordance with Louisiana Administrative Code 33:IX. On 30 November 2023, LDEQ provided USACE with a WQC, WQC 231130-01, for the proposed work for EA #597 Morganza to the Gulf- Borings and Surveys. Both documents may be found in Appendix D.

4.1.7 Cultural Resources

Future Conditions with No Action

The project Area of Potential Effect (APE) is low potential to disturb cultural resources. With no action, there would be no disturbance of any known or unknown cultural resources.

GIWW East

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

GIWW West

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Reach A South of GIWW

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Reach A North of GIWW

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Minors Canal Floodgate

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Shell Canal Floodgate and Levee

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Reach F

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Reach J2 Levee

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

L2L Reach 1 Levee

There are no intact cultural resources within the APE for survey and borings, and the no action would not affect cultural resources.

Future Conditions with the Proposed Action

The possible impacts that can be caused by geotechnical surveys and borings are small. While not all areas of APE containing survey and borings has been surveyed by Phase I standards, there are numerous reconnaissance studies, archival studies, and predictive model studies that cover the APE. Also, many portions of the APE have been disturbed by agricultural activities and have seen effects from these that are more spatially invasive than survey and borings.

GIWW East

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. A Conclusion of No Historic Properties Affected by the surveys and borings activities, was sent to SHPO and federally recognized Tribes on 3 November 2023. Responses of agreement with the conclusion for No Historic Properties Affected were received from SHPO on 14 December 2023, and from the Mississippi Band of Choctaw Indians on 5 January 2023. Survey and borings are an activity with minimal chance to create impacts to cultural resources and are not the same as a coordination of actual construction for the areas where they occur.

Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). A Programmatic Agreement (PA) is being coordinated at this time, for anticipated construction of the Morganza to Gulf project features, as a means to comply with the National Historic Preservation Act (NHPA) and would be executed in consultation with SHPO, federally recognized Tribes, and other interested parties. The executed PA would be consulted before any construction of project features, so that effects to cultural resources would be evaluated.

GIWW West

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the Project. Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). A Phase I cultural resources survey is underway and includes the APE for GIWW West. Findings of the Phase I survey will be coordinated with SHPO and federally recognized Tribes.

Reach A South of GIWW

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the Project. Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). Phase I cultural resources survey is underway and includes the APE for construction of Reach A, South of GIWW. Findings of the Phase I survey will be coordinated with SHPO and federally recognized Tribes.

Reach A North of GIWW

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). A cultural resources survey is underway that includes Reach A, North of GIWW. Findings will be reported, and a conclusion of effect will be coordinated with SHPO and federally recognized Tribes.

Minors Canal Floodgate

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the Project. Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). A cultural resources survey is underway that includes Reach A, North of GIWW. Findings will be reported, and a conclusion of effect will be coordinated with SHPO and federally recognized Tribes.

Shell Canal Floodgate and Levee

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. A Conclusion of No Historic Properties Affected by the surveys and borings activities, was sent to SHPO and federally

recognized Tribes on 3 November 2023. Responses of agreement with the conclusion for No Historic Properties Affected were received from SHPO on 14 December 2023, and from the Mississippi Band of Choctaw Indians on 5 January 2023. Survey and borings are an activity with minimal chance to create impacts to cultural resources and are not the same as a coordination of actual construction for the areas where they occur.
Survey and borings would inform the design of project features (levees, drainage structures, and floodgates). A (PA) is being coordinated at this time, for anticipated construction of the Morganza to Gulf project features, as a means to comply with the National Historic Preservation Act (NHPA) and would be executed in consultation with SHPO, federally recognized Tribes, and other interested parties. The executed PA would be consulted before any construction of project features, so that effects to cultural resources would be evaluated.

Reach F

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. Survey and borings will inform the design of project features (levees, drainage structures, and floodgates). There is 100% Phase I cultural resources survey coverage of the Reach F APE.

Reach J2 Levee

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. A Conclusion of No Historic Properties Affected by the survey and borings activities, was sent to SHPO and federally recognized Tribes on 3 November 2023. Responses of agreement with the conclusion for No Historic Properties Affected were received from SHPO on 14 December 2023, and from the Mississippi Band of Choctaw Indians on 5 January 2023. Survey and borings are an activity with minimal chance to create impacts to cultural resources and are not the same as a coordination of actual construction for the areas where they occur.

Survey and borings will inform the design of project features (levees, drainage structures, and floodgates). A (PA) is being coordinated at this time, for anticipated construction of the Morganza to Gulf project features, as a means to comply with the National Historic Preservation Act (NHPA) and would be executed in consultation with SHPO, federally recognized Tribes, and other interested parties. The executed PA would be consulted before any construction of project features, so that effects to cultural resources would be evaluated. The executed PA will be consulted before any construction of project features, so that effects to cultural resources will be evaluated.

L2L Reach 1 Levee

There are no intact cultural resources within the APE for survey and borings, and there are no historic properties affected as result of the project. A Conclusion of No Historic Properties Affected by the surveys and borings activities, was sent to SHPO and federally recognized Tribes on 3 November 2023. Responses of agreement with the conclusion for No Historic Properties Affected were received from SHPO on 14 December 2023, and from the Mississippi Band of Choctaw Indians on 5 January 2023. Survey and borings

are an activity with minimal chance to create impacts to cultural resources and are not the same as a coordination of actual construction for the areas where they occur.

Survey and borings will inform the design of project features (levees, drainage structures, and floodgates). A (PA) is being coordinated at this time, for anticipated construction of the Morganza to Gulf project features, as a means to comply with the National Historic Preservation Act (NHPA) and would be executed in consultation with SHPO, federally recognized Tribes, and other interested parties. The executed PA would be consulted before any construction of project features, so that effects to cultural resources would be evaluated. The executed PA will be consulted before any construction of project features, so that effects to cultural resources will be evaluated.

4.1.8 Recreational Resources

Future Conditions with No Action

Under the no action alternative, no direct, indirect, or cumulative impacts to recreational resources would occur. Conditions within the recreational environment would continue as they have in the past and would be dictated by the natural land use pattens and processes that exist in the area.

Future Conditions with the Proposed Action

With the proposed surveys and borings, no direct, indirect, or cumulative impacts to public recreational facilities, such as boat launches and marinas, would occur. 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 surveys and borings activities.

4.1.9 Visual Resources (Aesthetics)

Future Conditions with No Action

Under the no action alternative, no direct, indirect, or cumulative impacts to visual resources would occur. Visual resources would continue as they have in the past and would be dictated by the natural land use pattens and processes that exist in the area.

Future Conditions with the Proposed Action

No direct, indirect, or cumulative impacts to visual resources would occur with the proposed surveys and borings. A portion of Reach A would intersect the Mandalay National Wildlife Refuge; however public access and use within this portion of the Refuge is limited.

4.1.10 Air Quality

Future Conditions with No Action

Without implementation of the proposed action, it is likely no direct or indirect adverse impacts to ambient air quality in Lafourche and Terrebonne Parishes would occur and the parishes are projected to remain within the Attainment Status per LDEQ.

Future Conditions with the Proposed Action

With implementation of the proposed action, direct and indirect adverse impacts to ambient air quality within the project area—and possibly farther afield—are expected to be temporary and primarily due to the emissions of construction equipment. Due to the limited duration of the proposed project, any adverse impacts to ambient air quality are expected to be short-term and minor and are not expected to cause or contribute to a violation of federal or state ambient air quality standards. Once all temporary construction activities associated with the selected alternative cease, air quality within the vicinity is expected to return to pre-construction conditions.

4.1.11 Noise

Future Conditions with No Action

There are several residential and commercial properties that, depending upon their proximity to the project areas, could be exposed to adverse impacts from nuisance noise. Heavy machinery associated with the survey and boring activities would be limited to daylight hours.

Localized and temporary noise impacts would likely result in wildlife and fishery resources temporarily leaving project 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.

Cumulative impacts to noise levels resulting from implementation of the surveys and borings activity 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 relocate 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 survey and borings activities.

Future Conditions with the Proposed Action

Impacts associated with the surveys and borings activities would be similar to those described in future without project conditions. Noise generated from construction equipment would be of varying levels, ranging anywhere from 80dB, up to 130dB.

Overall, the direct impacts to noise levels would be short-term, minor, adverse conditions during the construction period. Based upon the proposed activities, no long-term direct impacts to noise levels within the project area is anticipated.

5 CUMULATIVE IMPACTS ANALYSIS

The Council on Environmental Quality's (CEQ) regulations (40 CFR 1500-1508) implementing the procedural provisions of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.), define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. (40 CFR 1508.7) Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."

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.

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 resources. 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).

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 the Deltaic Plain were broadly addressed through the following subheadings: (https://lacoast.gov/new/projects/list.aspx)

- Previously Constructed Wetland or Ecosystem Restoration Projects in the Deltaic Plain – 554
- Reasonably Foreseeable Wetland or Ecosystem Restoration Projects in the Deltaic Plain – 165
- Additional Authorized Projects in the Deltaic Plain - 6

As of November 2023, there are a total of 279 CWPPRA projects within the Deltaic Plain. Of those, 107 are active, 122 are complete, and 50 are deauthorized.

Levees and Floodgate Systems:

Billions of dollars have been spent in coastal Louisiana to construct flood risk reduction projects. Projects such as the Lake Pontchartrain & Vicinity project and Westbank & Vicinity project, as part of the Greater New Orleans HSDRRS, have constructed approximately 213 miles of levees, floodwalls, closure structures, and pump station structures. The direct and indirect effects of implementing those HSDRRS projects, the significant environmental resources, ecosystems, and human communities that are affected, and the effects important from a cumulative impact's perspective have been documented in the Comprehensive Environmental Document (CED), Record of Decision signed 1 December 2021. The CED is a cumulative impact assessment of the HSDRRS projects that were evaluated in 66 Individual Environmental Reports (IERs) supplemental IERs and EAs. All of these documents are available to the public via the USACE NEPA document website:
https://www.mvn.usace.army.mil/Missions/Environmental/NEPA-Compliance-Documents/HSDRRS-Projects/

The geotechnical analysis being conducted at various locations along the approximately 98-mile alignment of proposed earthen levees and floodgates identified in the final PACR/RPIES. The impacts from the eventual construction of the MTG project would be an additive impact to other similar projects constructed in the past, present and into the future. The MTG project would result in conversion of established wetland habitat to earthen levees and the floodgates for the waterways would be closed during named storm events and over time would be closed more frequently due to sea level rise.

Longer term cumulative impacts would include a reduction in existing habitat used by various terrestrial and aquatic organisms for shelter, nesting, feeding, roosting, cover, nursery, EFH and other life requirements.

6 MITIGATION PLANNING

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. 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).

Efforts taken to avoid, minimize, rectify and or reduce habitat impacts for the proposed action still resulted in unavoidable impacts to fish and wildlife resources. In compliance with Implementation guidance for Section 1163 of the WRDA of 2016, certified Wetland Value Assessment Models for swamp, BLH and Fresh/Intermediate Marsh were run to quantify the impacts requiring mitigation. The results of these models produced AAHUs for each impacted habitat type that would require compensatory mitigation (Table 28). All forested impacts would be mitigated in the same river basin where the impacts occurred (Terrebonne). All tidal marsh impacts would be mitigated within the Deltaic Plain. All impacts incurred within the LA coastal zone would be mitigated within the LA coastal zone.

Table 30: Proposed Action Compensatory Mitigation Requirement (AAHUs)

Reach	Swamp		BLH		Marsh	
	Acres	AAHU	Acres	AAHU	Acres	AAHU
Reach A*	0.793	-0.240	0.679	-0.040	12.468	-6.130
Reach F	0	0	0	0	0	0
Reach J2	0	0	0	0	0	0
L2L – Reach 1	0	0	0	0	2.02	-1.14
GIWW East Floodgate	0	0	0	0	2.30	-1.00
Shell Canal Floodgate	0	0	0.176	-0.040	0.714	-0.31
Total	0.793	-0.240	0.855	-0.080	17.502	-8.580

Because the habitat impacts, and resulting mitigation requirement, incurred from the proposed action are minimal, the purchase of in-kind mitigation bank credits will be pursued to satisfy the mitigation requirement. If sufficient in-kind mitigation bank credits are not available or excessively expensive at the time of solicitation, the Corps will evaluate mitigation sites that could be constructed to compensate for habitat impacts.

7 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Clean Air Act of 1972

The Clean Air Act (CAA) sets goals and standards for the quality and purity of air. It requires the Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. Much of the project area is in Terrebonne Parish, with portions located in Lafourche Parish. These parishes are currently in attainment of 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 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 Water Quality Certification was provided to the LDEQ on 22 September 2023 in accordance with LAC 33:IX. On 30 November 2023, LDEQ provided USACE a Water Quality Certification, WQC 231130-01, for the proposed work for the Environmental Assessment 597 Morganza to the Gulf- Borings and Surveys. (Appendix E)

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

Section 404 of the Clean Water Act 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 was conducted by USACE Hydrology, Hydraulics, and Coastal Engineering Branch on 19 January 2024. No comments were received during the 30-day review period. The final 404(b)(1) evaluation, stating the proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines, was signed on 5 March 2024. The evaluation can be found in Appendix G.

Coastal Zone Management Act of 1972

The Coastal Zone Management Act (CZMA) requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." The USACE coordinated the proposed action with the Louisiana Department of Natural Resources (LDNR). On 29 February 2024, the LDNR responded with determination C20230151 stating that the

project, as proposed in the application, is consistent with the Louisiana Coastal Resources Program.

Endangered Species Act of 1973

The Endangered Species Act (ESA) is designed to protect and recover threatened and endangered (T&E) species of fish, wildlife and plants. A biological assessment was prepared and submitted to NMFS on 17 October 2023 and USFWS on November 17, 2023, as part of on-going coordination with NMFS and USFWS for listed T&E species, including the West Indian manatee, Gopher tortoise, Ringed map turtle, Red-cockaded woodpecker, Louisiana quillwort, Eastern black rail, 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 a letter dated 22 February 2024, USFWS concurred with USACE's conclusions that the proposed action is not likely to adversely affect the ESA species listed, and/or designated critical habitat.

In an email dated 17 October 2023, NMFS acknowledged receipt of the project information and assigned the project tracking number SERO-2023-02587. In a letter dated 21 February 2024, NMFS concurred with USACE's conclusions that the proposed action is not likely to adversely affect the ESA species listed, and/or designated critical habitat.

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. However, CEMVN did assess the potential EJ impacts to the human environment from the surveys and borings action, including impacts to access roads and to those who live along them and from noise.

In general, access routes, including private and public roads, will be used to transport equipment and workers to conduct the surveys and borings. A review of the structural engineer's project description and discussion of past survey and borings projects with a structural engineer yielded a better understanding of the types of equipment expected to be used, how it will be moved to the work site, and how this could impact those who live along the access routes.

- No impacts are expected from utilization of the boring test site access roads since there are expected to be two trips per day to each site, in a 4 -wheel drive truck. Equipment used for the borings would be trucked in and left at the remote site where the borings would be conducted and retrieved at a later time once work is completed, often days or weeks later. Use of public access roads by people who live nearby would not be impacted due to the low volume of daily trips

expected. There would be no real notice of change of use to the road, degradation of the road or noise increases to those who may live along the access routes and in the general vicinity of the borings work.

- The borings tests would not cause noise impacts as most of the areas are in remote locations or in non-residential locations. Additionally, borings extractions themselves produce minimal decibels. All in all, there are expected to be no impacts to communities with EJ concern from the surveys and borings tests.

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. Impacts to residents in areas of EJ concern from implementation of the proposed action are not expected to occur and therefore a more detailed assessment to determine if impacts are high, adverse, and disproportionate is not warranted.

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 surveys and borings activities would facilitate the design of flood risk reduction measures for the authorized project. Further analysis of the direct, indirect and cumulative impacts of the project, including impacts to areas of EJ concern, will be addressed in the SEIS.

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 actions would not promote future development within the floodplain that otherwise would not occur.

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 surveys and boring activities were developed to avoid and minimize impacts to wetlands where practicable. All unavoidable impacts would be mitigated as described in Chapter 7.

Fish and Wildlife Coordination Act of 1934

The Fish and Wildlife Coordination Act (FWCA) provides authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. 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 (FWCAR) that details existing fish and wildlife resources in a project area, potential impacts due to a proposed project and recommendations for a project. The Final CAR recommendations were received on 21 March 2024. The recommendations and USACE responses are set forth below.

1. Full in-kind compensation (quantified in AAHUs) should be provided for unavoidable net adverse project impacts on forested wetlands, marsh, and associated submerged aquatic vegetation. Since survey and borings impacts will spatially overlap with levee construction impacts for MTG Reach A, the Service will consider only requiring mitigation for the construction impacts. Any Boring impacts that do not spatially overlap with construction impacts should still be mitigated. The Service should be consulted in the development of plans and specifications for mitigation features.

   CEMVN Response: Concur. The compensatory mitigation required for impacts resulting from implementation of this action will be addressed via the purchase of mitigation bank credits. If not, the Corps will evaluate potential mitigation sites that could be constructed to compensate for habitat impacts.

2. 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 Louisiana Department of Wildlife and Fisheries (LDWF). Recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nests during the nesting season (October through mid-May). If a bald eagle nest occurs or is discovered within 1,500 feet of the proposed project area, then an evaluation must be performed to determine whether the project

is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: https://www.fws.gov/media/bald-eagle-monitoring-guidelines-southeastern-us. Any take should be reported to this office and LDWF.

CEMVN Response: Concur. During 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 the USACE. If a bald eagle nest occurs or is discovered within 1500 feet of the RP 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.

3. 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. The implementation of the TSP would include Standard Manatee Conditions for In-Water Activities, Protected Species Construction Conditions, and Vessel Strike Avoidance Measures. In summary, the contractor will be responsible for instructing all personnel regarding the potential presence of protected species in the area and the need to avoid collisions with these animals. If protected species are sighted within 150 feet of the construction area, all operations of moving equipment must cease until the species has departed the area on its own volition. There also would be reporting requirements, restrictions on vessel operation, and restrictions on the use of siltation barriers. Construction guidelines can be found in Environmental Appendix C.

4. Avoid adverse impacts to nesting wading bird colonies through careful design of project features and timing of construction. The Service and 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. USACE will conduct on site surveys, in coordination with USFWS, to determine the presence of any wading bird colonies.

5. 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: The Corps will make every effort to avoid impacts and minimize disturbances to the alligator snapping turtle and coordinate with the Service regarding any unavoidable impacts caused by project features.

6. The Service recommends avoiding impacts on the Mandalay NWR. If impacts cannot be avoided, impacts will need to be mitigated for on the Mandalay NWR. For surveys and borings, 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: The Corps will make every effort to avoid impacts to the Mandalay National Wildlife Refuge and coordinate with the refuge regarding any unavoidable impacts caused by project features.

7. The impacts to Essential Fishery 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: Concur. USACE will work, in coordination with NMFS, to address any necessary mitigation and monitoring plan which fully compensates for all EFH impacts.

8. 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 300 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: Acknowledged. Access to project locations will rely upon utilization of existing roads and waterways.

9. The Service recommends that the USACE contact the Service for additional consultation if:

   - the scope or location of the proposed project is changed significantly,
   - new information reveals that the action may affect listed species or designated critical habitat.

- the action is modified in a manner that causes effects to listed species or designated critical habitat; or
- 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. The USACE will continue to coordinate with the resource agencies throughout the project phases.

Hazardous, Toxic and Radioactive Waste (HTRW)

The USACE is obligated under Engineering Regulation (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) has been completed and is included in Appendix F.

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. A draft of EA #597 was provided to the NMFS for review and comment during the public comment period. No comments were received from the agency and in an email dated 6 March 2024, NMFS indicated that this concludes our coordination obligations.

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

The Migratory Bird Treaty Act of 1918, as amended (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 previously mentioned 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 was removed from the List of Endangered and Threatened Species in August 2007 but continues to be protected under the Bald and Golden Eagle Protection Act (BGEPA) and the MBTA. During nesting season, construction must take place outside of USFWS/LDWF buffer zones.

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 the surveys and borings activities, 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 activity 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.

National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act of 1966, as amended, (NHPA) requires federal agencies to consider 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.

CEMVN has concluded that the proposed surveys and borings activities would have no effect on historic properties. A letter was sent to SHPO 3 November 2023. The SHPO agreed with this conclusion with a response dated 14 December 2023, and the Mississippi Band of Choctaw Indians agreed with the conclusion on 5 January 2024. No other responses were received.

Tribal Consultation

NEPA, Section 106 of the National Historic Preservation Act, Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), the American Indian Religious Freedom Act, and related statutes and policies have a consultation component. In accordance with CEMVN's responsibilities under NEPA, Section 106, and Executive Order 13175, CEMVN will offer federally recognized Indian Tribes the opportunity to review and comment on the potential of the proposed action to significantly affect protected tribal resources, tribal rights, or Indian lands.

8 PUBLIC INVOLVEMENT AND COORDINATION

Public involvement is an important part of planning and decision-making. Agencies, nongovernmental organizations, (NGOs), and citizens provide 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 NGOs regarding the content of EA #597 in all stages is critical to achieving the USACE objective of enhancing trust and understanding with stakeholders, teammates, and the public through strategic engagement and communication.

A Public Notice was posted on the USACE website announcing the start of the 30-day review and comment period for EA #597, which ran from 23 January 2024 to 22 February 2024. Due to a technical error on the website, the public comment period was extended an additional 5 days and concluded on 27 February 2024. A notice of this extension was placed on the website. There were no comments received during the public review and comment period.

Preparation of EA #597 was coordinated with appropriate federal, Tribal, state, and local interests, as well as environmental groups and other interested parties. The following

agencies, and other interested parties, received copies of draft EA #597 and its associated FONSI during the public review and comment period:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Coastal Protection and Restoration Authority Board of Louisiana
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer
Louisiana Departments of Transportation and Development

Federally Recognized Tribes

Alabama-Coushatta Tribe of Texas
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Chitimacha Tribe of Louisiana
Jena Band of Choctaw Indians
Mississippi Band of Choctaw Indians
Muscogee (Creek) Nation
Seminole Nation of Oklahoma
Tunica Biloxi Tribe of Louisiana

9 CONCLUSION

The proposed project consists of surveys and borings being conducted along eleven areas. of a proposed 98-mile levee alignment in Lafourche and Terrebonne Parishes. Surveys and borings are needed to inform design of project features (levees, drainage structures, and floodgates) for Morganza to the Gulf project.

This office has assessed the environmental impacts of the proposed surveys and borings activities and has determined that with implementation of the mitigation plan, the proposed action would have no significant adverse impact on the human and natural environment.

10 PREPARED BY

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