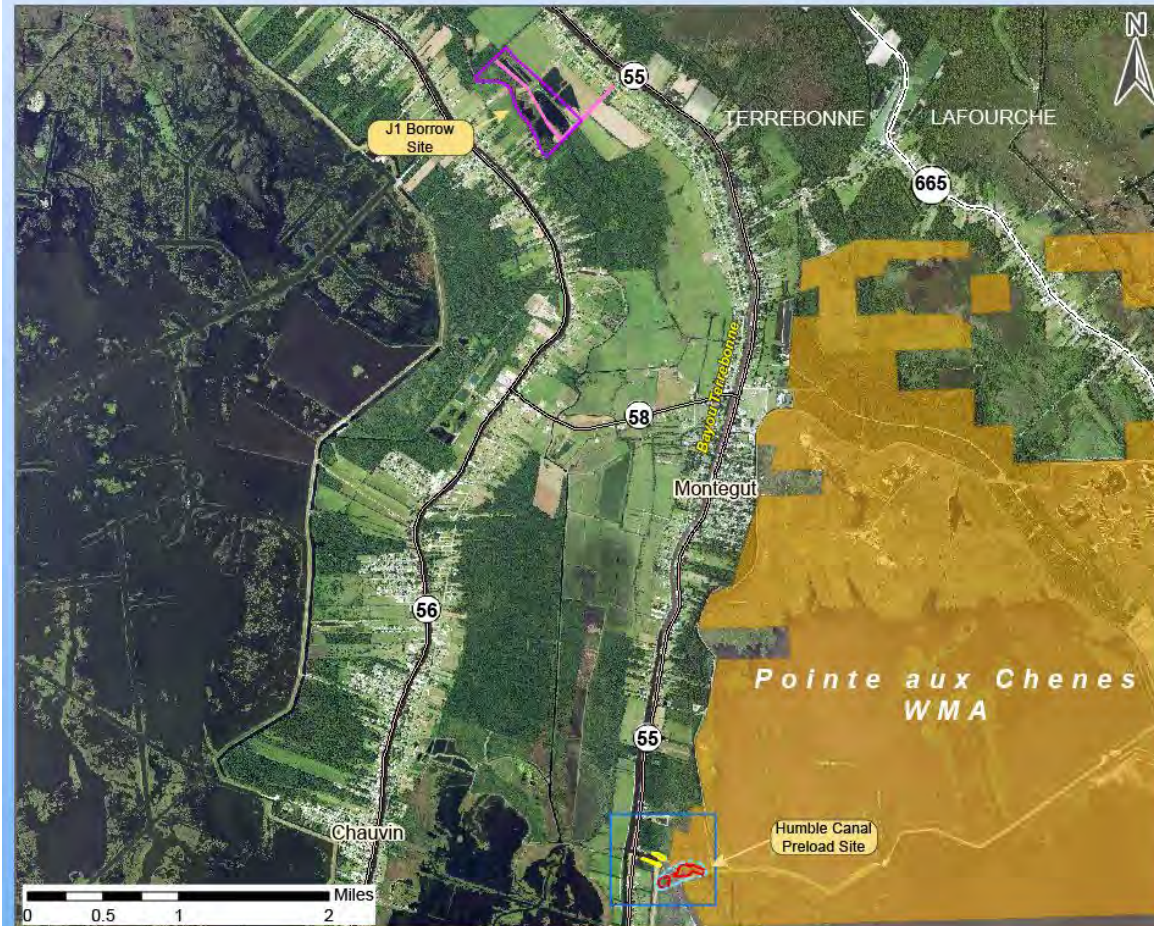


DRAFT ENVIRONMENTAL ASSESSMENT #583
Mississippi River and Tributaries
Morganza to the Gulf of Mexico, Louisiana (MRT-MTG)
Humble Canal Gate Site Preparation and Initial Levee Preload
Terrebonne Parish, Louisiana



US Army Corps of Engineers
New Orleans District

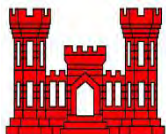
Legend

- Preload Limits
- Preload ROW
- Preload Staging
- J1 Borrow Pit
- Borrow Pit Access
- Pointe aux Chenes WMA
- Parishes

Area of Detail



Date: 8/4/2021



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 River Valley Division, Regional Planning and Environmental Division South, has prepared this Environmental Assessment (EA) #583 for New Orleans District (CEMVN) to evaluate the impacts of constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site. This preload levee would tie-in to existing levees on the Morganza to the Gulf levee system, between Reaches I-3 and J-2 (See Appendix A, Figure A-1 for levee section status map). Section 2.2 has further details of the proposed action.

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

This Humble Canal preload levee project is in preparation for the proposed future construction of the Humble Canal sector gate, associated floodwalls, and earthen levees. A future supplemental environmental impact statement will address the proposed plans for constructible features for the Mississippi River and Tributaries Morganza to the Gulf of Mexico ("MRT-MTG") project and address changes to the project since the Revised Programmatic Environmental Impact Statement (PEIS) (2013).

Please see Appendix F for a list of acronyms included in this document.

1.1 Authority

The MRT-MTG project was originally authorized for Federal construction by Section 1001(24) of the Water Resources Development Act (WRDA) of 2007, Public Law 110-114, in accordance with the Reports of the Chief of Engineers dated August 23, 2002 and July 22, 2003.

In accordance with the Post Authorization Change Report of the Chief of Engineers dated July 8, 2013, MRT-MTG was then re-authorized by Section 7002(3)5 of the Water Resources Reform and Development Act (WRRDA) 2014, Public Law (P.L.) 113-121, as follows:

“SEC. 7002(3)5. 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.— “

A. State	B. Name	C. Date of Report of Chief of Engineers	D. 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

A MRT-MTG project history timeline of authorizations, studies, and tropical storm events from 1985 through 2012 is provided in the Table B-1 of Appendix B. Figure 1 below provides an abbreviated timeline of actions and NEPA documentation associated with MRT-MTG.



Figure 1 Morganza to the Gulf Timeline

1.2 Purpose and Need for the Proposed Action

The purpose of the proposed action is to prepare the site for a floodgate at Humble Canal as a feature of the MRT-MTG project that will provide hurricane and storm damage risk reduction for the communities located within the MRT-MTG levee system in accordance with the project described in the re-authorization of the MRT-MTG project in Section 7002(3)5 of WRRDA 2014, as updated by the MRT-MTG Engineering Documentation Report (EDR) which is being concurrently prepared. The overarching goal is to reduce the risk to people and property in the vicinity of Houma, Louisiana. All project benefits are related to hurricane and storm damage risk reduction. No flood damage risk reduction, navigation, or ecosystem restoration benefits are quantified for this project. The project is needed because of the increasing susceptibility of coastal communities to storm surge due to wetland loss, sea level rise, subsidence, and climate change.

1.3 Data Gaps and Uncertainties

Because natural systems are complex and consist of an intricate web of variables that influence the existence and condition of other variables within the system, all hurricane and storm damage risk reduction projects contain certain inherent uncertainties. The effects of tropical storms, increased sea level rise, and climate change on each project's performance are uncertain and are addressed through future projections based on existing information. All models used for this study rely on mathematical representations of current and future conditions to quantify and predict the future success and benefits of these mitigation projects. No model can account for all relevant variables in an evolving coastal system. Additionally, there is inherent risk in reducing complex natural systems to mathematic expressions driven by simplified interactions of key variables. As such, how the proposed projects will actually perform and the benefits that will result from their creation are a 'best guess' based on what we presently know about existing ecosystems and the results of already constructed restoration projects.

1.4 Prior NEPA Documents

Two previous NEPA documents are associated with the proposed project.

- (1) 2002, Final PEIS titled "Mississippi River & Tributaries – Morganza to the Gulf of Mexico Hurricane Protection." This document evaluated the impacts associated with the proposed Highway 57 Alternative that covers upgrading multiple existing forced drainage system levees in southern Terrebonne and Lafourche Parishes, constructing new levees and water control structures, and operating the water control structures and floodgates during tropical storm or hurricane tidal surges.
- (2) 2013, Final Revised Programmatic Environmental Impact Statement (RPEIS) titled "Mississippi River & Tributaries - Morganza to the Gulf of Mexico, Louisiana." This document evaluated changes in existing conditions and evaluates all direct, indirect, and cumulative environmental impacts of increased levee footprints and new levee alignments resulting from the incorporation of post-Katrina design criteria. Four constructible features received sufficient analysis of impacts in this RPEIS and these are as follows: 1) Levee Reach F1 and F2, 2) Levee Reach G1, 3) Houma Navigation Canal Lock Complex (HNC), and 4) Bayou Grand Caillou Floodgate. The Record of Decision was signed on December 9, 2013.

Project Information regarding the MRT-MTG project may be found at <https://www.mvn.usace.army.mil/About/Projects/Morganza-to-the-Gulf/>.

1.5 Public Concerns

Prior to the original FPEIS for the MRT-MTG levee system, CEMVN held a scoping meeting for a proposed hurricane and storm damage risk reduction system on May 12, 1993, in Houma, Louisiana. Written comments were accepted from April 7 to May 24, 1993. On the draft PEIS, public meetings also occurred between November 13, 2001 to February 21, 2002. The meeting was attended by more than 100 participants (Standing Room Only). Attendees included Chief Albert White Buffalo Naquin, Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw tribe. An article on the meeting appeared in the Houma Courier on September 10, 2009 (See References). For the draft RPEIS a public meeting in Houma, LA was held on January 31, 2013. Verbal comments received at the Public Hearings were made part of the Public Meeting transcript and were included within the comment database. During the comment period, approximately 473 comments were received via email, letter, and/or fax.

The public expressed concern related to the importance of providing hurricane and storm damage risk reduction for businesses and residences. Other concerns included potential adverse impacts to existing marshes, improvement of marsh habitat both inside and outside the proposed levee system, maintaining or improving ingress and egress of marine organisms for the benefit of commercial fisheries, and avoiding adverse water quality impacts.

1.6 Prior Studies and Reports

A number of studies, reports, and environmental documents on water resources development in the project area have been prepared by the USACE, other Federal, state, and local agencies, research institutes, and individuals. Prior studies, reports, and projects are described below

Additional information on other activities in the vicinity of this project is available online: <http://www.mvn.usace.army.mil/About/Offices/Operations/BeneficialUseofDredgedMaterial.aspx>

The Larose to Golden Meadow project (LGM) is a ring levee system that provides hurricane and storm damage risk reduction to roughly 25,000 people living on both sides of Bayou Lafourche, about 50 miles southwest of New Orleans in Lafourche Parish. The 43-mile levee system extends from Larose to a point two miles south of Golden Meadow, Louisiana. The proposed Morganza to the Gulf levee would be built on the north east and northern sections of the existing LGM levee system (C-North).

The Gulf Intracoastal Waterway (GIWW) is the portion of the Intracoastal Waterway located along the Gulf Coast of the United States. It is a navigable inland waterway extending approximately 1,050 miles from Carrabelle, Florida to Brownsville, Texas. The waterway provides a channel with a controlling depth of 12 feet, designed primarily for barge transportation. The GIWW was authorized by the River and Harbor Act of July 24, 1946, and prior River and Harbor Acts. Construction was completed in 1949. The GIWW extends across the Morganza to the Gulf project area from Bayou Lafourche at Larose, through Houma, and to the Atchafalaya River.

The Houma Navigation Canal (HNC) is a navigable waterway connecting the city of Houma and the GIWW directly to the Gulf of Mexico. The HNC was completed by local interests in 1962, but it is currently maintained by the Federal Government. The authorized channel is 15 feet deep and

150 feet wide from its intersection with the GIWW to Mile 0.0, and 18 feet deep by 300 feet wide to the Gulf of Mexico. The oil and gas industries in Houma rely heavily upon the 40-mile channel as a critical path to the Gulf of Mexico. A WRDA 1986, Section 203 study to deepen the HNC has been authorized by Congress; however, initiation of construction as a Federal project requires Congressional appropriation, programming authority and execution of a cost-sharing agreement between the Government and a non-Federal sponsor.

Terrebonne Parish Non-Federal Levees. Terrebonne Parish, Louisiana contains approximately 100 miles of NFL which are associated with the parish forced drainage system. In late September of 2005, Hurricane Rita brought catastrophic tidal inundation from its storm surge to the communities of Terrebonne Parish. The storm surge and the resultant flooding overtopped and in some instances severely damaged existing NFL systems, causing millions of dollars in property damage. Hurricanes Gustav and Ike in 2008 also caused damage to the Terrebonne NFL system. Pursuant to a limited authorization in Public Law 109-234, EA #450 (FONSI signed 14 January 2009) evaluated impacts associated with the repair, replacement, modification, and improvement of 6.1 miles of the NFL that were damaged by the storm surge. Supplemental EA #555 (FONSI signed 24 May 2019) later evaluated the impacts of completing mitigation to offset brackish marsh impacts from mitigation measured associated with EA #450.

TLCD Risk Reduction Projects

The Terrebonne Levee Conservation District (TLCD) and/or other non-Federal entities, started work on reaches that were initially proposed to be a part of the MRT-MTG project, at their own expense, acknowledging that there was no signed Project Partnership Agreement (PPA) or In Kind Memorandum of Understanding (In Kind MOU) in place at the time that construction was initiated. This work happened independently and is not a component of the Federal project. See Figure A-1 (Appendix A) for details. Note, however, that in 2019, an In-Kind MOU was executed by USACE and the proposed non-Federal sponsors. That In-Kind MOU identified work that the proposed non-Federal sponsors proposed to undertake in advance of the execution of the project PPA and any such work for which construction was initiated prior to signing of the In Kind MOU would be eligible to be determined by USACE to be a part of the Federal MRT-MTG project.

2 Alternatives Including the Proposed Action

2.1 Planning Goals, Objectives and Constraints

The intent of the proposed action is to construct the preload foundation for the Humble Canal feature of the MRT-MTG project and its system of levees and floodwalls. The planning horizon, or period of analysis, for this project is 50 years.

Proposed Alternatives

The alternatives are technically feasible and meet the project purpose and need. These alternatives are:

1. No Action Alternative
2. Action Alternative (i.e. the proposed action)

Wetland Value Assessment

Evaluations of the effects of the alternatives to fish and wildlife resources were conducted using the Wetland Value Assessment (WVA) methodology. Implementation of the WVA requires that habitat quality and quantity (acreage) are measured for baseline conditions and predicted for future without-project and future with-project conditions. Each WVA model utilizes an assemblage of variables considered important to the suitability of that habitat type to support a diversity of fish and wildlife species.

The WVA provides a quantitative estimate of project-related impacts to fish and wildlife resources; however, the WVA is based on separate models for bottomland hardwoods (BLH), chenier/coastal ridge, fresh/intermediate marsh, brackish marsh, and saline marsh. Although, the WVA may not include every environmental or behavioral variable that could limit populations below their habitat potential, it is widely acknowledged to provide a cost-effective means of assessing restoration measures in coastal wetland communities.

The WVA models operate under the assumption that optimal conditions for fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated and expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of: (1) a list of variables that are considered important in characterizing community-level fish and wildlife habitat values; (2) a Suitability Index (SI) graph for each variable, which defines the assumed relationship between habitat quality (SI) and different variable values; and, (3) a mathematical formula that combines the SI for each variable into a single value for wetland habitat quality, termed the Habitat Suitability Index (HSI).

The product of an HSI value and the acreage of available habitat for a given target year is known as the Habitat Unit (HU) and is the basic unit for measuring project effects on fish and wildlife habitat. HUs are annualized over the project life to determine the Average Annual Habitat Units (AAHUs) available for each habitat type. The change (increase or decrease) in AAHUs for each future with-project scenario, compared to future without-project conditions, provides a measure of anticipated impacts. A net gain in AAHUs indicates that the project is beneficial to the fish and wildlife community within that habitat type; a net loss of AAHUs indicates that the project would adversely impact fish and wildlife resources.

All alternative WVAs were calculated using the intermediate relative sea level rise (RSLR) scenario and a 50-year project life. See Appendix C for the WVA model results and summary of assumptions. The draft U.S. Fish and Wildlife Coordination Act Report (FWCAR) dated May 24, 2021 (Appendix D) also offers information about the WVA process.

2.2 Proposed Action

The proposed action consists of constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site (“the site,” see Figure 2) for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee would provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee would tie-in to Reach I-3 and J2 (See Figure A-1 in Appendix A) which were previously constructed by TLCD and/or other non-Federal entities.

The main project site is approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is located on Humble Canal approximately 1/3 mile east

of the Bayou Terrebonne/Humble Canal intersection (Lat 29 26 08.5, Lon -90 33 44.0). A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately 500 linear feet and tie-in to levees that have been independently constructed by TLCD and others prior to this EA. It will have a maximum elevation of approximately +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach "J-2" Levee. It will have a maximum elevation of approximately +24 ft NAVD88.

Approximately 150,000 cubic yards (cyd) of fill and borrow material comprised of mostly of clay and some sand and rock will be used to construct the preload levee. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation. The borrow material shall be of naturally occurring earth materials. Materials that are classified in accordance with American Society for Testing and Materials, Unified Soil Classification System (ASTM D 2487) as CL (silty clay or sandy clay) or CH (fat clay) with less than 35% naturally occurring sand content are suitable for use as levee construction material. Materials classified as ML (silt) are suitable if blended to produce a material that classifies as CL or CH according to ASTM D 2487. Allowable borrow material cannot have organic content greater than 12 percent by weight, as determined by ASTM D 2974, Method C.

The borrow material proposed to construct the preload levee would be hauled from the Terrebonne Levee and Conservation District's 100-acre J-1 borrow site which is adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the project site and has been pumped and drained since the 1950s and utilized for farming sugar cane and cattle grazing. The J-1 borrow site has been cleared of vegetation and subdivided into three categories for use. Figure 2 depicts the site location and the three subdivided areas of the J-1 borrow site. Acreage and specific planned use for each subdivided site is listed below (see Appendix A, Figure A-2b map):

1. Area A (29 acres) – primary borrow source
2. Area B space between the ponds (17 acres) – additional borrow
3. Access Road between Area B and C (additional borrow if needed)

It should be noted that the Sponsor has stated Area C is currently being used for another contract and will not be available for use in the Humble Canal preload levee project. The borrow site contains a makeup of 40% silty clay loam and 60% schriever clay. There is no evidence of potential contaminants in the soil.

The estimated construction duration would be 430 Days (5 day/week; 10 hr/days), the equipment that may be used in the various stages of construction of the preload levee includes, but is not limited to the following:

- Excavators, bulldozers, marsh excavators and buggies, barges, and pontoons will be used in clearing and grubbing, excavation, placement of levee and roadway fill, rock, and gravel.
- Dump trucks will be used to haul fill between the borrow pit and construction site and to haul other construction materials. See Section 4.15.2 for roadways utilized.
- Water or spray trucks will be used to process borrow material.
- Rollers will be used to compact levee and roadway fill.

- Excavator with mounted hollow mandrel will be used to install the vertical wick drains.
- A work boat will be used to install navigation aids in Humble Canal and oversee construction operations from the water when necessary.
- 1/2-ton and 1-ton work trucks will also be used on-site for hauling equipment.

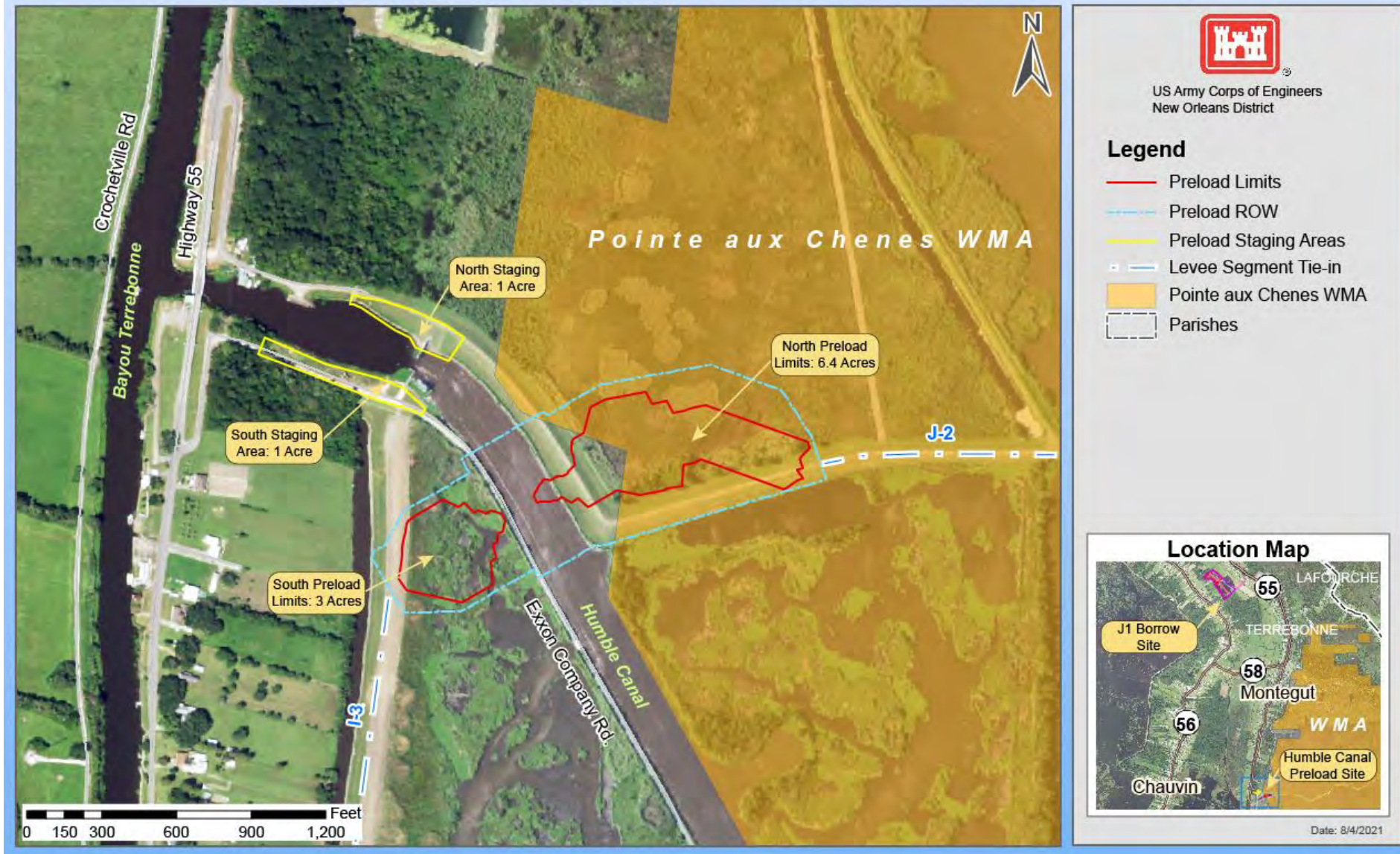


Figure 2: MRT-MTG Humble Canal Preload Project Location

2.3 **No-Action Alternative (Future without Project (FWOP))**

NEPA requires that in analyzing alternatives to a proposed action, a Federal agency must consider an alternative of “No Action.” The No Action alternative evaluates the impacts associated with not implementing the proposed action and represents the Future without Project (FWOP) condition against which alternatives considered in detail are compared. The FWOP provides a baseline essential for impact assessment and alternative analysis.

Without implementation of the proposed action, other federal, state, local, and private projects have occurred and may still occur within or near the proposed project area, the Louisiana state coastal area, and the nation’s coastal areas. Some of these other efforts include the following:

- LGM and HNC, which are projects falling within alignment with the MRT-MTG alignment (See Section 1.6 for details).
- TLCD and/or other non-federal entities have also constructed storm damage risk reduction structures along the MRT-MTG alignment at their own expense. (See Figure A-1 in Appendix A for the non-Federal levee alignment completed to date).

Levee reaches constructed by TLCD and/or non-federal entities to elevation +12 feet NAVD88:

- Levee Reach J-1
- Levee Reach G-1
- Levee Reach H-3
- Levee Reach H-2
- Levee Reach I
- Levee Reach J-2
- Levee Reach F

Additional structures completed by TLCD and/or other non-federal entities to elevation +18 feet NAVD 88:

- On Reach B: Upper Bayou du Large Pump Station, Falgout Canal Floodgate
- On Reach E: two environmental control structures (ECS)
- On Reach F: Bayou Grand Caillou Barge Floodgate, HNC, Bubba Dove Barge Floodgate
- On Reach G: Four Point Bayou Floodgate and Roadway Gate, three ECS.
- On Reach H: Bayou Petit Interim Barge Gate, Highway 56 Roadway Gate, Placid Canal Barge Gate
- On Reach I (i.e. within the project area): Bush Canal Barge Gate, Bayou Terrebonne Sector Floodgate, Hwy 55 Roadway Gate, Humble Canal Barge Gate
- On Reach J: three ECS, Pointe aux Chenes Pump Station FP, Point aux Chenes Floodgate, Highway 665 Roadway Gate
- On Reach K: two ECS

-Other past and proposed actions are addressed in the 2017 Louisiana’s Comprehensive Master Plan for a Sustainable Coast (State Master Plan or “SMP”) (Source: <http://coastal.la.gov/our-plan/2017-coastal-master-plan/>). See Figure A-4a in Appendix A for a map of current SMP projects. The 2017 SMP indicates that the Coastal Protection and Restoration Authority Board of Louisiana (CPRAB) has, since 2007:

- Benefited 36,000 acres of coastal habitat

- Identified and used dozens of different Federal, state, local and private funding sources of projects
- Completed or funded construction of 135 projects
- Constructed or is currently constructing 60 miles of barrier islands/berms

- By September 2016, 108 Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects were completed in partnership with various Louisiana non-Federal sponsors and five statutorily designated Federal agencies, benefiting over approximately 100,000 acres (source: <https://lacoast.gov/new/About/FAQs.aspx>). As of March 2021, there are currently 127 active CWPPRA projects throughout coastal Louisiana, 15 of which are currently under active construction with 30 additional projects approved and in the engineering and design phase of development.

See Figures A-3a to A-3d (Appendix A) for all FWOP features. This includes maintenance dredging (e.g. Houma Navigation Canal) and beneficial use of dredged material projects alongside the abovementioned projects.

3 Affected Environment

3.1 Description of the Study and Project area

The Terrebonne Basin watershed (“the watershed”) is the study area (Appendix A, Figure A-2a) within the Deltaic Plain. The watershed covers approximately 1,712,500 acres in south-central Louisiana (LCWRCTF 1993), bordered by Bayou Lafourche to the east, the Atchafalaya Basin floodway to the west, the Mississippi River to the north, and the Gulf of Mexico to the south. It includes all of Terrebonne Parish and parts of Lafourche, Assumption, St. Martin, St. Mary, Iberville, and Ascension Parishes. The watershed is part of an abandoned delta complex, characterized by a thick section of unconsolidated sediments that are undergoing dewatering and compaction, contributing to high subsidence, and a network of old distributary ridges extending southward from Houma (CWPPRA 2021). The southern end of the watershed is defined by a series of narrow, low-lying barrier islands (Isles Dernieres and Timbalier chains), separated from the mainland marshes by a series of wide, shallow lakes and bays (e.g., Lake Pelto, Terrebonne Bay, Timbalier Bay).

The proposed MTG project feature (Figure 2) is located on Humble Canal (Lat 29 26 08.5, Long -90 33 44.0) approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is bounded on the north by the 100-acre J-1 borrow site off Aragorn Road. The east and west boundary follows Louisiana Highway 55 through Montegut, running south to the intersection with the Exxon Company Road, crossing the Hilcorps facility, and terminating at the southern bend in Point Barre Road. A portion of the proposed project site extends into the Pointe-aux-Chenes State WMA.

3.1.1 Sea Level Change

Global, or eustatic, sea level rise and regional subsidence have affected and are projected to continue affecting the watershed. ER 1100-2-8162 states potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence. The WVA incorporated the “intermediate” sea-level change scenario to determine benefit outcomes over the 50-year period of analysis. As documented in the WVA project

information sheets from US Fish and Wildlife (See Appendix C), the “low” and “high” sea level change rates were run on all impacted wetlands.

Because any alternative involves a one-time preload disposal event, using only the “intermediate” sea-level change scenario presents the most reasonable expectation for calculating benefits from the preload levee over the 50-year period of analysis. Under the “high” sea-level change scenario, any alternative would likely underperform very soon after construction the project would be inundated beyond tolerances as sea-level changes. This would be a result of not enough material being placed initially to compensate for sea-level change over time. However, under the “low” sea-level change scenario alternatives would likely not perform, or the benefits would be minimal, for an extended period post-construction until sea-level change reaches a point that is conducive for levee project function and sustainability. This would be a result of placing so much material initially, the levee project could rapidly subside.

3.1.2 Climate and Climate Change

The climate in the project area is humid, subtropical with a strong maritime character. Warm, moist southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, dry fronts dominated by northeast high-pressure systems. The influx of cold air occurs less frequently in autumn and only rarely in summer. Tropical storms and hurricanes are likely to affect the area 3 out of every 10 years, with severe storm damage approximately once every 2 or 3 decades. The majority of these occur between early June and November. Earlier storms in the project area include Hurricane Juan (1985), Hurricane Andrew (1992), TS Isidore and Hurricane Lili (2002) (See Figure 1). The largest recent hurricanes were Katrina and Rita in 2005 which caused damage in the project area. Hurricanes Gustav and Ike in 2008, and more recently, Isaac in 2012, caused additional damage in the project area. Summer thunderstorms are common, and tornadoes strike occasionally. Average annual temperature in the area is 67°F, with mean monthly temperatures ranging from 82°F in August to 52°F in January. Average annual precipitation is 57.0 inches, varying from a monthly average of 7.5 inches in July, to an average of 3.5 inches in October. (<http://www.srcc.lsu.edu/>).

The 2014 USACE Climate and Resiliency Policy Statement states the “USACE shall continue to consider potential climate change impacts when undertaking long-term planning, setting priorities, and making decisions affecting its resources, programs, policies, and operations.” A healthy and resilient coastal complex is dynamic, not static, and is subject to the ebb and flow of the various effects, adverse or beneficial, that impact conditions at any given point in time. The most significant adverse potential impact on coastal wetlands and levee and floodwall systems as a product of climate change is sea-level change (rise). The impact of sea-level change is addressed in section 3.1.2 Sea Level Rise.

3.1.3 Geology

The geology of the watershed within the Deltaic Plain is heavily influenced by the Mississippi River and the complex of abandoned and active deltas it created. 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 meters 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).

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 meters 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 thousands of years.

Soils

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

3.2 Relevant Resources

This section contains a description of relevant resources that could be impacted by the proposed project. The important resources described are those recognized by laws, executive orders (EO's), regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the public. Table 3-2a provides summary information of the institutional, technical, and public importance of these resources.

A wide selection of resources was initially considered and determined not to be affected by the project—mainly due to the remote and uninhabited nature of the project area and general lack of significant populated areas in the vicinity. The objectives of EO 11988 (Floodplain Management) were considered; however, CEMVN has determined that floodplain impacts, if any, from the proposed action would be mainly positive (i.e., improving the adjacent flood plain and associated habitats, and thus, maintaining their natural and beneficial values). Additionally, there is no practicable alternative for project construction outside the 100-year floodplain. No prime or unique farmlands, as defined and protected by the Farmland Protection Policy Act, would be affected by the proposed project (See Appendix D for coordination letter received from Natural Resource Conservation Service). No portion of the project area has been designated a Louisiana Natural and Scenic River; therefore, a Scenic Rivers permit is not warranted.

The following relevant resources are discussed in this report: navigation, wetlands, wildlife, aquatic resources/fisheries, essential fish habitat (EFH), threatened, endangered, and protected species, water and sediment quality, air quality, cultural resources, tribal resources, recreational resources, Aesthetics (visual resources), environmental justice, noise and vibration, and socioeconomics.

Table 3-2a: Relevant Resources and Their Institutional, Technical, and Public Importance

Resource	Institutionally Important	Technically Important	Publicly Important
Aesthetics (Visual Resources)	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, the Coastal Barrier Resources Act of 1990, Louisiana's National and Scenic Rivers Act of 1988, and the National and Local Scenic Byway Program.	Visual accessibility to unique combinations of geological, botanical, and cultural features that may be an asset to a watershed. State and Federal agencies recognize the value of beaches and shore dunes.	Environmental organizations and the public support the preservation of natural pleasing vistas.
Air Quality	Clean Air Act of 1963, Louisiana Environmental Quality Act of 1983.	State and Federal agencies recognize the status of ambient air quality in relation to the NAAQS.	Virtually all citizens express a desire for clean air.
Aquatic Resources/ Fisheries	Fish and Wildlife Coordination Act of 1958, as amended; Clean Water Act of 1977, as amended; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968.	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.
Cultural and Historic Resources	National Historic Preservation Act (NHPA), as amended, and Section 106 and 110 of the NHPA; the Native American Graves Protection and Repatriation Act of 1990; the Archeological Resources Protection Act of 1979; and USACE's Tribal Consultation Policy (2012). 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	Federal, State, and Tribal stakeholders document and protect cultural resources including archaeological sites, districts, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and/or sites of religious and cultural significance based on their association or linkage to past events, to historically important persons, to design and construction values, and for their ability to yield important information about prehistory and history.. State and Federal agencies document and protect sites, their association or linkage to past events, to historically important persons, and to design and construction values, and their ability to yield important information about prehistory and history.	Preservation groups and private individuals support protection and enhancement of historical resources.

Resource	Institutionally Important	Technically Important	Publicly Important
Environmental Justice	Executive Order 12898 of 1994 (E.O. 12898) and the Department of Defense's Strategy on Environmental Justice of 1995	State and Federal agencies recognize social and economic welfare of minority and low-income populations	Public concerns about the fair and equitable treatment (fair treatment and meaningful involvement) of all people with respect to environmental and human health consequences of Federal laws, regulations, policies, and actions.
Essential Fish Habitat (EFH)	Magnuson-Stevens Fishery Conservation and Management Act of 1996, Public Law 104-297	Federal and state agencies recognize the value of EFH. The Act states, EFH is "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."	Public places a high value on seafood and the recreational and commercial opportunities EFH provides.
Navigation	Rivers and Harbors Act of 1899 and River and Harbor Flood Control Act of 1970 (PL 91-611).	The Corps provides safe, reliable, efficient, and environmentally sustainable waterborne transportation systems (channels, harbors, and waterways) for movement of commerce, national security needs, and recreation.	Navigation concerns affect area economy and are of significant interest to community.
Noise and Vibration	USACE ER 1105-2-100, and National Environmental Policy Act of 1969, Noise Control Act of 1972, Quiet Communities Act of 1978USACE ER 1105-2-100 and National Environmental Policy Act of 1969	Unwanted noise has an adverse effect on human beings and their environment, including land, structures, and domestic animals and can also disturb natural wildlife and ecological systems.	The EPA must promote an environment for all Americans free from noise that jeopardizes their health and welfare.
Recreation Resources	Federal Water Project Recreation Act of 1965 as amended, and Land and Water Conservation Fund Act of 1965 as amended	Provide high economic value of the local, state, and national economies.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana; and the large per-capita number of recreational boat registrations in Louisiana.
Socio-Economic Resources	USACE ER 1105-2-100, and National Environmental Policy Act of 1969River and Harbor Flood Control Act of 1970 (PL 91-611).	When an environmental document is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental document will discuss all of these effects on the human environment.	Social concerns and items affecting area economy are of significant interest to community.

Resource	Institutionally Important	Technically Important	Publicly Important
Threatened, and Endangered, and Protected Species	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940.	USACE, USFWS, NMFS, NRCS, EPA, LDWF, and LDNR cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.
Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Mgt Act of 1972, and Louisiana State & Local Coastal Resources Act of 1978.	USACE, USFWS, NMFS, NRCS, EPA, and State DNR and wildlife/fishery offices recognize value of fisheries and good water quality and the national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.
Wetlands	Clean Water Act of 1977, as amended; EO 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968., EO 11988, and Fish and Wildlife Coordination Act.	They provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they provide storage areas for storm and flood waters; they serve as natural water filtration areas; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non-consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of marshes.
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.

3.2.1 Navigation

Existing Conditions

Humble Canal provides southerly access for fishing and recreational vessels from Bayou Terrebonne, which parallels LA Hwy 55, to the Gulf of Mexico via Madison Bay and Lake Barre. The area has historically provided support for offshore petrochemical production/exploration efforts.

An existing barge gate (See Figure 2) admits boat traffic that pass under the Humble Canal Bridge.

3.2.2 Wetlands

Existing Conditions

Wetlands in the vicinity are tidally influenced and classified as mainly brackish marsh, with areas of saline marsh between Madison Bay and Lake Barre. The wetlands are strongly influenced by freshwater discharges from the Bayou Terrebonne and adjacent tributary outlets. Mean

growing season salinity within the project ranges from 2.25 ppt at CRMS0385 south of Chauvin and 7.55 ppt at CRMS0315 south of Montegut (CPRA 2019).

Marsh in the watershed is being lost around Wonder Lake at the rate of 1.67 percent per year (Couvillion et al. 2017). This loss is due to subsidence, sea level rise, saltwater intrusion caused by navigation channels and oilfield canals, shoreline erosion, and ponding of water, etc. These losses are expected to continue with or without the proposed project.

A combination of fresh and brackish marsh species occurs within the project area. Fresh marsh northeast of the proposed preload levee had been previously been classified as low-salinity marsh prior to constructed levees in the Montegut forced drainage area. Brackish marsh located in the northwest corner is not impounded by existing levees. Wetland species in the project area include leafy three square (*Schoenoplectus robustus*), California bullwhip (*Scirpus californicus*), cattail (*Typha latifolia*), Roseau cane (*Phragmites australis*), water hyssop (*Bacopa monnieri*), rushes (*Juncus sp.*), iris (*Iris sp.*), seashore paspalum (*Paspalum vaginatum*), saltmeadow cordgrass (*Spartina patens*), and smooth cordgrass (*Spartina alterniflora*).

No marsh or other wetland habitats are found at the J-1 borrow site.

BLH is located northeast of Humble Canal in the Montegut forced drainage system. Historically, this area was tidal marsh, but after being leveed and pumped, trees have colonized a portion of the area adjacent to Humble Canal. Trees include black willow (*Salix nigra*), Chinese tallow (*Triadica sebifera*), sugarberry (*Celtis laevigata*), water oak (*Quercus nigra*), and live oak (*Quercus virginiana*).

Invasive Species

Invasive plant species are found in the project area. The most visible is the Chinese tallow tree, a successful invader of chenier habitats. It has affected plant community structure by becoming the most abundant woody species at many locations. It has the potential to invade surrounding marshes and convert them from herbaceous to woody plant communities (Neyland and Meyer 1997). Other important invasives include water hyacinth (*Eichhornia crassipes*) and giant salvinia (*Salvinia molesta*), both of which are present in the marshes and canals of South Louisiana. Both can form dense mats that cover entire bodies of water with a thick layer that blocks sunlight, thereby reducing photosynthesis, reducing dissolved oxygen, and contributing to fish kills.

3.2.3 Aquatic Resources/Fisheries

Existing Conditions

The project area consists of primarily shallow open water and fresh to brackish marsh. The water bottom is composed of firm silty, sandy clay mainly deposited by the river. These submerged lands are typically soft and almost fluid, but some areas are firm where heavier silts and sands have deposited. Water depths measure approximately 1 to 5 feet with submerged aquatic vegetation (SAV) occurring in some portions of the shallow open-water areas, with the most common species including pondweed (*Potamogeton sp.*), coontail (*Ceratophyllum demersum*), and water millfoil (*Myriophyllum spp.*). These submerged plants provide a source of food for the large numbers of waterfowl frequently during winter. None of these SAV's were observed during the site visit in May 2021 with US Fish and Wildlife. Shellfish species including oysters (*Crassostrea virginica*), shrimp (*Penaeus sp.*), and crabs (*Callinectes sapidus*) are found in the brackish marshes near the project area. Many juveniles of these species use fringe marsh,

interspersed shallow ponds, and SAV for grazing. See Figure 3-2a for private oyster lease location in relation to the preload levee footprint.

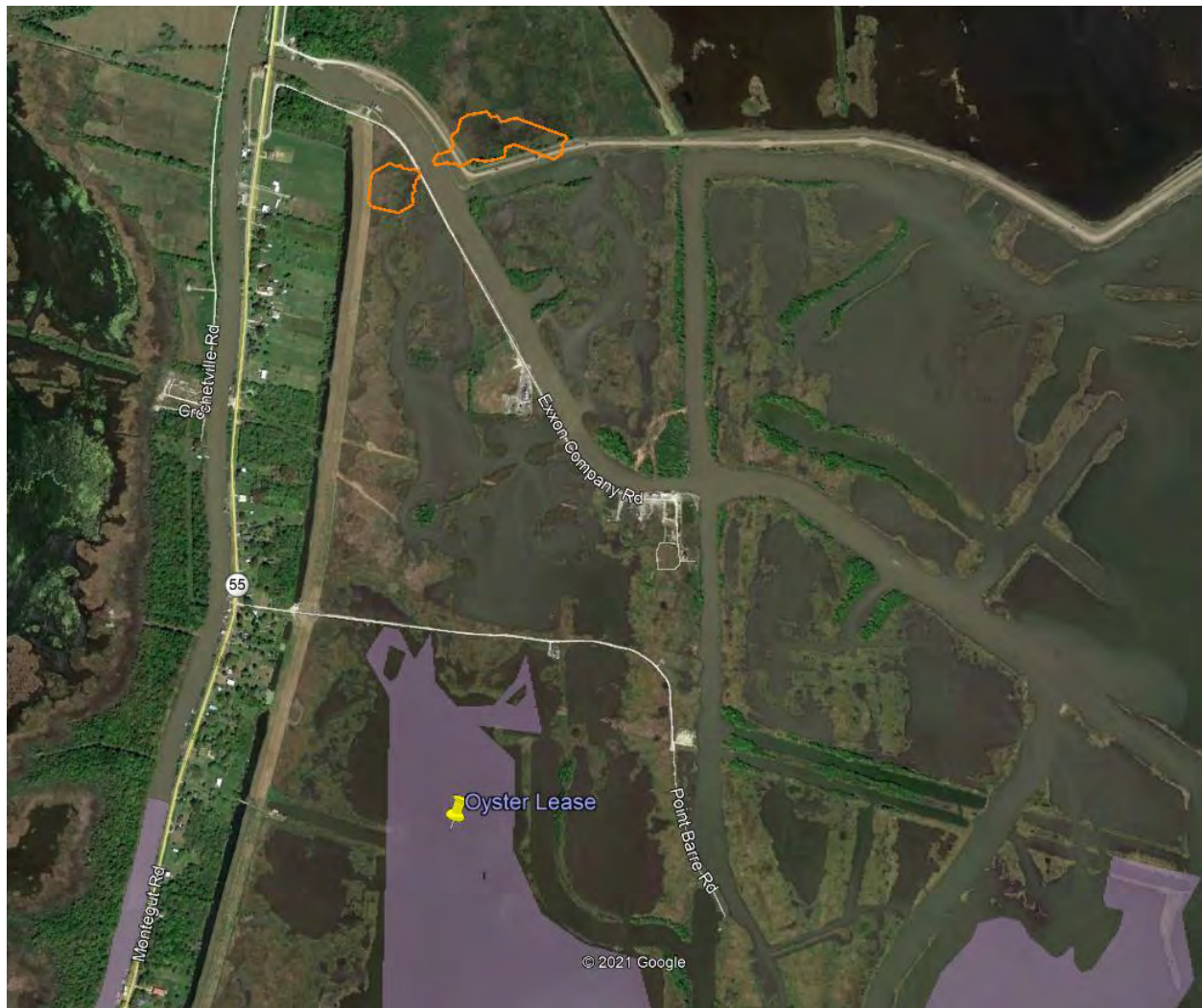


Figure 3-2a. Preload footprint (orange polygon) location relative to private oyster leases.

Fishing is a major recreational and commercial activity. The estuarine nature of the area provides a dynamic aquatic environment where freshwater and saltwater meet, providing a transitional zone between the two aquatic ecosystems. The marshes and waterways provide important spawning and nursery habitat and a food source for a wide variety of fresh and saltwater fish species. Vegetation and marsh loss degrades the utility of the area as a nursery habitat and food source.

Potential species that could occur during high water/low salinity periods include channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), flathead catfish (*Pylodictis olivaris*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), black

crappie (*Pomoxis nigromaculatus*), white crappie (*Pomoxis annularis*), sunfish (*Lepomis spp.*), gizzard shad (*Dorosoma cepedianum*), and buffalo (*Ictiobus bubalus*), among others.

During low water periods, storm surges, and seasonally strong tidal influences, the increased saltwater intrusion from the Gulf restricts the abundance and diversity of freshwater fisheries, and provides opportunities for estuarine (brackish) species. Many of these species are economically and recreationally important, including red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*), spotted sea trout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), striped mullet (*Mugil cephalus*), Gulf menhaden (*Brevoortia patronus*), Atlantic croaker (*Micropogonias undulatus*), sheepshead (*Archosargus probatocephalus*), southern flounder (*Paralichthys lethostigma*), Spanish mackerel (*Scomberomorus maculatus*), southern kingfish (*Menticirrhus americanus*), and spot (*Leiostomus xanthurus*).

Commercially important shellfish found include blue crab (*Callinectes sapidus*), brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*Farfantepenaeus duorarum*), white shrimp (*Litopenaeus setiferus*), Gulf stone crab (*Menippe adina*), and oysters (*Crassostrea virginica*). Other commercially less important species include grass shrimp (*Palaemonetes pugio*), mysid shrimp (*Mysidopsis bahia*), roughneck shrimp (*Trachypenaeus constrictis*), and mud crab (*Eurypanopeus depressus*). No oyster leases or public seeding grounds are located within the project area. However, privately-owned oyster leases are located immediately south of Point Barre Road.

The watershed also supports populations of phytoplankton and zooplankton (e.g., copepods, rotifers, fish larvae, and molluscan and crustacean larvae). Benthic invertebrate populations are comprised of both epifaunal and infaunal species (e.g., polychaete and oligochaete worms, crustaceans, bivalves and gastropod mollusks). These organisms constitute vital components of the aquatic food chain and may comprise the diets of numerous finfish and shellfish species.

Louisiana's coastal estuaries are among the most productive in the Nation (Chew D.L.). Louisiana has historically been an important contributor to the Nation's domestic fish and shellfish production, and one of the primary contributors to the Nation's food supply for protein. Landings in 2007 for commercial fisheries in coastal Louisiana, estimated at 951 million pounds, were the largest for any state in the contiguous U.S. and second only to Alaska (National Marine Fisheries Service, 2008). These landings represent over 10% of the total landings in the U.S., with a value of approximately \$259.6 million.

The saltmarsh topminnow (*Fundulus jenkinsi*) may occur within the watershed. This species is at-risk for federal listing and has a S3 state rank and is considered rare in Louisiana. The saltmarsh topminnow is a species of concern that could use the watershed's tidal marshes. Pollution and habitat destruction are major threats with habitat alteration being the most serious threat to this species.

No aquatic species have been documented within the J-1 borrow site.

3.2.4 Wildlife

Existing Conditions

The watershed provides habitat for numerous species of wildlife, including waterfowl, wading birds, shorebirds, mammals, reptiles and amphibians. The coastal marshes provide wintering habitat for migratory ducks and geese. The resident Mottled Duck (*Anas fulvigula*), which nests in fresh to brackish marshes along the coast, is found throughout the year within watershed marshes. Besides migratory waterfowl, other game birds which occur within the area include rails

(*Rallus sp.*), coots (*Fulica sp.*), and snipe (*Gallinago sp.*). Several species of wading birds including of herons and egrets (*Ardea sp.*), and ibis (*Eudocimus sp.*) utilize the marsh, mud flats, and shallow water habitats within the watershed. The mudflats and shallow-water areas also attract a wide variety of shorebirds (killdeer, avocet, stilt, dowitchers, snipe, and sandpipers), while seabirds such as pelicans (*Pelecanus sp.*), gulls (*Larus sp.*), and terns (*Sternula sp.*) are found more often in deeper water areas.

Other common bird species that can be found within the watersheds include songbirds, raptors, kingfishers, and numerous seasonal neo-tropical migrants. Ibis, egrets, cormorants (*Phalacrocorax spp.*), terns, gulls, skimmers (*Rynchops niger*), sandpipers (*Calidris spp.*), pelicans, osprey (*Pandion haliaetus*), herons (*Ardea herodias*; *Egretta sp.*; *Nycticorax sp.*), hawks (*Accipiter sp.*; *Buteo sp.*), kestrels (*Falco sparverius*), vultures (*Coragyps atratus*; *Cathartes aura*), grackles (*Quiscalus spp.*), blackbirds (*Agelaius phoeniceus*), and several species of swallows, flycatchers, wrens, warblers, and sparrows also reside within the watershed.

Commercially and economically important wildlife species include mammals using the marsh habitat, such as nutria (*Myocastor coypus*), muskrat (*Ondatra zibethicus*), mink (*Neovison vison*), raccoon (*Procyon lotor*), as well as the American alligator (*Alligator mississippiensis*). Other wildlife species known to have occurred within the watershed include white-tailed deer (*Odocoileus virginianus*), feral hogs (*Sus scrofa*), and swamp rabbits (*Sylvilagus aquaticus*).

See Table B-3 in Appendix B for a listing of common wildlife species in Terrebonne Basin that could reside around the proposed project features and J-1 borrow pit.

3.2.5 Essential Fish Habitat

Existing Conditions

All of the marine and estuarine waters of the northern Gulf of Mexico have been designated as Essential Fish Habitat (EFH) through regulations promulgated by the National Marine Fisheries Service (NMFS) and the Gulf of Mexico Fishery Management Council as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). EFH is described as waters and substrates necessary for Federally-managed species to spawn, breed, feed, and grow to maturity. In the northern Gulf of Mexico, EFH has generally been defined as areas where individual life-stages of specific Federally-managed species are common, abundant or highly abundant. In estuarine areas, EFH is defined as all estuarine waters and substrates (mud, sand, shell, rock and associated biological communities, including the sub-tidal vegetation (seagrasses and algae) and adjacent inter-tidal vegetation (marshes and mangroves). The open waters, waterbottom substrates, and inter-tidal marshes are considered EFH under the estuarine component.

In addition, estuarine aquatic habitats provide nursery and foraging areas that support economically important marine fishery species that may serve as prey for Federally-managed fish species such as mackerels, snappers, groupers, billfishes and sharks.

The estuarine waters in the proposed project area include EFH for several Federally-managed species (See Table 3-2b below). These species use the area for foraging and nursery habitat, as well as a migration route to other areas considered to be EFH. Specific categories of EFH in the project area include estuarine emergent wetlands, mud/sand substrates, and estuarine water column.

Table 3-2b: EFH Species in the Watershed

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

EFH for highly migratory species include blacktip, bull, spinner, and finetooth sharks within the watershed in the estuarine waters of Terrebonne Bay. See Table 3-2c.

Table 3-2c. Highly Migratory Species EFH in the Watershed

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 Parish
	Juvenile	All estuarine waters; nearshore waters Freeport to mouth of Sabine Lake; nearshore waters off west Cameron Parish; Terrebonne 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); Terrebonne and Barataria Bays and the Mississippi birdfoot delta
Finetooth Shark	Juvenile & Adult	Estuarine and nearshore waters east of Terrebonne Bay

3.2.6 Threatened, Endangered and Protected Species

Existing Conditions

According to a USFWS letter dated May 24, 2021, which provided comments in accordance with the Fish and Wildlife Coordination Act (FWCA), Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA), protected species that may occur in the project vicinity include the formerly listed brown pelican (*Pelecanus occidentalis*), and various raptors including the formerly listed bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrines*).

The federally-listed threatened West Indian manatee (*Trichechus manatus*) could be encountered in the project area. West Indian manatees, also known as sea cows, are large aquatic mammals found in shallow, slow-moving rivers, estuaries, saltwater bays, canals, and coastal areas. Manatees forage on submerged, floating, and shoreline vegetation including seagrasses, algae, and invasive water hyacinth. There is a low chance that manatees would be found in the project area and surrounding shallow open waters; however, if manatees are observed within 100 yards of the “active work zone” during proposed construction and dredging activities, the appropriate special operating conditions would be implemented as provided by the USFWS, Lafayette, Louisiana Field Office. Special operating conditions for manatees would be included in any plans and specifications developed prior to dredging and disposal activities (See Appendix G).

The brown pelican (*Pelecanus occidentalis*), a year-round resident of coastal Louisiana that may occur in the project area, was removed from the Federal List of Endangered and Threatened Wildlife (i.e., “delisted”) by USFWS on November 17, 2009. Despite its delisting, brown pelicans, and other colonial nesting wading birds and seabirds, remain protected under the MBTA. Portions of the proposed project area may contain habitats commonly inhabited by colonial nesting wading birds and seabirds.

Of the Federally listed and protected species within the project vicinity only the protected species are known to inhabit the immediate project area. Ibis, herons, egrets, hawks, owls, anhinga, and bald eagles may reside in the vicinity of the project area. No known colonial nesting water/wading bird rookeries exist within the project area. If any such nests are discovered during construction the appropriate no work zones would be observed.

3.2.7 Water and Sediment Quality

Regulatory Overview

The Clean Water Act (CWA) established a process for states to assess surface water quality. Section 305(b) requires states to develop a surface water quality monitoring program, and a report describing the water quality status of state waterbodies with respect to support of designated uses. Section 303(d) requires states to develop and list Total Maximum Daily Loads (TMDLs) for

impaired waterbodies (waterbodies with water quality unsupportive of one or more designated uses). A TMDL is the maximum amount of the pollutant(s) contributing to impairment that can enter a waterbody from all sources (including nonpoint sources) and still meet water quality criteria. The Louisiana Department of Environmental Quality (LDEQ) implements a watershed-based approach to reduce pollutant loads in the waterbodies where TMDLs have been established, through the Louisiana Pollutant Discharge Elimination System (LPDES) and Louisiana Nonpoint Source (NPS) programs. For the purpose of state water quality assessment, Louisiana is divided into twelve major watersheds, which are further divided into areas known as waterbody subsegments. The Louisiana Water Quality Inventory: Integrated Report is the biennial publication prepared by the Louisiana Department of Environmental Quality (LDEQ) on the status of Louisiana waters in accordance with Sections 305(b) and 303(d) (LDEQ 2021).

Historic and Existing Conditions

Figure A-4 (See Appendix A) depicts project area LDEQ subsegments and ambient water quality monitoring sites. The project area is within subsegment 120704 (Bayou Terrebonne-From Humble Canal to Lake Barre [Estuarine]). The four designated uses for this subsegment (Table B-4a, Appendix B) include primary contact recreation (PCR), secondary contact recreation (SCR), fish and wildlife propagation (FWP), and oyster propagation (OYS). In the 2012-2020 reporting periods, the subsegment has only supported half of its designated uses (Table B-4b, Appendix B). In the 2014-2020 reporting periods, SCR and FWP have been fully supported, but PCR and OYS have not been supported, while during the 2012 reporting period PCR and SCR were fully supported but FWP and OYS were not supported.

Table B-4c (Appendix B) includes suspected causes and sources of designated use impairment. For the 2012 reporting period, the BP/Gulf of Mexico oil spill was likely responsible for impairment of FWP and OYS. For the 2014-2020 reporting periods, pathogens originating from sewerage discharges were responsible for impairment of PCR and OYS.

Table B-4d (Appendix B) is a 2010-2020 statistical water quality summary for LDEQ water quality monitoring network stations 0349 and 3001, which are located approximately 3 ½ miles inland and gulfward of the project area. Site 0349, located further inland, is generally freshwater, while site 3001 is intermediate or brackish. Site 3001 has slightly higher pH and slightly lower water temperatures. The 5th and 25th percentile dissolved oxygen statistics and median, 75th, and 95th percentile turbidity statistics for site 0349 suggest the site more commonly experiences low dissolved oxygen conditions, often in violation of Louisiana water quality criteria, which may be related to elevated turbidities. For both sites, total nitrogen concentrations (nitrate + nitrite and Kjeldahl nitrogen) often exceed the EPA regional water quality criteria for rivers and streams. For both sites, enterococci concentrations were generally above both Louisiana criteria values. Overall, the water quality data provides additional context for designated use support and sources of impairments.

Water quality impairments in the watershed include fecal coliform bacteria resulting from on-vessel discharge and sewage discharges and enterococcus bacteria resulting from on-vessel discharge. See Table B-4a (Appendix B) for details.

The J-1 borrow area is a dry site located within a fallow agricultural field, and contains no water bodies within the area proposed for excavation. Bayou LaCache is located just to the west of the borrow site, but is not expected to be impacted by the project. An approximately 27-acre borrow pond is located nearby, but is also not expected to be impacted by the project action.

3.2.8 Air Quality

Existing Conditions

The USEPA, under the requirements of the Clean Air Act (CAA), has established National Ambient Air Quality Standards (NAAQS) for six contaminants, referred to as “criteria” pollutants (40 CFR 50). These are 1) carbon monoxide (CO), 2) nitrogen dioxide (NO₂), 3) ozone (O₃), 4a) particulate matter less than 10 microns in diameter (PM₁₀), 4b) particulate matter less than 2.5 microns in diameter (PM_{2.5}), 5) lead (Pb), and 6) sulfur dioxide (SO₂).

Ozone is the only parameter not directly emitted into the air, forming in the atmosphere when three atoms of oxygen (O₃) are combined by a chemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOC, 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 indicates that Terrebonne Parish is currently in attainment for all Federal NAAQS pollutants, including the 8-hour ozone standard (USEPA 2011). This classification is the result of area-wide air quality modeling studies. Therefore, further analysis required by the CAA general conformity rule (Section 176(c)) would not apply for the proposed Federal action.

Table 3-2d: National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	primary	8 hours	9 parts per million (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 parts per billion (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
<p>(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.</p> <p>(2) The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.</p> <p>(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.</p> <p>(4) The previous SO₂ 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 SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.</p>					

3.2.9 Cultural Resources

Existing Conditions

Cultural Resources surveys have been conducted in lower Terrebonne Parish since 1926. The most recent and synthesized of these are Weinstein and Kelley (1992) and Robblee et al. (2000). Numerous earthen mounds and shell middens have been located and recorded.

Prehistoric settlement in lower Terrebonne parish dates as early as the Marksville Period (A.D. 1– 400) and includes mound sites, hamlets, and shell middens. Societies in the project area subsisted on marsh resources such as clams, fish, mammals, birds, and reptiles, while shellfish were also utilized as a food source and to provide a base on which to settle. By the Coles Creek Period (A.D. 700 – 1200), settlements in the region may have been organized as major mound sites surrounded by satellite villages and seasonal camps. Villages were concentrated on stable levee surfaces or at the confluence of distributaries. Both year-round occupation and seasonal

movement have been suggested for the inhabitants of the area. During Plaquemine times (A.D. 1200 – 1700) the settlement pattern suggests a complex social hierarchy, with large ceremonial sites composed of multiple mounds surrounding a central plaza, and smaller villages and hamlets scattered throughout the area. Non-mound sites that have been located are on elevated natural levees and seem to have focused on the cultivation of crops. The majority of known prehistoric sites located in the vicinity of the project area date to this late prehistoric period and suggest a significant occupation of the region.

The early historic period in southeast Louisiana is marked by increasing settlement and European dealings with Native American tribes. Early French writings describe a native cultural landscape of small tribal groups and shifting alliances. The most is known about the Chitimacha Indians, a federally recognized Native American tribe that claims ties to much of south Louisiana as its ancestral homeland, and is currently clustered around Charenton in St. Mary Parish. In addition to the many ancient Chitimacha village locations recorded on 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. Descendents 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 ca. 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 nineteenth 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 Intracoastal Waterway 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.

3.2.1 Tribal Resources

Existing Conditions

In addition to cultural resources or historic properties considered eligible for the National Register of Historic Places, USACE's 2012 Tribal Consultation Policy asks the agency to determine if any of three categories of resources will be significantly adversely affected by the proposed action. The three categories are: Tribal Rights, Tribal lands, and protected tribal resources (see Section 7. E.O. 13175 for more information on Government-to-Government Consultation between

Federally-recognized Tribes and USACE). Tribal interest varies by geographic limits and USACE uses the most inclusive approach to consultation and coordination. Six (6) Federally-recognized Tribes have an aboriginal/historic interest in the watershed. The tribes are: 1) the Chitimacha Tribe of Louisiana, 2) the Choctaw Nation of Oklahoma, 3) the Coushatta Tribe of Louisiana, 4) the Jena Band of Choctaw Indians, 5) the Mississippi Band of Choctaw Indians, and, 6) the Tunica-Biloxi Tribe of Louisiana.

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

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

3.2.2 Recreational Resources

Existing Conditions

This resource is institutionally important because of the Federal Water Project Recreation Act of 1965, as amended and the Land and Water Conservation Fund Act of 1965, as amended. Recreational resources are technically important because of the high economic value of these recreational activities and their contribution to local, state, and national economies. Recreational resources are publicly important because of the 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.

The watershed is bordered by Bayou Lafourche on the east, the Atchafalaya Basin floodway on the west, and the Gulf of Mexico on the south. The Basin includes all of Terrebonne Parish, and parts of Lafourche, Assumption, St. Martin, St. Mary, Iberville, and Ascension parishes. Major bodies of water located in the Basin include Lake Boudreaux, Lake Felicity, Bayou Terrebonne, Bayou Pointe au Chenes, Bayou du Large and many others including numerous oil field canals. The Pointe-aux-Chenes Wildlife Management Area (WMA), the Mandalay National Wildlife Refuge (NWR), the Isles Dernieres Barrier Islands Refuge, and the Elm Hall WMA are located within the Basin. The Atchafalaya Delta WMA is also located in the vicinity. See Table 3-2e for a listing of the refuges and wildlife management areas in the Basin. Most of the watershed is brackish and saline marshes with some forested wetlands and uplands. Recreational facilities include camps, marinas, boat launch ramps and small neighborhood parks.

These extensive wetland resources, comprised of swamp and marsh habitat, have traditionally supported substantial consumptive and non-consumptive recreational use. Primary consumptive recreational uses have included both freshwater and saltwater based activities. Freshwater based consumptive uses include freshwater fishing, crawfishing, hunting for waterfowl, as well as hunting for deer or small game along natural ridges and in wooded swamp lands. Primary saltwater based activities have included saltwater fishing, recreational shrimping, and crabbing. Non-consumptive activities have included recreational boating, water skiing, wildlife observation, birdwatching, hiking, camping, and photography.

Like much of coastal southeast Louisiana, much of the Basin 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 Basin 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. As fresh and intermediate marshes, cypress trees, and submerged aquatic vegetation in the area have disappeared, waterfowl habitat has become less abundant, and, consequently, duck hunting opportunities have decreased.

Unlike most of coastal Louisiana, the far western portion of the Basin, due to the influence of the Atchafalaya River, has been relatively stable or experiencing some limited accretion of deltaic lands. Salinity levels are relatively stable in this area and freshwater fishing opportunities in the area are excellent. The floating marshes traditionally have provided quality habitat for waterfowl and waterfowl hunting.

Table 3-2e. Recreation Resources within Terrebonne Basin

Managing Agency	Name	Public Recreation Resources
US Fish and Wildlife Service	Mandalay National Wildlife Refuge	4,416 acres with estimated annual visitation of 18,000. Refuge offers public use opportunities for fishing, wildlife observation, photography, environmental education, and boating.
Louisiana Department of Wildlife and Fisheries	Pointe-aux-Chenes Wildlife Management Area	33,488 acres, offers fishing, hunting, boating, wildlife viewing and tent-only camping.
Louisiana Department of Wildlife and Fisheries	Atchafalaya Delta Wildlife Management Area	137,695 acres, offers fishing, hunting, boating, and 2 campgrounds.
Louisiana Department of Wildlife and Fisheries	Isle Dernieres Barrier Islands Refuge	Consists of four barrier islands in the Isles Dernieres Chain. Wine, Trinity/East, Whiskey, and Raccoon Islands comprising a total of approximately 1,900 acres. Raccoon Island is one of the most important waterbird nesting areas on the coast.
Louisiana Department of Wildlife and Fisheries	Elm Hall Wildlife Management Area	2,839 acres located in Assumption Parish. Access is via water from Lake Verret. The entire acreage consists of cypress-tupelo swamp. Pipe canals and natural drainages bisect the area. Deer, squirrels, and waterfowl hunting are allowed as is trapping for furbearers. The area is known for good fishing, particularly chinquapin and white perch. Numerous bald eagles have been spotted in the vicinity and nests have been located nearby. The area offers opportunities for bird watchers, as well as aesthetic values with respect to unique cypress and tupelo stands.

Sources: <https://www.fws.gov>, <https://www.wlf.louisiana.gov>
 Accessed April 2021

3.2.3 Aesthetics (Visual Resources)

Existing Conditions

Environmental assessments and impact statements for Corps planning studies are supposed to focus on significant environmental considerations as recognized by technical, institutional and public sources. The Visual Resources Assessment Procedure for U.S. Army Corps of Engineers (Visual Resource Assessment Procedure [VRAP] (Smardon, et al., 1988)) provides a method to evaluate visual resources affected by Corps water resources projects. The following VRAP criteria determines if any significant visual resources are in the watershed:

- Important urban landscapes including visual corridors, monuments, sculptures, landscape plantings, and greenspace.
- Areas that are easily accessible by a major population center.

- Projects that are highly visible and/or require major changes in the existing landscape.
- Areas that have low scenic quality and limited visibility.
- Historic or archeological sites designated as such by the National Register or State Register of Historic places.
- Parkways, highways, or scenic overlooks and vistas designated as such by a Federal, State, or municipal government agency.
- Visual resources that are institutionally recognized by Federal, State or local policies.
- Tourism is important in the area's economy.
- Area contains parks, forest preserves, or municipal parks.
- Wild, scenic, or recreational water bodies designated by government agencies.
- Public or privately operated recreation areas.

Significant visual resources are primarily described in the Cultural/Historic and Recreation Resources sections of this document; one example is the Louisiana State Pointe-aux-Chenes Wildlife Management Area (WMA). A description of the Pointe-aux-Chenes WMA including ways to access can be located at <https://www.wlf.louisiana.gov/page/pointeauxchenes>.

3.2.4 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice for Minority and Low-Income Populations, directs all federal agencies to determine whether a proposed action would have a disproportionately high and adverse impact on minority and low-income populations. Disproportionate effects refer to circumstances where there exists significantly higher and more adverse health and environmental effects on minority populations and low-income populations. The objective of the environmental justice policy is to ensure that minority and low-income populations are fully and equitably considered during the project development process.

3.2.4.1 *Minority Status*

According to the United States Census Bureau (USCB), minority populations are those persons who identify as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population is present where the percentage of minorities within the affected area exceeds 50 percent or is significantly greater than in the general population. Tables 3-2f and 3-2g show the minority populations of areas within the larger watershed including Terrebonne Parish and the towns of Montegut and Chauvin, LA. Approximately 30% of Terrebonne residents identify as a minority, according to USCB data for 2019, below the State of Louisiana minority rate of 38 percent. The majority of residents in the towns of Montegut and Chauvin are white, with approximately 18% and 10% of residents identifying as a minority, respectively which is well below the parish minority percentage.

Table 3-2f. Minority Populations in Terrebonne Parish

RACE	MINORITY POPULATION
Black	21,311
White	78,715
Asian	1,111
Two or More Races	2,991
Other	1,525
Native American	6,337
Pacific Islander	64
TOTAL POPULATION	112,054
PERCENTAGE Minority	29.7%
Percent Hispanic	5.2%
State of Louisiana Percentage Minority	38.0%

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

Minority populations according to USCB data for 2019 for each race in Montegut and Chauvin, LA are shown in **Table 3-2g.**

Table 3-2g. Minority Populations in Montegut CDP* and Chauvin CDP, LA

RACE	Montegut Minority	Chauvin Minority
Black	0	35
White	1,747	2,154
Asian	0	0
Two or More Races	124	86
Other	0	86
Native American	216	47
Pacific Islander	46	0
TOTAL POPULATION	2,133	2,408
PERCENTAGE MINORITY	18.1%	10.5
Hispanic Percentage	0.0%	3.6%

*A Census Designated Place located in Terrebonne Parish

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

3.2.4.2 Low-Income Status

Low-income populations are those that fall below the poverty threshold determined by the USCB. According to EPA's EJ Promising Practices document, a population living below poverty is meaningful and an EJ focus is necessary when the percentage of people living below poverty within the affected area exceeds 20 percent or is significantly greater than in the general population.

Poverty rates in Chauvin CDP is comparable to poverty rates in Terrebonne Parish and the State of Louisiana, with approximately 18%, 21% and 19% of residents living below the poverty level,

respectively. On the other hand, Montegut CDP percent of residents living below poverty is about twice the parish level as shown in **Table 3-2h.** The percent of residents living below poverty in Terrebonne is comparable to the rate in the State of Louisiana, approximately 21% and 19%, respectively.

Table 3-2h. Poverty populations in Terrebonne Parish compared to the region, the state, and US.

LOCATION	PERCENT LIVING IN POVERTY
Montegut CDP*	39.7%
Chauvin CDP*	18.2%
Terrebonne Parish	20.6%
Lafourche Parish	15.6%
State of Louisiana	19.2%
United States	13.4%

*A Census Designated Place located in Terrebonne Parish

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

3.2.5 Noise and Vibration

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

3.2.14.1 Environmental Setting/Affected Environment

This section begins with background information to support the noise and vibration analysis and then presents the existing noise and vibration conditions and sensitive receptors in the project area with the potential to be affected by project implementation.

Noise Terminology

Noise can be defined as unwanted sound. Sound, traveling in the form of waves from a source, is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). The sound pressure level (referred to as sound level) is the most common descriptor used to characterize the loudness of an ambient sound level. It is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain.

Pressure oscillation rates can be measured in units of hertz, which correspond to the frequency of a sound. Typically, sound does not consist of a single frequency but a broad band of frequencies varying in levels of magnitude (sound power). The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the frequency/sound power level spectrum. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum; humans cannot hear low and high-end frequencies well. Therefore, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 and above 5,000 hertz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies and greater

sensitivity to mid-range frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted dB (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in Table B-5, Appendix B.

A key concept in evaluating potential noise impacts is the perceived effect of incremental increase in existing noise levels. Table 3-2i presents the effect of increasing noise levels. For example, the table shows that an increase of three dBA is barely perceptible, an increase of five dBA is noticeable, and a 10-dBA increase would be perceived by someone to be a doubling of noise (CalTrans 2013).

Table 3-2i. Perceived Effect of Incremental Increases in Existing Noise Levels

Sound Level Change (dBA)	Relative Loudness/ Impact	Acoustical Energy Gain (%)
0	Reference	0
+3	Barely Perceptible Change	50
+5	Noticeable Change	67
+10	Twice as Loud	90
+20	Four Times as Loud	99

Source: CalTrans 2013. Pg 2-45.

Noise analyses and regulations use the following terms:

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

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

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

Vibration terminology

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

In extreme cases, the vibration can cause damage to buildings or equipment. In most circumstances, common ground-induced vibrations related to roadway traffic and construction activities pose no threat to buildings or structures, with the occasional exception of blasting and sheet pile-driving during construction. To assess the potential for structural damage associated with vibration, the vibratory ground motion near the affected structure is measured in terms of peak particle velocity (PPV) in the vertical and horizontal directions, typically in units of inches per second (in/sec). The PPV is defined as the maximum instantaneous peak of the vibration signal. According to FTA guidelines (2018), the construction vibration damage criterion for non-engineered timber and masonry buildings is 0.2 in/sec, and that of structures or buildings constructed of reinforced-concrete, steel, or timber is 0.5 in/sec.

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

Construction activities can either result in continuous or single-impact (transient) vibration impacts. Typical equipment or activities that could result in continuous vibration impacts include excavation equipment, traffic, vibratory pile drivers, and vibratory compaction equipment; examples of transient vibration sources include blasting and drop balls. Some construction activities, like jackhammers or impact pile drivers, can continually generate single transient events at a high frequency. However, for evaluation purposes, this equipment would be regarded as

having frequent or continuous vibration impacts. Damage thresholds for continuous sources are approximately half of the thresholds for transient sources.

Existing Noise and Vibration Sources

The project involves construction approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is located on Humble Canal approximately 1/3 miles east of the Bayou Terrebonne/Humble Canal intersection. A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

Haul routes may include portions of Louisiana Highway 55 including the bridge across Bayou Terrebonne at Louisiana Highway 58 to the project site, and Aragon Road between the borrow site and the bridge at Bayou Terrebonne.

The area surrounding the Project area and haul routes is mainly agricultural and rural residential.

Noise sources in the project area are of four general types: agricultural, recreational, general stationary, and general mobile.

- **Agricultural Noise.** The predominant land use near the project area is related to agricultural activities. Farm operations produce noise from a variety of sources. These include heavy equipment for plowing and harvesting, crop-spraying aircraft, onsite processing equipment, and irrigation water pumps. Farm tractors typically produce an average of 84 dBA Lmax at 50 feet (FHWA 2021(uploaded)). Crop-spraying aircraft typically fly at low altitude and may cause loud temporary noise exceeding those of commercial aircraft. Crop-spraying is typically seasonal and short in duration at any given location. In addition to affecting the farmers and farm laborers, agricultural noise also affects those living in or near agricultural areas.
- **Recreational Noise.** Recreational noise can include hunting and boating noise. Pointe-aux-Chenes State Wildlife Management Area allows waterfowl, deer, pig and fur bearer hunting and trapping. Firearms typically generate instantaneous noise exceeding 140 dBA (American Speech-Language-Hearing Association 2017). There is regular boat traffic on Bayou Terrebonne and Humble Canal which could produce noise greater than 86 decibels at 50 feet. (https://www.cpperformance.com/t-state_noise_laws.aspx, updated 2005). The project is not expected to change the effect of these activities.
- **General Stationary Noises.** General stationary noises (i.e., those emanating from fixed locations) are associated with a variety of land uses. Stationary sources can include air conditioning units, power tools, motors, generators, appliances, and manufacturing and industrial facilities. There are several industrial facilities near the project area with an unknown decibel level, and frequency of noise and vibration emanation. The distance of the industrial facilities to residences is greater than 0.3 miles to the levee, attenuating most noise generated by the facilities. Therefore, contribution of general stationary noises to the ambient noise levels in the Project area is minimal.
- **General Mobile Noise.** General mobile noise sources can include vehicles, aircraft, boats, and trains. Mobile noise is usually temporary and variable but can be intense and annoying because of its abruptness and intensity. In urban areas, these mobile sources

contribute to the ambient noise. The closest mobile noise sources to the Project area are mobile noise sources on LA Highway 55, boat traffic on the Bayou Terrebonne, and agricultural equipment.

Existing Noise and Vibration Sensitive Receptors

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

Noise receptors located within the project area include residences further than 750 feet from the project footprint, with the levee as a sound barrier, recreational visitors to the Pointe-aux-Chenes State Wildlife Management Area (which would be open to the public during construction) and wildlife (See Section 3.2.4). Noise-sensitive receptors located near the project area include residential receptors and Montegut Elementary School along the haul route.

3.2.6 Socioeconomics

3.2.6.1 *Population and Housing*

Population

Population and household characteristics in the region of influence (ROI) determine consumption patterns, land use activities, and future development patterns. Figure A-5a (Appendix A) displays the historic and projected population in the ROI, extending from the years 1970 to 2046. Throughout 1970s, the Lafourche and Terrebonne Parishes experienced significant growth; from 1970 to 1980 their populations grew by 20.8% and 24.8% respectively. The population in Terrebonne Parish and Lafourche Parish declined slightly in the late 1980s but recovered by the late 1990s. Between 2005 and 2006 population increased as those fleeing Hurricane Katrina moved to the ROI. Post- Katrina population in the ROI continued to increase at steady incremental rate; these trends are expected to continue over the 25 years.

Households

Figure A-5b (Appendix A) shows the number of households in the ROI from the year 1970 to the year 2045. The number of households in the ROI increased by an average of 4% every year between 1970 and 1980. In the following decades, the two parishes experienced steady growth, closely mirroring trends in population. In most recent years, the number of households in Lafourche Parish increased from 35,650 in 2010 to 38,090 in 2020 (6.8% increase) and the number of households in Terrebonne Parish increased from 40,020 in 2010 to 43,050 in 2020 (7.6% increase). Projected data estimates that trends in the number of households in the watershed will continue. The number of households in Lafourche Parish is expected to reach

41,810 by the year 2035 and the number of households in Terrebonne Parish is expected to reach 46,320.

3.2.15.2 Labor and Employment

Labor Force

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

Figure A-5c (Appendix A) displays the total labor force in the ROI from 1990-2046. Employment trends in the ROI are strongly influenced by the oil and gas industry; meaning employment is highly sensitive to booms and busts in the oil and gas industry. For example, the price of oil declined sharply in the late 1990s and, in response, the labor force in Terrebonne Parish declined by 4% and the labor force in Lafourche Parish declined by 3%. Similar trends occurred in the years following a sharp decline in oil prices in 2008 and 2014.

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

Unemployment Rate

The unemployment rate is the percentage of people that are unemployed out of the total labor force. The unemployment rate is another proxy for the overall health of the economy. Figure A-5d (Appendix A) shows the unemployment rate for the ROI as well as the total unemployment rate for state of Louisiana.

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

Employment by Industry

The type of employment in the ROI gives us an idea of what industries area important to the ROI. Figure A-5e and A-5f (Appendix A) show the employment by industry for each parish in the ROI. The biggest industry in the ROI is the trade, transportation, and utilities industry. Historically, the Terrebonne Parish heavily relied on the natural resource and mining industry. After the collapse of oil in the 1980s Terrebonne Parish began to diversify and employment in industries like government, manufacturing and health/education services became more popular. Other popular industries in Lafourche Parish include government, manufacturing, and professional/business services. The natural resource and mining industry pays the highest wages in ROI. According to

the 2018 American Community Survey, retail trade is the most common industry in Terrebonne Parish followed by healthcare/social assistance, mining, quarrying, and oil and gas extraction and food services. The most common industries in Lafourche Parish include healthcare/social assistance, manufacturing, retail trade, and construction.

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

3.2.15.3 Transportation

Major Transportation Routes

There are two major transportation routes around the project area that may be impacted by the proposed project area construction. Louisiana state highway 55 and state highway 58 connect the borrow site and the proposed project area. According to Louisiana Department of Transportation the annual average daily traffic count on state highway 55 is 2441 and the annual average daily traffic count on state highway is 2636.

3.2.15.4 Regional and Community Growth

Income Per Capita

Income per capita serves as a proxy for regional and community economic growth. Table 1 shows the income per capita for the ROI for the years 1970, 1980, 1990, 2000, 2010, 2020, 2030 and 2040. Income per capita in the ROI increases throughout the past 50 years in response to economic growth and inflation.

4 ENVIRONMENTAL CONSEQUENCES

This section provides a scientific analysis/comparison of the alternatives that have been carried forward. Resources should be listed in the same manner in which they were listed in Section 3. The information provided should include the environmental impacts of the alternatives, including the No Action and the Proposed Action. For each alternative, the discussion should include direct, indirect and cumulative impacts and their significance. It should include any unavoidable adverse environmental impacts should the proposed action be implemented as well as beneficial impacts associated with all the actions.

Direct Impacts: Those caused as a direct result of the action. These impacts occur at the same time and in the same place as the proposed action. This includes both adverse and beneficial impacts as well as permanent and temporary impacts.

Indirect Impacts: Those caused by the proposed action and occurring later in time or further in distance from the proposed action. These impacts don't occur immediately, but they can be reasonably foreseen as a result of the action. (Example: If 500,000 cubic yards of material are deposited in Site A, Site B, which is downstream, may experience a decrease in water quality during construction of the proposed action due to suspended sediments in the water column. This action could occur weeks or months after the initial placement of material due to the time needed for the sediments to travel to Site B)

Cumulative Impacts: Those impacts which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (Example: The proposed action may cause a minor disruption in the water column during construction activities, but when coupled with 15 other earth moving projects in the vicinity, the disruption to water quality and the aquatic resources in the area becomes more significant)

Table 4: Relevant Resource Impacts In and Near the Project Area for the Proposed Action

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

¹Although not impacted, cultural resources are addressed to comply with the National Historic Preservation Act.

²Hazardous, Toxic, and Radioactive Waste. Although the area has been determined to have a low probability of containing HTRW, it is assessed in this document to comply with USACE policy.

4.1 Navigation

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

There would be no anticipated direct, indirect or cumulative impacts to navigation without implementation of the proposed project.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

The proposed action may cause minor and temporary interference with navigation by reducing the width of the Humble Canal from the east bank of the preload footprint but is not expected to

interfere significantly with shipping traffic. Preload construction would be closely coordinated with representatives of the navigation industry and a Notice to Mariners would be posted by the US Coast Guard. Construction of the preload levee in Humble Canal could cause minor disruptions to small vessels using these portions of the project area; however, the effects on navigation would be mainly temporary. Portions of the site may become inaccessible to some watercraft as wetland vegetation eventually colonizes the area; however, the shallow nature of the area currently limits most vessel access anyway. No impacts would result from staging or the boat launch access.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and work by TLCD and/or other non-Federal entities within the Morganza to the Gulf levee system. Impacts from completed projects, including LGM, HNC, and the GIWW (See Section 1.6 for details) would also coincide with this resource.

4.2 Wetlands

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Land loss in the proposed deposition area, due to subsidence, sea level rise (SLR) and saltwater intrusion would likely continue at their current rate.

Without implementation of the proposed action, wetlands in the project vicinity would continue to be directly and indirectly impacted by the present natural and anthropogenic factors. Salinity intrusion would continue to impact vulnerable marsh habitats, causing them to either convert type or convert to open water. Subsidence and erosional land loss would continue at the present rate. The overall habitat value and acreage of the remaining wetlands would decline with the No Action alternative.

Without implementation of the proposed action, other federal, state, local, and private projects may still occur within or near the proposed project area, providing hurricane and storm damage risk reduction for communities located within the watershed as well as additional wetland creation.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

The proposed action would directly impact approximately 9.6 acres of wetlands (approximately 2.5 AAHUs) consisting of roughly 9 acres of fresh and brackish marsh, and 0.5 acres of BLH. The constructible features would result in this area being converted into upland habitat for the preload levee. No wetlands would be impacted from the proposed staging areas, existing boat access or the J-1 borrow site.

The proposed action would offer minimal wave impact reduction for adjacent wetland habitat to the north. The action would result in approximately 150,000 cyd of fill material being placed into waters of the U.S. with a footprint of around 3 acres on the west bank and around 6.4 acres on the east bank of Humble Canal (See Figure 2). Therefore, under authority delegated from the Secretary of the Army and in accordance with Section 404 of the Clean Water Act of 1977, a 404(b)(1) evaluation has been prepared for the proposed project. (Appendix E)

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment. Impacts from completed projects, including LGM, HNC, and the GIWW (See Section 1.6 for details) would also coincide with this resource.

4.3 Aquatic Resources/Fisheries

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Without implementation of the proposed action, aquatic habitat in the project footprint would not be directly impacted. Conversion of existing marsh to open water in the project area would continue because of continued subsidence and erosion, which could negatively affect fish and shellfish populations inhabiting the area. Wetland vegetation loss and the decrease in the amount of open water less than or equal to 1.5 feet deep would result in the loss of forage and nursery habitat for fisheries.

Without implementation of the proposed action, other federal, state, local, and private projects may still occur within or near the proposed project area, providing hurricane and storm damage risk reduction for communities located within the watershed as well as additional benefits to aquatic resources and fisheries.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

Short-term temporary impacts to aquatic/fishery resources would result from borrow material placement in approximately 0.1 acres of open water in Humble Canal. This impact would be classified as “de minimis” and not require compensatory mitigation. Increased turbidity and disturbance from construction activities and vibration from equipment could result in relocation and mortality of sessile or slow-moving species in the immediate vicinity.

Brown shrimp, white shrimp, and crabs may be directly impacted through the filling of shallow open water areas with borrow fill; however, these species would indirectly benefit from the abundance of introduced detritus, and subsequent food resources, from these materials. Since the project area is a naturally turbid environment and the majority of resident finfish and shellfish species are generally adapted to, and very tolerant of, high suspended sediment concentrations, the effects of turbidity and suspended solids on fisheries would likely be negligible.

For any standing water removed in the J-1 borrow site, there is a potential for temporary impacts to aquatic species. . The borrow site has not been used for fisheries or farming any aquatic species.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees, LGM, HNC, the GIWW, and prior work constructed by TLCD and other non-Federal entities within the MRT-MTG alignment (See Section 1.6 for details).

4.4 Wildlife

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Without implementation of the proposed action, land loss in the proposed deposition area would likely continue at the present rate resulting in a reduction of habitat diversity and availability for resident terrestrial wildlife such as nutria, muskrat, mink and river otter; migratory waterfowl such as snow geese, gadwalls, pintails, mallard, teal, coot redheads, lesser scaup, mergansers, wigeons, canvasbacks and black ducks; and other avian species such as ibis, egrets, cormorants, terns, gulls, skimmer, pelicans, and various raptors. Recent CWPRRA and beneficial use projects have resulted in the creation of wetlands habitat within the surrounding areas which provides valuable and diverse habitat for foraging, refugia, nesting, and loafing of terrestrial wildlife, migratory waterfowl, and other avian species.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

The proposed action would result in the direct loss of approximately 0.5 acres of BLH, 4 acres of fresh marsh, and 5 acres of brackish marsh habitat.

Minimal and temporary adverse direct and indirect impacts to wildlife would be anticipated. While construction activities are expected to mainly occur over open water, there is the potential for noise or wave action generated by construction activities to displace terrestrial wildlife in the area; however this would be a temporary disturbance, with wildlife likely to return following the construction of the preload levee. Migratory waterfowl and other avian species would be temporarily displaced from the project area. It is anticipated that wildlife populations would move to existing adjacent habitat areas during construction activities. The placement of fill material for the preload levee would reduce some shallow open water habitat, thereby reducing available foraging habitat for some avian species. However, the reduction in the amount of shallow open water is negligible compared to that remaining in the project area.

For any standing water removed in the J-1 borrow site, there is a potential for temporary impacts to species that utilize the site for breeding and foraging. The adjacent Bayou Petit Gaillou on the southwest border currently provides adequate foraging habitat for wildlife including alligators.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment. Impacts from completed projects, including LGM, HNC, and the GIWW (See Section 1.6 for details) would also coincide with this resource.

4.5 Essential Fish Habitat

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Without implementation of the proposed action, no direct impacts to EFH would occur in the marsh restoration area. However, land loss, due to subsidence, SLR and saltwater intrusion would continue in the project area at the current rate. Therefore, indirect impacts to EFH would likely occur as existing estuarine emergent marsh areas continue to be converted to open water.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

With implementation of the proposed action, minor impacts in the form of increased turbidity to essential fish habitat are anticipated with mitigation measures in place (see Section 5). Short term minor EFH impacts would include a temporary and localized increase in estuarine water column turbidity during the placement of borrow fill material in shallow open water areas and in the channel. No impacts would result to EFH from the J-1 borrow site.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment. Impacts from completed projects, including LGM, HNC, and the GIWW (See Section 1.6 for details) would also coincide with this resource.

4.6 Threatened, Endangered and Protected Species

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Under the no action alternative, minimal direct, indirect, or cumulative impacts to T&E and protected species or their critical habitat would occur. The presence of T&E in the project area is unlikely and therefore the no action alternative is not likely to adversely affect T&E or their critical habitat.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

Although threatened or endangered species may occur within the larger watershed, their presence within the project area is highly unlikely. The proposed project area does not contain critical habitat for Federally-listed species, and the open water areas surrounding the project area would allow them to easily avoid the project activities. Therefore, in coordination with USFWS on 13 April 2021 (See Appendix D), the proposed action would not result in adverse direct or indirect impacts to (i.e., “not likely to adversely affect”) Federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of USFWS.

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

- All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). USFWS recommends the following to minimize potential impacts to manatees in areas of their potential presence:
- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).
- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at "no wake/idle" speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8" X 11" reading language similar to the following: "CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT". A second temporary sign measuring 8" X 11" should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: "CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION".
- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service's Louisiana Ecological Services Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (1-800-442-2511). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

In addition, USFWS recommends that on-site contract personnel be trained to identify colonial nesting birds and their nests and avoid affecting them during the breeding season (i.e., the time period outside the activity window).

During nesting season, construction must take place outside of USFWS/LDWF buffer zones. Previous field surveys of the project completed on April 22, 2021 and May 7, 2021 indicated no presence of bald eagle nests within or adjacent to the project area. Prior to the start of construction, a Corps Biologist and USFWS Biologist will perform a survey for nesting birds. If nesting bald eagles are present, the National Bald Eagle Management Guidelines would be followed.

CEMVN has concluded there is no critical habitat for any threatened, endangered, or candidate species under the purview of NMFS has been designated within the project area, including the borrow site, and that there would be no adverse impacts (i.e., “no effect”) to any of the NMFS Federally-listed species that could potentially occur within the project area.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees, LGM, HNC, the GIWW, and prior work constructed by TLCD and other non-Federal entities within the MRT-MTG alignment (See Section 1.6 for details).

4.7 Water and Sediment Quality

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Without the proposed project, water quality in the project area would still be impacted by the MTG Hurricane Risk Reduction project, as well as other factors such as weather and climate, development, and industry. Conditions would be similar to those described in the summary of historical and existing conditions as well as in the future with project conditions for the MTG Environmental Impact Statement (EIS).

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

Under the proposed action, future with project water quality conditions would differ slightly from those described in the future with project conditions for the Morganza to the Gulf of Mexico Environmental Impact Statement (EIS).

During construction of the proposed action, the placement of fill materials is expected to generate minor releases of clay minerals (hydrous aluminum phyllosilicates containing other oxidized minerals such as iron and manganese) and small amounts of decomposed organic matter. These releases may create minor, short-lived water column impacts, including elevated turbidity and suspended sediment plumes in adjacent surface waters. Suspended sediment could absorb solar radiation causing elevated water temperatures, and suspended organic materials could cause a temporary increase in oxygen demand capable of decreasing dissolved oxygen levels. Additionally, staging locations occur adjacent to surface waters and low-quality fragmented marsh habitat. Incidental discharges of fill material into Humble Canal may occur during construction or with stormwater runoff, causing temporary localized elevated turbidity and suspended sediment levels. Following construction activities, heavier materials used to construct the preload levee footprint and initial levee lift would settle and compact while lighter unconsolidated material near the sediment or soil surface would be washed away by rainfall runoff or surface water movement.

See Appendix E for 404(b)(1) analysis with further details on water quality impacts of the proposed action. For any standing water in the J-1 borrow site, there is a potential for temporary water and sediment quality impacts.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the

Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment.

4.8 Air Quality

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

With no action, no new direct, indirect or cumulative impacts to ambient air quality would be expected to occur.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

With implementation of the proposed action, direct and indirect impacts to ambient air quality within the immediate vicinity of the project area, including the borrow site, are expected to be temporary, primarily due to the emissions of construction equipment. Due to the short duration of the proposed project, any increases or 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 construction activities associated with the proposed action cease, air quality within the vicinity is expected to return to pre-construction conditions.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Morganza to the Gulf levee system and Terrebonne NFL. Impacts from completed projects, including LGM, HNC, and the GIWW (See Section 1.6 for details) would also coincide with this resource.

4.9 Cultural Resources

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts

If there is no action taken, there is no anticipated change to cultural resources. No cultural resources have been identified within the area of potential effect, and no direct, indirect, or cumulative impacts to cultural resources are expected to occur.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

No cultural resources have been identified within the area of potential effect, including the borrow site, and no direct, indirect, or cumulative impacts to cultural resources are expected to occur.

4.10 Tribal Resources

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts

Under the No Action alternative, tribal resources, including significant archaeological sites, burial locations, as well as plant and animal materials would be negatively affected by the land-loss trends throughout the Terrebonne Basin; however there is no potential for USACE to significantly adversely affect protected tribal resources, tribal rights, or Indian lands without an action.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

While Terrebonne Parish has a long history of occupation by Native American communities, prior to its establishment and throughout its history, there are currently no protected tribal resources, tribal rights, or Indian lands that have the potential to be significantly directly, indirectly, or cumulatively impacted by the proposed action. Therefore, CEMVN has determined that no tribal resources, rights, or lands will be significantly affected by implementing this action. The results of the NHPA Section 106/E.O. 13175 process between USACE and Federally-recognized Tribes will confirm this determination. The consultation period ended on July 10, 2021 and No Federally-recognized Tribes objected to the Section 106 determination or informed CEMVN of additional resources to address.

4.11 Recreational Resources

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Without intervention, communities within Terrebonne Basin would continue to be at risk from high water events induced by coastal storm surges and rainfall events. Recreational resources would continue to evolve from existing conditions because of both land use trends and natural processes over the course of time. Land loss would likely continue and there could be an overall loss of habitat within the system that once provided cover, resting, nesting and foraging habitat. The loss of these habitats, and the effect such losses would have on wildlife and aquatic species, could cause recreational resources in the basin to transition.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

The preload levee at the Humble Canal Floodgate site extends into the Pointe-aux-Chenes Wildlife Management Area and could have minimal and temporary adverse direct and indirect impacts to recreational resources. The preload levee may be built in wildlife habitats and fisheries and temporarily displace animals using the area during construction. Consumptive recreation associated with hunting and fishing in these habitats, as well as non-consumptive recreation such as birding and wildlife observation, may be temporarily impacted. Refer to Aquatic Resources/Fisheries and Wildlife sections in this document for associated impacts.

Cumulative impacts to this resource would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne NFL and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment.

4.12 Visual Resources

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

The forecasting of what the project area's visual landscape will look like in the future is determined by:

1. Physical and ecological changes (e.g., land use or vegetative succession).
2. Identifying trends in recreation and land use.
3. Reviewing government agencies' planning information.

The extent of effort involved for forecasting the project areas' visual landscape's future is limited by time and the availability of relevant information. Additionally, physical and ecological changes combined with trends in recreation and land use may be found elsewhere in this document. Therefore, the focus of this section is on identifying relevant project area information related to desired visual resources' conditions; this information can be found at <https://www.wlf.louisiana.gov/page/pointeauxchenes>.

The Louisiana Department of Wildlife and Fisheries provides oversight on activities occurring in Pointe-aux-Chenes Wildlife Management Area. The aforementioned Louisiana Department of Wildlife and Fisheries website contains details on conservation measures including operation and management activities. These conservation measures including any planned wildlife habitat restoration projects may result in changes to the Pointe-aux-Chenes Wildlife Management Area's visual environment. There would be no additional direct, indirect, or cumulative impacts to visual resources as result of the no action alternative.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

Direct, indirect or cumulative impacts to visual resources caused by this alternative are primarily based on this alternative's impacts to cultural and recreational resources; these impacts may include the introduction of potentially visually distressful elements into the project area's viewshed, modifications to the built-environment that involves elevating or demolishing historic structures or project features that restrict physical access to the Pointe-aux-Chenes Wildlife Management Area. The proposed action to construct the preload levee and retrieve material from the J1 borrow site would not have any additional direct, indirect, or cumulative impacts to the project area.

4.13 Environmental Justice

Future Conditions with No-Action

Direct, Indirect, and Cumulative Impacts

Under the No Action Alternative, there will be no direct, indirect, or cumulative EJ impacts and minority and low-income residents will continue to experience flood risk associated with storm surge events. The no action alternative will not construct the preload levees. Therefore, all

residents, including those residents that are low-income and minority, may be impacted in the future as they are today.

Future Conditions with the Proposed Action

Direct, Indirect, and Cumulative Impacts

The proposed project feature would be implemented as part of the MRT-MTG project authorized under Section 7002(3)5 of WRRDA 2014, PL 113-121. The objective of this project feature is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, and associated floodwalls, and earthen levees in the vicinity of Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees. The proposed actions would involve construction activities for the preload levee and borrow material retrieved from the J-1 borrow site near Montegut, LA.

The proposed project includes the construction of the preload levees and the use of staging areas and borrow pits. The preload levees will be constructed adjacent to the existing levees but at a higher elevation, so novel impact/disruption to the hydraulics at this location will be minimal. The channel will not be closed off under the preload contract. Therefore, flows will be maintained through this location limiting disruption to the existing hydraulics of Humble Canal. The footprint of the preload levee is located in wetlands and its construction will not cause direct adverse impacts to EJ communities in the area. There will be no direct impacts to low-income and minority residents in the vicinity of the proposed pre-load levee.

Construction activities associated with the preload levees may cause temporary, minor indirect adverse impacts such as noise and transportation associated detours. The human environment is expected to return to pre-construction conditions after activities are completed. A staging area is located along the Humble Canal on the southern bank near the existing barge gate. The staging area will be used temporarily for equipment and materials needed to construct the preload levee. Impacts to residents in the immediate area will include minor noise and a possible minor increase in truck traffic entering and leaving the staging area. A borrow pit has been identified for use to extract suitable clay material to construct the pre-load levees.

Positive indirect impacts associate with constructing the preload levees is that these levees are the first phase in providing storm surge risk reduction benefits to the community. The SEIS will evaluate a sector gate that may be placed across the Humble Canal that would tie into the preload levees, and other features of the proposed Morganza to the Gulf levee system that would reduce the risk of storm surge. At this time, the construction timeframe of the Humble Canal Sector Gate is unknown.

4.14 Noise and Vibration

Future Conditions with No-Action

Direct, Indirect and Cumulative Impacts

Under the No Action Alternative, the project would not be implemented and none of the project features would be developed. This analysis assumes that ambient noise levels under the No Action Alternative would be the same as existing conditions. Neither construction-related activities

nor increased operational activities would occur so there would be no direct, indirect or cumulative impacts.

Future Conditions with the Proposed Action

Direct Impacts

Noise from construction equipment would occur throughout the construction phase of the proposed action. Ambient noise levels within the project area would increase because of additional noise from construction equipment. Noise levels would vary, depending on the construction phasing and specific pieces of equipment in use at any given time.

There are residences near the construction area and along the haul route, including Montegut Elementary School. The speed limit on Hwy 55 at the Montegut Elementary School is 35 mph and the school is 75 feet from the roadway. A large diesel truck going 50 mph, 50 feet away produces approximately 84 dBA, but the reduced speed and increased distance of the school from the roadway would reduce the impact of the noise. Currently, heavy equipment for agricultural use travel on these county roads. The increase in heavy traffic would be temporary and would return to a pre-construction level at the completion of the project.

Indirect Impacts

There is no operational portion of this project, therefore continuing and indirect noise from this project would have no impact on receptors.

The noise and vibration caused by this project is likely to disturb wildlife and fish during the construction activity, as addressed in Sections 4.4, 4.6 and 4.7. The activities during construction may also disturb visitors to the Pointe Aux Chenes Wildlife Management Area, as addressed in the Recreation Impacts (See Section 4.11).

Cumulative Impacts

Positive cumulative impacts associate with constructing the preload levees is that these levees are the first phase in providing storm surge risk reduction benefits to the community. Any noise levels from the construction and operation of a proposed sector gate across Humble Canal would be evaluated in a future NEPA document. If the surrounding environment is not significantly changed, the existing and any proposed future levees, and trees between the new structures and receptors would continue to act as a sound barrier and attenuate this construction and operational noise and vibration. There is no planned concurrent construction in the area that would compound the noise and vibration from this activity.

4.15 Socioeconomics

4.15.1 Socioeconomics

Future Conditions with No-Action

Direct Impacts and Indirect Impacts

Under the No Action alternative there will be no construction of the project in the area and employment, income, housing, social connectedness, and all other measures of socioeconomics will be the same as the existing conditions. Without construction of the project, this area will still be a high risk for flooding. Severe flooding has adverse effects on the vitality of a community. The existing condition socioeconomics reflect current high-risk flooding conditions.

Future Conditions with the Proposed Action

Direct Impacts, Indirect Impacts, and Cumulative Impacts

With the proposed action in place there will be temporary increases in employment and income during construction of the project. The project footprint does not include any private parcels. The housing in the project area will not be adversely affected by the proposed project. With implementation of the proposed project area in place the surrounding communities will be at lower risk for severe flooding. This may lead to an increased economic vitality surrounding the proposed project area. Cumulative impacts to socioeconomics would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment

4.15.2 Transportation

Future Conditions with No-Action

Direct and Indirect Impacts

Under the no action alternative there will be no expected changes to transportation as there will be no construction.

Future Conditions with the Proposed Action

Direct Impacts

With the implementation of the proposed project, there will be increased traffic between the borrow pit location and the Humble Canal preload construction site during the construction period. Impacted roads include Aragon Road, LA State Highway 58, and LA State Highway 55. Contractors and sub-contractors transporting material will stay in compliance with state and parish load limits and traffic ordinances. Increased traffic will only occur during project hours of operation which may occur seven days a week between the hours of 7am to 7pm. The proposed project does not include any road closures or detours. Increased debris along roads during construction due to transportation of materials to the proposed project area will be removed immediately and cleaned. There will be limestone turnouts and wash points at the exit point of the borrow site and construction site to mitigate the presence of debris on the roadways.

Indirect Impacts

Construction of the proposed project will increase travel time on Aragon Road, LA State Highway 58, and LA State Highway 55. Increased travel time will only occur during project hours of operation- seven days a week, between 7am and 7pm.

Cumulative Impacts

Cumulative impacts to transportation would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts, including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment.

4.15.3 Commercial Fisheries

Future Conditions with No-Action

Direct Impacts and Indirect Impacts

Under the no action alternative fishing resources will remain the same.

Future Conditions with the Proposed Action

Direct Impacts, Indirect Impacts, and Cumulative Impacts

With implementation of the proposed project there may be increased adverse impacts on fishery resources due to changes in fishery access, salinity, turbidity, and submerged aquatic vegetation. Cumulative impacts to commercial fisheries would be the additive combination of impacts by this and other Federal, state, local, and private flood risk reduction efforts., including, but not limited to the Terrebonne Non-Federal Levees and construction by TLCD and/or other non-Federal entities within the MRT-MTG levee alignment

4.16 Cumulative Impacts Analysis

The Council on Environmental Quality (CEQ) Regulations define cumulative impacts (CI) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. CI can result from individually minor but collectively significant actions taking place over a period of time.”

Coastal Louisiana, including the project area, has been greatly impacted by natural subsidence, levees, hurricanes and oil and gas infrastructure. Recent events, such as hurricanes (see Section 3.1.3) and oil spills like the 2010 BP Deepwater Horizon spill, each contribute to the loss of habitat but are largely indiscernible from other impacts. Direct and indirect impacts of past, present and reasonably foreseeable future events were considered in the analysis of the proposed project consequences. These impacts include historical and predicted future land loss rates for the area and restoration projects in the vicinity. The proposed action would have reversible temporary adverse impacts to some environmental resources, but overall cumulative moderate benefits to the environmental resources.

The approximately 9.5 acres (2.5 AAHUs) of project impacts to wetlands (i.e. BLH, fresh and brackish marsh) and open water would be in addition to, and often synergistic with, the impacts and benefits from other wetland acres restored, nourished and protected by other Federal, state, local, and private restoration efforts within or near the Project area, the Louisiana state coastal area, and the nation’s coastal areas. Impacts to the wetlands would be mitigated and coordinated with USFWS and NMFS.

Though CWPPRA projects are nominated and implemented one at a time and must have individual merit, the cumulative value of the wetland restoration and protection projects in the area can exceed the summed values of the individual projects. Similar wetland restoration projects in the area would operate synergistically with the proposed alternative to enhance the structural and functional integrity of the ecosystem, improve primary productivity rates, and thereby improve the overall environmental resources. The nearest CWPPRA project for restoration listed by the state database involve shoreline protection, marsh management, and hydrological restoration: West Lake Boudreaux Shoreline Protection and Marsh Creation (5.5 miles away, status completed).

Environmental benefits from these project types address the suite of environmental threats along this area of coast. In recognition that the environmental needs are varied in type and differ by location, the state of Louisiana developed a 2017 Coastal Master Plan for Southwest Louisiana as a way to prioritize restoration projects. The proposed plan is consistent with this coastwide planning.

Physical cumulative impacts are related to mining dredge materials. The effect of borrowing from offshore sources has been evaluated and determined to have no adverse impact. Cumulative impacts would result from the removal of benthic organisms. There is no difference in the cumulative and direct/indirect impacts for this project. Offshore borrow sites disruptions from the proposed and other past, current and future activities are separated by time and space, thus allowing the recolonization of benthic organisms. Separation of time and space also reduce any potential cumulative impact with other actions for wave climate. Therefore, no adverse cumulative impacts are expected.

5 Mitigation

5.1 Mitigation Measures

An assessment of the potential environmental impacts to important resources found that the approved project and the proposed changes include the loss of marsh and BLH habitat (approximately 0.5 acres of BLH and 4 acres of fresh and 5 acres of brackish marsh) for the initial preload construction.

Mitigation alternatives investigated included the following:

- Alternative 1: No Action Alternative – this alternative cannot be selected as CEMVN is required to mitigate for unavoidable impacts.
- Alternative 2: Expanding an existing CWPPRA project – would require a project to already exist in the watershed and be completed within suitable time and budget.
- Alternative 3: Constructible mitigation site – this would involve creating a BLH, brackish, and fresh marsh mitigation site to offset the impacts of habitat lost from the project.
- Alternative 4: Mitigation bank credit purchase (proposed mitigation plan) – buying in-kind mitigation bank credits.

USACE-approved mitigation banks with perpetual conservation servitudes currently in compliance with their authorizing instrument (mitigation bank instrument) and able to mitigate fresh and brackish marsh and BLH Coastal Zone impacts were considered as a potential

alternative. Alternative 4 assumes that the mitigation requirement could be satisfied through the purchase of fresh, brackish/saline, and BLH mitigation bank credits.

The WIIN Act of 2016 (PL 114-322) states that all potential credits from mitigation banks and the Louisiana in-lieu fee (ILF) programs with service areas that include the impacted areas should be considered as reasonable alternatives. The Louisiana ILF program is currently not acceptable until Federal requirements for USACE projects can be met. Tidal marsh mitigation banks in Louisiana have a service area made up of either the Deltaic or Chenier Plain. There are mitigation banks in the watershed with available fresh marsh and BLH credits for purchase, but there are no mitigation banks in the watershed with available brackish/saline marsh credits for purchase. As such, the study area for mitigating the brackish marsh requirement is the Deltaic Plain ("the plain"). See "Location Map" in Figure A-2, Appendix A for a map of this boundary. There are brackish/saline marsh credits available in the plain. As such, if mitigation bank credits were purchased to satisfy all or part of the remaining brackish marsh requirement, mitigation for project impacts incurred would occur outside of watershed.

In coordination with the resource agencies, the USACE-certified WVA models for fresh and brackish marsh and BLH were used in determining the AAHUs to offset the habitat impacts. CEMVN proposes to purchase sufficient mitigation bank credits to satisfy 1.77 AAHUs of fresh marsh impacts and 0.18 AAHUs of BLH impacts in the watershed, and 0.58 AAHUs of brackish marsh impacts in the plain.

5.2 Mitigation impacts to relevant resources

Overall, the proposed mitigation measure would offset impacts from construction of the pre-load levee. However, as stated above, mitigation would involve the purchasing of brackish marsh credits outside of the watershed. For fresh marsh and BLH, in-kind credits purchased inside the watershed would offset the wetland habitats lost in the project footprint. This mitigation approach would result in a permanent loss of brackish marsh habitat in the watershed. As such, breeding, nesting, and foraging habitat for wildlife, T&E and protected species, and aquatic species associated with brackish marsh would be reduced in the watershed and improved elsewhere in the plain. However, because there is an abundance of brackish marsh habitat in the plain, this small loss of AAHUs will have a minimal impact on species populations. Credits purchased for fresh marsh and BLH would remain in the watershed.

No impacts associated with navigational, cultural, tribal, visual, noise and vibration, socioeconomic, and EJ resources would result. Mitigation outside of the watershed would provide benefits to all other relevant resources, especially for the natural community and fully offset wetland habitat impacts from the pre-load levee. Cumulatively, when added to other past, present, and reasonably foreseeable future ecosystem restoration and mitigation projects, this alternative would help counter the overall trend of loss of fresh and brackish marsh and BLH habitat and the loss of associated species.

6 Coordination and Public Involvement

A Public Notice for EA #583 has been published in the Baton Rouge and New Orleans Advocate for 30 days beginning August 12, 2021 and ending September 11, 2021.

Preparation of this EA and FONSI was coordinated with appropriate Congressional, Federal, Tribal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, received copies of the draft EA and draft FONSI:

Advisory Council on Historic Preservation
Associated Federal Pilots
Big River Coalition
Coastal Protection and Restoration Authority
Coastal Protection and Restoration Authority Board of Louisiana
Crescent River Port Pilots Association
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Environmental Quality
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Transportation and Development
Louisiana Department of Wildlife and Fisheries
Louisiana Division of Administration, State Land Office
Louisiana State Historic Preservation Officer
Lower Mississippi River Committee (LOMRC)
Maritime Navigation Safety Association
New Orleans Baton Rouge Steamship Pilot Association
Terrebonne Levee Conservation District
Terrebonne Parish Consolidated Government
The Associated Branch (Bar) Pilots
U.S. Coast Guard Marine Safety Unit Baton Rouge
U.S. Coast Guard Sector New Orleans
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Natural Resources Conservation Service, State Conservationist
Caddo Nation of Oklahoma
Chitimacha Tribe of Louisiana
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Mississippi Band of Choctaw Indians
Jena Band of Choctaw Indians
Muscogee Creek Nation
Seminole Nation of Oklahoma
Tunica-Biloxi Tribe of Louisiana

US Fish and Wildlife Recommendations

CEMVN received recommendations in a Draft CAR from USFWS dated May 24, 2021. The document and these recommendations can be found in Appendix D. CEMVN's responses are as follows:

1. Forest clearing associated with project features should be conducted during the fall and winter to minimize impacts to nesting migratory songbirds.

Response 1. – Concur. Forest clearing will be conducted during fall and winter to minimize impacts to nesting migratory songbirds.

2. Important fish and wildlife habitat (emergent wetlands, forested wetlands, and non-wetland forest) should be conserved by avoiding and minimizing the acreage of those habitats directly and indirectly impacted by project features.

Response 2 – Concur. In coordination with the project delivery team, avoidance and minimization of impacts were both considered for reducing project impacts to the maximum extent practicable, including impoundment impacts along the existing levee. Compensatory mitigation from Corps-approved mitigation banks will be required to mitigate all unavoidable impacts to wildlife habitat impacted from the project.

3. Avoid impacts to threatened and endangered species, at-risk species, and species of concern such as the bald eagle, and wading bird nesting colonies.

Response 3 – Concur. Impacts for T&E species, at-risk species, and species of concern will be avoided. Bird abatement procedures would be implemented to prevent wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants from nesting during their nesting period. In the event that implementation of the bird abatement plan is not successful and nesting does occur, all activity occurring within 1,000 feet of a nesting colony would be restricted to the non- nesting period. For nesting brown pelicans, activity should be avoided within 2,000 feet of the colony. Activity would be restricted within 650 feet of nesting black skimmers, gulls, and terns.

4. West Indian manatee conservation measures should be included in all contracts, plans, and specifications for in-water work in areas where the manatee may occur.

Response 4 – Concur. Manatee conservation procedures would be included in all contracts, plans, and specifications for in-water work in areas where the manatee may occur.

5. A survey should be conducted to determine if a bald eagle nest is present within or adjacent to the project area. If a bald eagle nest occurs within 660 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 <http://www.fws.gov/southeast/birds/Eagle/tamain.html>.

The Service developed the National Bald Eagle Management Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles. A copy of the guidelines is available at: <https://ecos.fws.gov/ServCat/DownloadFile/36458?Reference=36436>

Response 5 - Concur. Previous field surveys completed on April 22, 2021 and May 7, 2021 indicated no presence of bald eagle nests in the project area. See Section 4.6 which states that USACE biologists would conduct bald eagle surveys prior to construction.

6. Any 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.

Response 6 - Concur. USACE seeks to avoid impacts to EFH and would coordinate with NMFS on any unavoidable impacts.

7. Compensation should be provided for any unavoidable losses of BLH and marsh habitat, caused (directly or indirectly) by project features. All mitigation should be developed/coordinated with the Service, LDWF, and other natural resource agencies.

Response 7 – Concur. Compensation will be provided for unavoidable losses of habitat from project features.

8. Any proposed change in project features or plans should be coordinated in advance with the Service, LDWF, NMFS and other resource agencies.

Response 8. Concur. CEMVN will continue to coordinate with the resource agencies on any proposed changes.

9. The Service recommends that the USACE contact the Service for additional consultation if:
1) the scope or location of the proposed project is changed significantly; 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in your consultation should occur before changes are made and/or finalized.

Response 9 – Concur. CEMVN will consult with USFWS on any proposed changes.

7 Compliance with Environmental Laws and Regulations

There are many Federal and state laws pertaining to the enhancement, management and protection of the environment. Federal projects must comply with environmental laws, regulations, policies, rules and guidance. Compliance with laws will be accomplished upon 30-day public and agency review of this EA #583 and associated Finding of No Significant Impact.

Farmland Protection Policy Act of 1981

The Farmland Protection Policy Act of 1981 (FPPA) was enacted to minimize the extent that Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, would be compatible with the State, local government, and private programs and policies to protect farmland.

Under this policy, soil associations are used to classify areas according to their ability to support different types of land uses, including urban development, agriculture, and silviculture. The USDA Natural Resource Conservation Service (NRCS) designates areas with particular soil characteristics as either “Farmland of Unique Importance,” “Prime Farmland,” “Prime Farmland if Irrigated,” or variations on these designations. Prime farmland, as defined by the FPPA, is land that has the best combination of physical and chemical characteristics for producing food, feed,

forage, fiber, and oilseed crops and is available for these uses. Farmland of unique importance is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, drought-prone, and less productive, and cannot be easily cultivated as compared to prime farmland (NRCS 2016).

No prime or unique farmlands, as defined and protected by the Farmland Protection Policy Act, would be affected by the proposed project (See Appendix D for coordination letter received from Natural Resource Conservation Service).

Clean Air Act of 1972

The Clean Air Act (“CAA”) sets goals and standards for the quality and purity of air. It requires the EPA to set National Ambient Air Quality Standards (“NAAQS”) for pollutants considered harmful to public health and the environment. The Project area is in Terrebonne Parish, which is currently in attainment of NAAQS. The Louisiana Department of Environmental Quality is not required by the CAA and Louisiana Administrative Code, Title 33 to grant a general conformity determination.

Clean Water Act of 1972 – Section 401 and Section 404

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. Surface water quality standards are established Louisiana Administrative Code (LAC) Title 33, Part IX (2020). State Water Quality Certificate (WQC) 210601-03 (dated August 3, 2021) was received from the Louisiana Department of Environmental Quality on August 3, 2021 (Appendix D).

As required by Section 404(b)(1) of CWA, an evaluation to assess the short- and long-term impacts associated with the discharge of dredged and fill materials into waters of the United States resulting from this Project has been completed (Appendix E). The Section 404(b)(1) public notice was mailed out for public review comment period beginning August 12, 2021 and ending September 11, 2021

Coastal Zone Management Act of 1972

The Coastal Zone Management Act requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." Coordination with the Louisiana Department of Natural Resources (LDNR) on a modified coastal zone consistency for C20130001 on the Morganza to the Gulf levee alignment began in an email dated May 7, 2021 (Appendix D). LDNR concurred by letter dated June 21, 2021 with the determination that the proposed action is consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program; Consistency (C20130001 Mod 02). (Appendix D)

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. The USFWS identified in their coordination letter, five T&E species, the Pallid sturgeon, West Indian manatee, piping plover, red knot, and

American alligator that are known to occur or believed to occur within the vicinity of the Project area. No plants were identified as being threatened or endangered in the Project area. CEMVN initiated coordination with the USFWS on April 13, 2021 (Appendix D). The project, as proposed, is not likely to adversely affect Federally-listed threatened or endangered species, or their critical habitat, under the jurisdiction of USFWS. This fulfills the requirements under Section 7(a)(2) of the ESA. (Appendix D)

The proposed action would include Standard Manatee Conditions for In-Water Activities with the contractor instructing all personnel regarding the potential presence of manatees in the project area, and the need to avoid collisions with these animals. If a manatee(s) is sighted within 100 yards of the project area, moving equipment must be kept at least 50 feet away from the manatee or shut down. There would be restrictions on vessel operation, restrictions on the use of siltation barriers, and mandatory signage designed to avoid any harm to manatees in the project area. More specific information would be contained in the dredging contracts.

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 USFWS reviewed the proposed changes to the previously approved ridge restoration and marsh creation project described in EA #583 and provided a draft FWCAR with project specific recommendations on May 25, 2021. The Draft CAR can be found in Appendix D.

Hazardous, Toxic, and Radioactive Waste

Engineer Regulation (ER) 1165-2-132 provides that in the Planning, Engineering and Design (PED) Phase that, for proposed project in which the potential for HTRW problems has not been considered, an HTRW initial assessment, as appropriate for a reconnaissance study, should be conducted as a first priority. If the initial assessment indicates the potential for HTRW, testing, as warranted and analysis similar to a feasibility study should be conducted prior to proceeding with the project design. The non-Federal sponsor (NFS) for the project will be responsible for planning and accomplishing any HTRW response measures and will not receive credit for the costs incurred.

An ASTM E 1527-13 Phase 1 Environmental Site Assessment (ESA), HTRW 21-03 dated June 7, 2021, was completed for the project area and a copy is being maintained on file at CEMVN. The probability of encountering HTRW for the proposed action is low based on the initial site assessment. If a recognized environmental condition (REC) is identified in relation to the Project area, the U.S. Army Corps of Engineers, New Orleans District would take the necessary measures to avoid the REC so that the probability of encountering or disturbing HTRW would continue to be low.

Prior HTRW reports have been completed for the proposed J-1 borrow site. An Initial Phase 1 ESA entitled "Morganza To The Gulf Of Mexico, Hurricane Protection Levees, Reach J-1, HTRW #233" was prepared by MVN on April 23, 2005. A subsequent Phase I ESA entitled "Terrebonne Parish Non-Federal Levee System Repairs, Replacements, Modifications, and Improvements,

Terrebonne Parish, Louisiana (Susie Canal Levee, Orange Street Levee, and J-1 Borrow Pit” was completed on November 7, 2008. Both Phase I ESAs included the J-1 borrow area as part of the project area. Neither the April 2005 nor the November 2008 ESA identified any RECs or HTRW associated with the proposed J-1 borrow area. On May 18, 2021, an update to the two previous Phase 1 ESAs was completed on the J-1 borrow site in conjunction with EA #583. The probability of encountering HTRW at the proposed borrow site is low based on the initial and subsequent assessments. A copy of the J-1 borrow area assessment update will be maintained on file at CEMVN.

Magnuson-Stevens Fisheries Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended, Public Law (P.L.) 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 MSFCMA. In those findings, the CEMVN and NMFS have agreed to complete EFH coordination requirements for federal civil works projects through the review and comment on National Environmental Policy Act documents prepared for those projects. EA #583 was provided to the NMFS for review and comment on August 12, 2021.

Migratory Bird Treaty Act

The bald eagle was removed from the List of Endangered and Threatened Species in August 2007 but continues to be protected under the BGEPA and the MBTA. During nesting season, construction must take place outside of USFWS/LDWF buffer zones. A Corps Biologist and USFWS Biologist survey for nesting birds. This will be done prior to the start of construction.

National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The procedures in 36 CFR Part 800 define how Federal agencies meet these statutory responsibilities. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, including the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) and any Tribe that attaches religious or cultural significance to historic properties that may be affected by an undertaking. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. NHPA consultation letters pursuant to Section 106 were mailed to SHPO on June 10, 2021 for 30-day review. In a letter dated July 7, 2021, SHPO concurred that the actions of this EA are determined as having no effect on historic properties (See Appendix D).

Tribal Consultation

It is the policy of the federal government to consult with Federally-recognized Tribal Governments on a Government-to-Government basis as required in E.O. 13175 (“Consultation and Coordination with Indian Tribal Governments,” U.S. President 2000). The requirement to conduct coordination and consultation with Federally-recognized Tribes on and off of Tribal lands for “any activity that has the potential to significantly affect protected tribal resources, tribal rights (including treaty rights), and Indian lands” finds its basis in the constitution, Supreme Court cases, and is clarified in later planning laws. The USACE Tribal Consultation Policy, 1 Nov 2012, specifically implemented this E.O. and later Presidential guidance. The 2012 USACE Tribal

Consultation Policy and Related Documents provide definitions for key terms, such as tribal resources, tribal rights, Indian lands, consultation, as well as guidance on the specific trigger for consultation.

Table 7 2012 USACE Tribal Consultation Policy Definitions

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

While Terrebonne Parish has a long history of occupation by Native American communities, prior to its establishment and throughout its history, there are currently no protected tribal resources, tribal rights, or Indian lands that have the potential to be significantly affected by the proposed actions within in the watershed. However, in accordance with CEMVN's responsibilities under the NHPA Section 106 process and E.O. 13175, CEMVN has offered the following Federally-recognized Indian tribes the opportunity to review and comment on the proposed action: 1) the Chitimacha Tribe of Louisiana, 2) the Choctaw Nation of Oklahoma, 3) the Coushatta Tribe of Louisiana, 4) the Jena Band of Choctaw Indians, 5) the Mississippi Band of Choctaw Indians, and, 6) the Tunica-Biloxi Tribe of Louisiana. See Appendix D for consultation letter date and response received from Seminole Nation of Oklahoma dated 15 June 2021 and the Choctaw Nation of Oklahoma dated 8 July 2021.

8 Conclusion

The proposed action would result in construction of a preload levee that would support further MRT-MTG project. Future impact analysis of other constructible features with the MRT-MTG alignment and their impacts would occur in future supplemental NEPA documents.

This office has assessed the environmental impacts of the proposed action and has determined that the proposed action would have no significant adverse impact on the human and natural environment.

9 Prepared By

EA #583 and the associated FONSI were prepared by Daniel C Meden, Biologist, U.S. Army Corps of Engineers, New Orleans District; Regional Planning and Environment Division South, MVN-PDN-CEP; 7400 Leake Avenue; New Orleans, Louisiana 70118.

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HTRW & Air Quality	Joe Musso
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Recreation	Jack Milazzo
Socioeconomics	Grace Wieland
Tribal Resources	Jason Emery
District Quality Control Reviewers	Laura Lee Wilkinson (Environmental), Eric Williams (Cultural)

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APPENDIX A: FIGURES AND MAPS

**Figure A-1 Construction Status on Alignment of
Morganza to the Gulf Levee System**

Figure A-2 Study Area Map

Figure A-3 FWOP Project Maps

Figure A-4 LDEQ Subsegments

Figure A-5 Socioeconomic Graphs



Figure A-1 Construction Status on Alignment of Mississippi River and Tributaries, Morganza to the Gulf of Mexico Levee System



Morganza to the Gulf



IBERIA

Paincourtville
ASSUMPTION
Napoleonville
Supreme
Labadieville

ST. MARTIN

Attakapas Island WMA
Elm Hall WMA
Duck Lake
Grassy Lake
Cypress Bayou
Flat Lake
Lake Palourde
Patterson
Amelia

ST. JAMES

North Vacherie
South Vacherie
Lac des Allemands
Bayou des Allemands
Thibodaux
Schriever
Gray
Bayou Cane
Houma

ST. CHARLES

Lake Boeuf WMA
Raceland
Mathews
Simoneaux Ponds
Lake Catowatchie
Timken WMA
Salvador WMA
Lake Salvador
Palet Canal
Estelle

ST. MARY

Baldwin
Franklin
Way Lake
Bateman Lake
Bayou Sharpe
Sweet Bay Lake
East Cote Blanche Bay
Lower Atchafalaya River
Atchafalaya Delta WMA

LAFORCHE

Mandaleet NWR
Lake Theriot
Lake Penchant
Lake de Cade
Jug Lake
Carencro Lake
Four League Bay
Lost Lake
Lake Pagie
Lake Chapeau
Mosquito Bay
King Lake
Mud Lake
Bay Long
Ray Castagner
Ray Junop
Caillo Lake
Moncleuse Bay
Ray Voisin
Hackberry Lake
Deer Bay
Dog Lake
Bay de Mongles
Terrebonne Bay
Pelican Lake
Lake Pelto
Isles Dernieres Barrier Islands Refuge

TERREBONNE

Montegut
Chauvin
Preload Limits
Madison Bay
Lake Boudreaux
Lake Quitman
Sweetwater Pond
Lake Tambour
Lake Chien
Lake Felicite
Deep Lake
Catfish Lake
Galliano
Cut Off
Larose
Barataria Bay Waterway
Little Lake
The Pen

WISNER

Wishner WMA
Bay Champagne
Timalier Bay
Lake Raccourci
Old Lady Lake
Lake Barre
Deer Saline

MISSISSIPPI RIVER

0 3 6 12 18 24 Miles

Legend

- Terrebonne Basin Watershed
- Deltaic Plain / Study Area
- Preload Limits
- Wildlife Management Area
- National Wildlife Refuge
- Parishes

Location Map

Date: 8/4/2021

Date: 8/4/2021

Figure A-2b MRT-MToG Humble Canal Borrow Site Areas ("J-1 borrow")

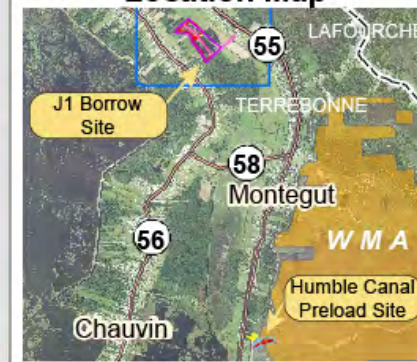


US Army Corps of Engineers
New Orleans District

Legend

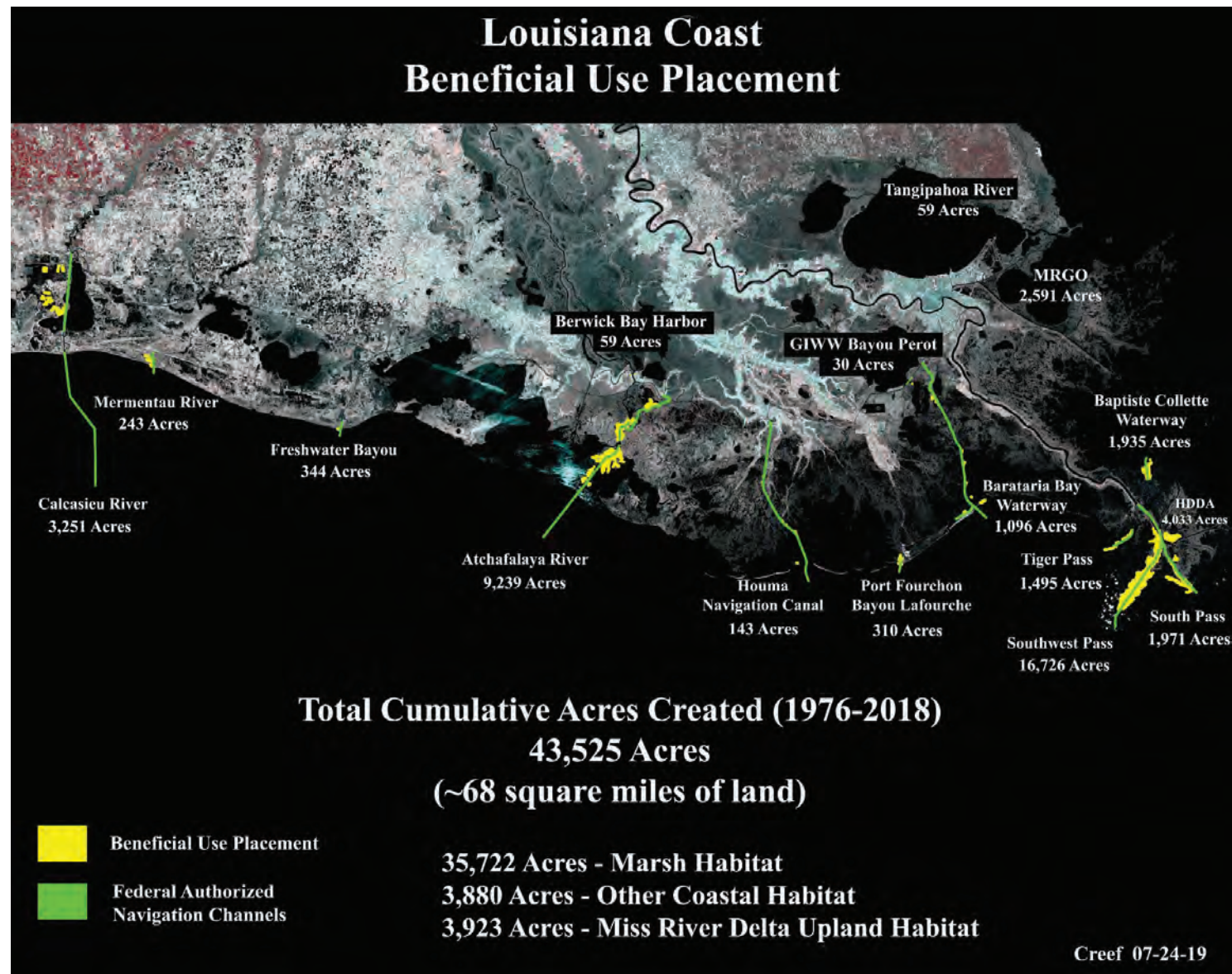
- J1 Borrow Pit
- Borrow Pit Access Road
- Borrow Areas A, B, and C
- Pointe aux Chenes WMA
- Parishes

Location Map



Date: 8/4/2021

Figure A-3a FWOP:
Operations and Maintenance Dredging Overview (1978 - 2018)



[illegible]

Figure A-3c FWOP: Coastal Restoration Project Map

Projects in Terrebonne Basin, Louisiana Coastal Zone

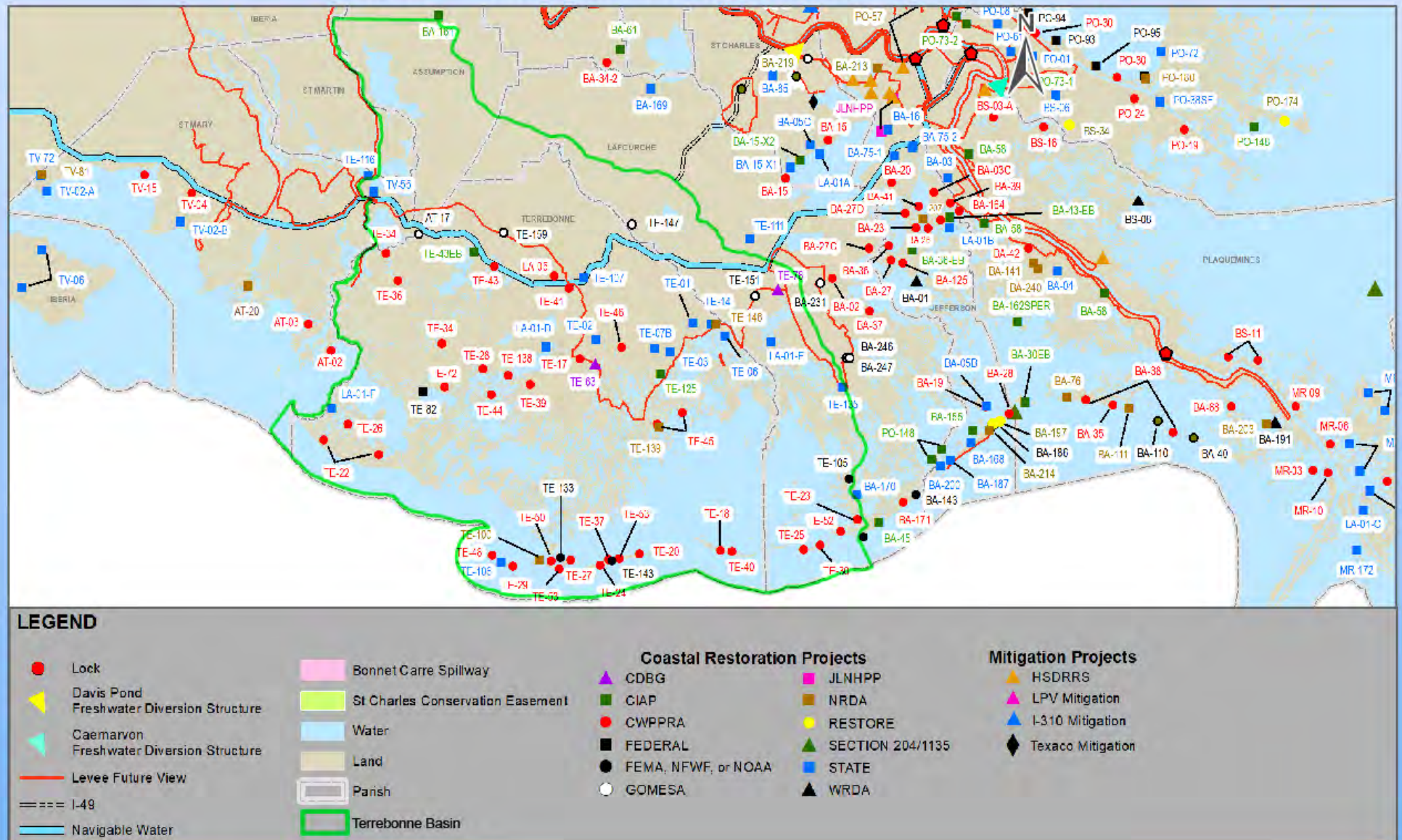


Figure A-3d. FWOP: LA State Master Plan Projects



Figure A-4. Louisiana Department of Environmental Quality subsegments in project area

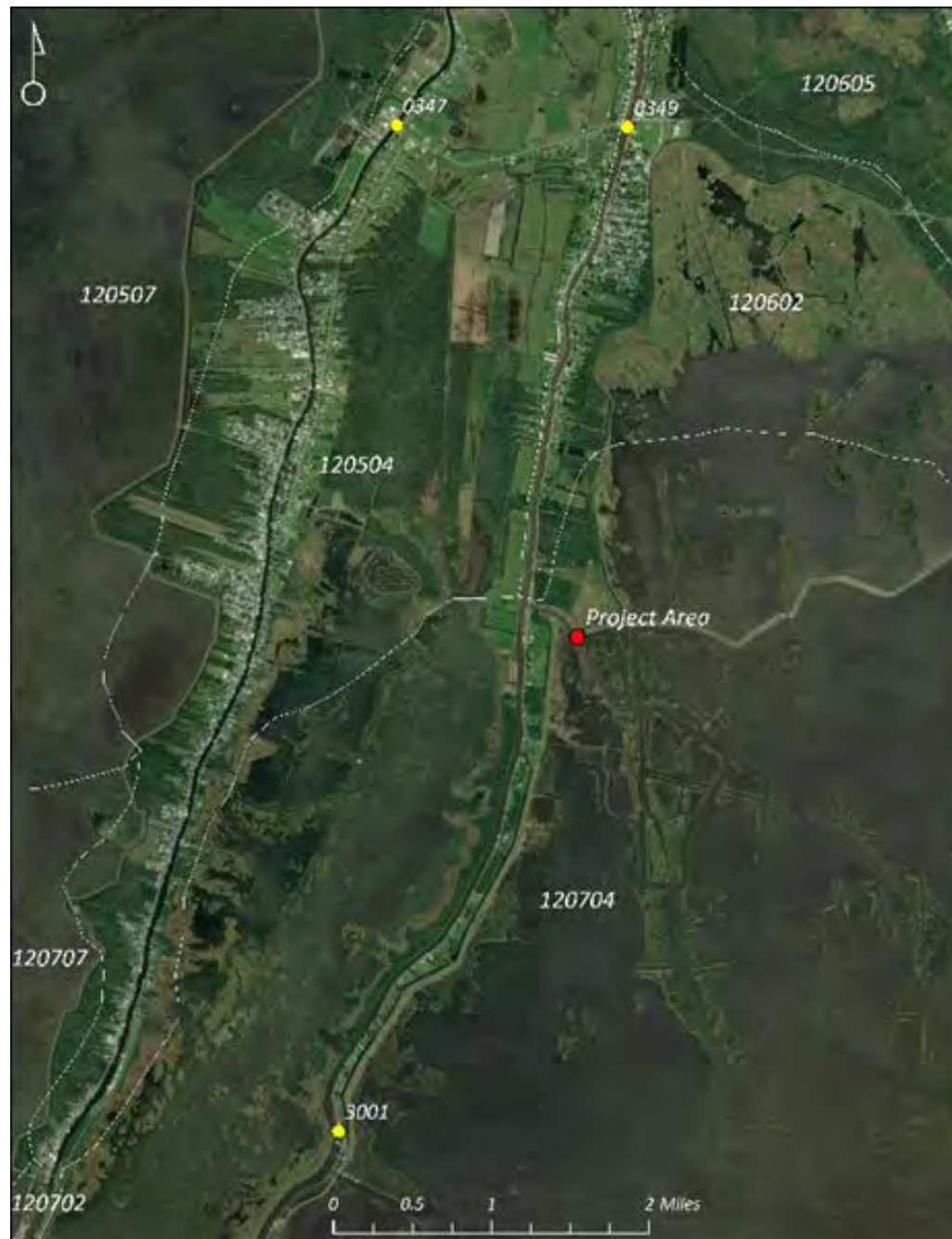


Figure A-5a MRT-MToG Humble Canal Population

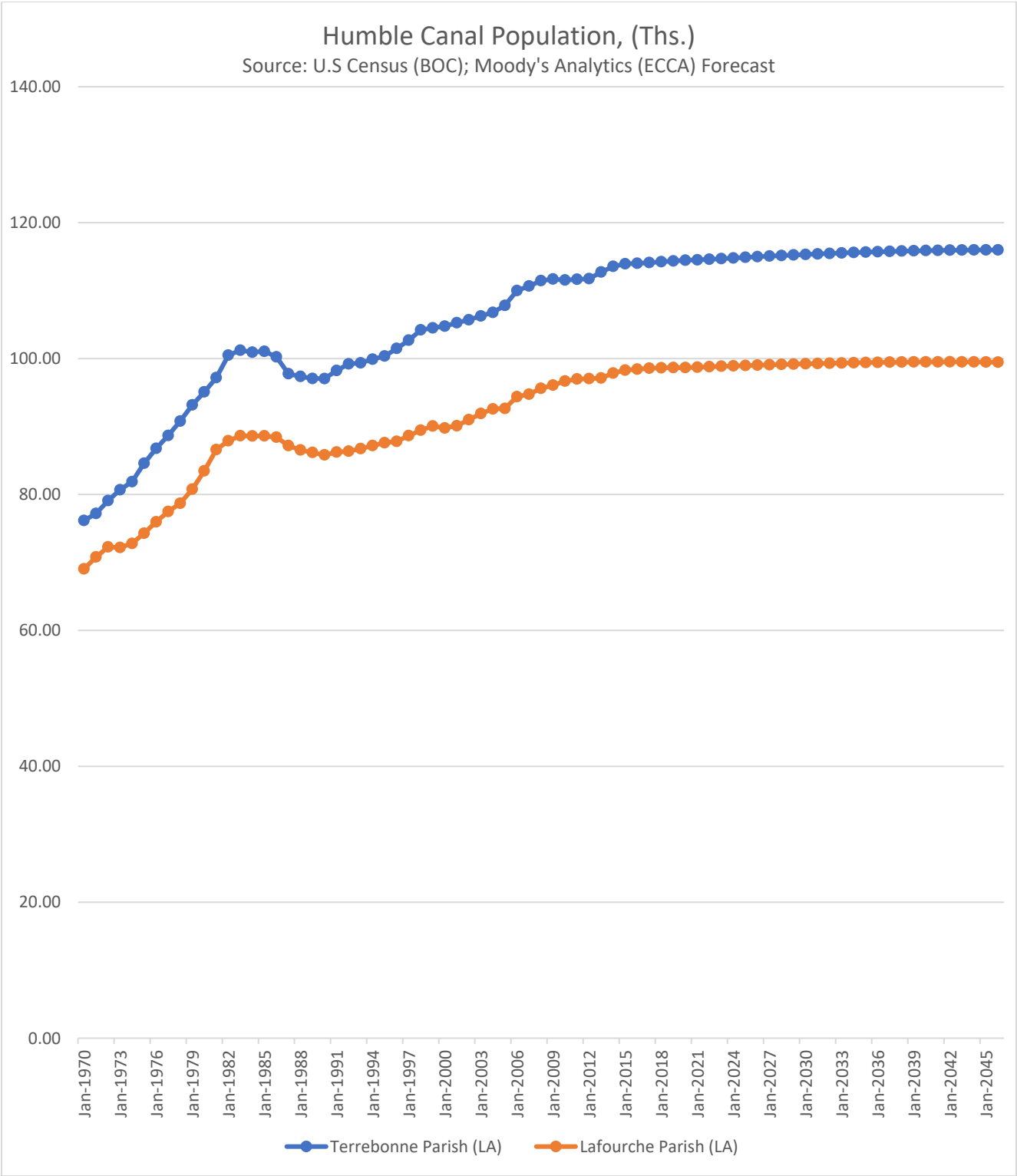


Figure A-5b MRT-MToG Humble Canal Number of Households

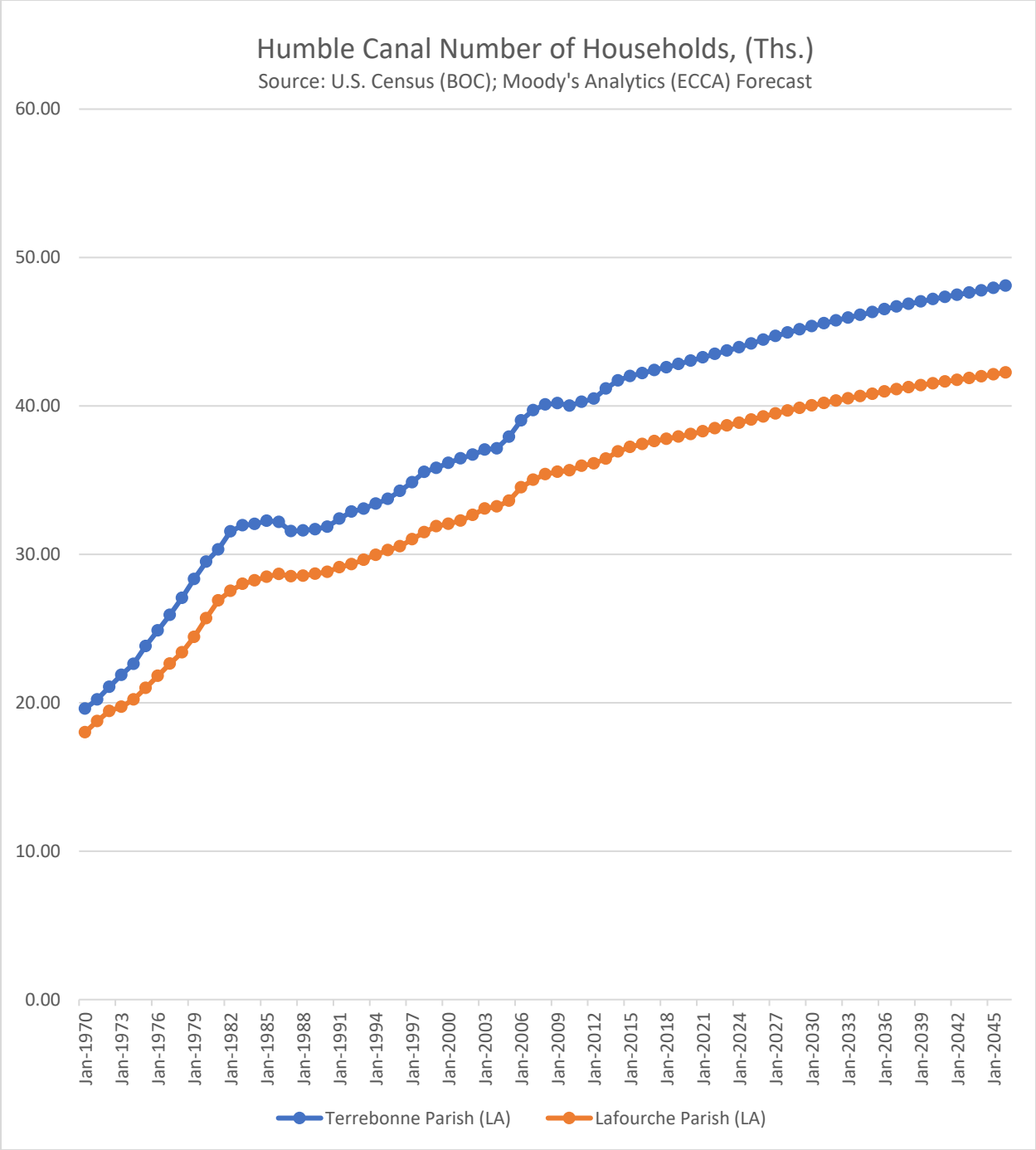


Figure A-5c MRT-MToG Humble Canal Labor Force

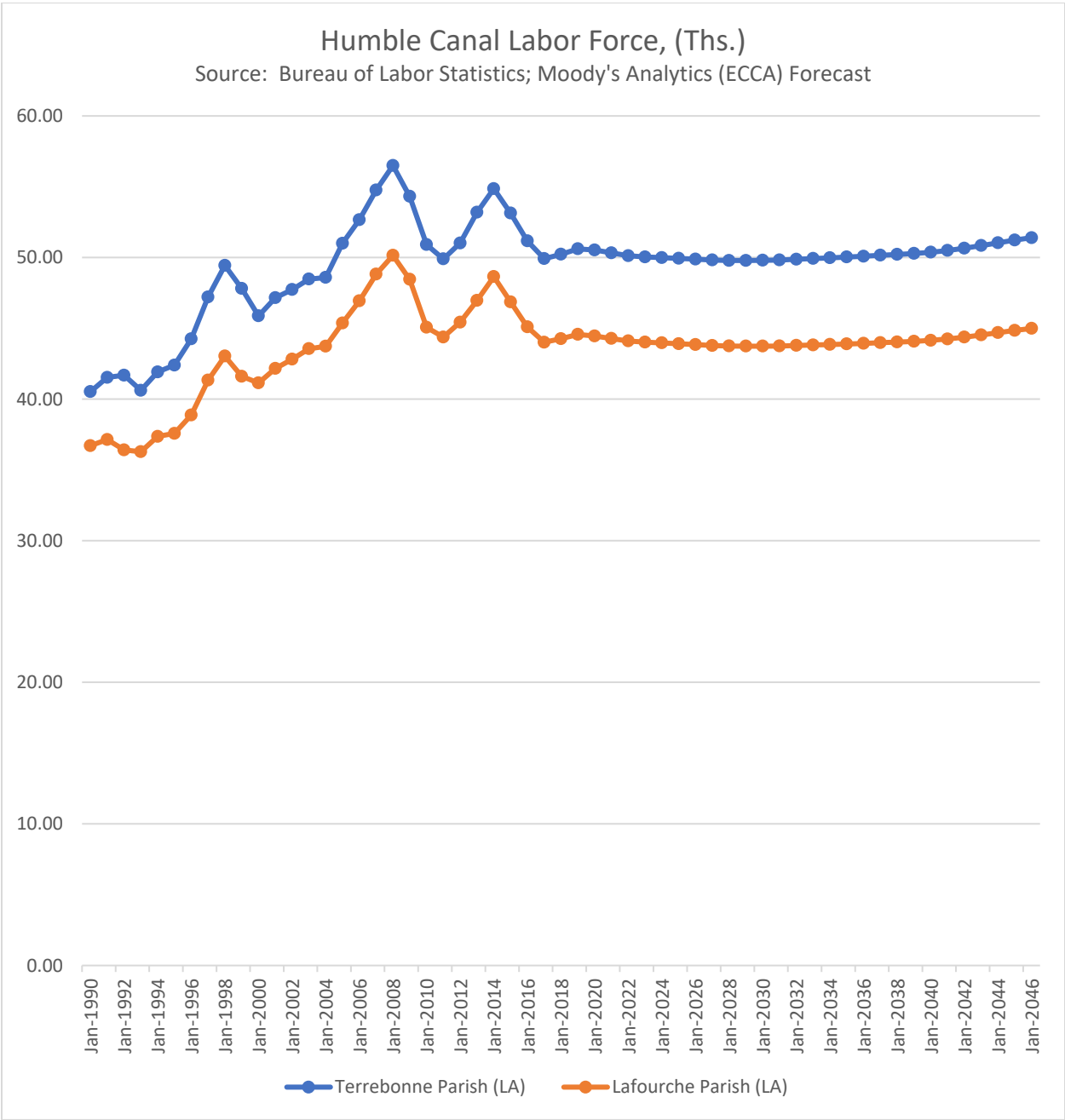


Figure A-5d MRT-MToG Humble Canal Unemployment Rate



Figure A-5e Terrebonne Parish Employment Sector Trends

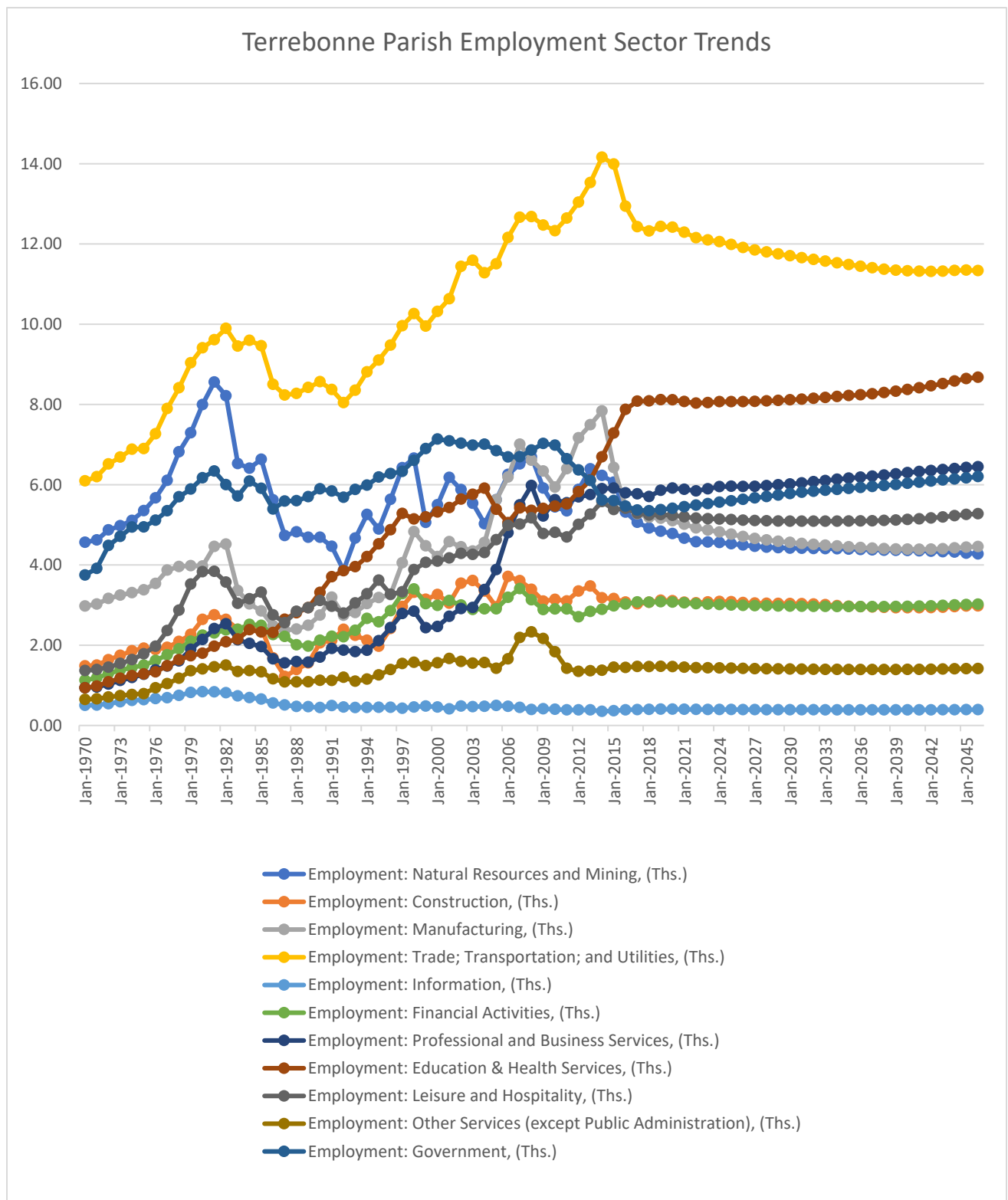
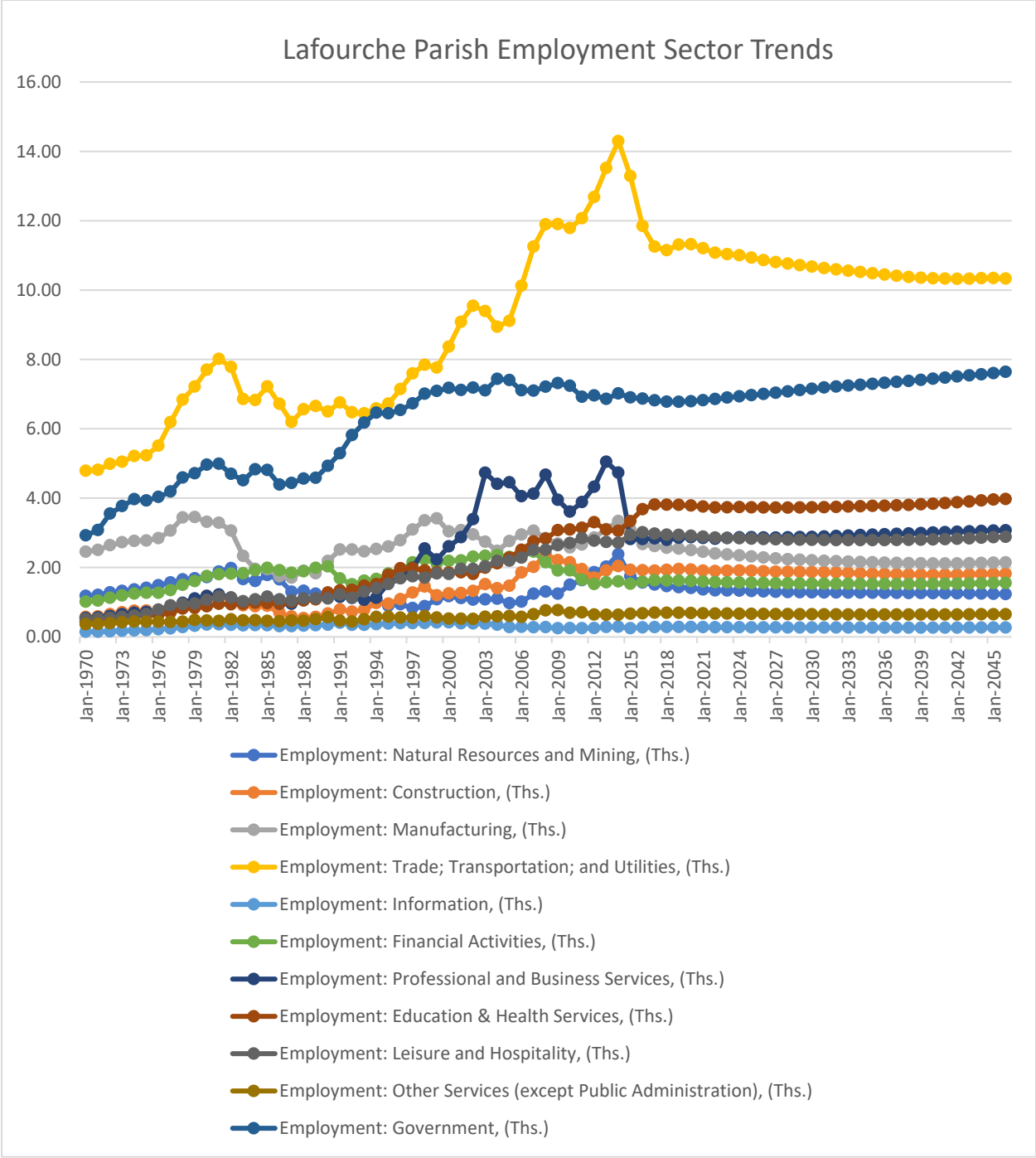


Figure A-5f Lafourche Parish Employment Sector Trends








APPENDIX A: FIGURES AND MAPS























Figure A-6 Environmental Sensitivity Index Maps

LOUISIANA




































SHORELINE HABITAT RANKINGS

-  1B) EXPOSED, SOLID MAN-MADE STRUCTURES
-  2A) EXPOSED WAVE-CUT PLATFORMS IN CLAY OR MUD
-  2B) EXPOSED SCARPS AND STEEP SLOPES IN CLAY OR MUD
-  3A) FINE- TO MEDIUM-GRAINED SAND BEACHES
-  3B) SCARPS AND STEEP SLOPES IN SAND
-  4) COARSE-GRAINED SAND BEACHES
-  5) MIXED SAND AND GRAVEL (SHELL) BEACHES
-  6A) GRAVEL BEACHES
-  6B) RIPRAP
-  7) EXPOSED TIDAL FLATS
-  8A) SHELTERED SCARPS IN CLAY OR MUD
-  8B) SHELTERED, SOLID MAN-MADE STRUCTURES
-  8C) SHELTERED RIPRAP
-  8E) PEAT
-  9A) SHELTERED TIDAL FLATS
-  10A) SALT- AND BRACKISH-WATER MARSHES
-  10B) FRESHWATER MARSHES
-  10C) SWAMPS
-  10D) SCRUB-SHRUB WETLANDS, INCLUDING BLACK MANGROVES

HUMAN-USE FEATURES

- | | | |
|---|---|--|
|  ACCESS |  CRITICAL HABITAT |  NATURE CONSERVANCY |
|  AIRPORT / HELIPORT |  FACILITY / PORT |  PARK |
|  AQUACULTURE SITE |  FERRY |  RECREATIONAL BEACH |
|  ARCHAEOLOGICAL SITE |  LOCK / DAM |  WATER INTAKE |
|  ARTIFICIAL REEF |  MANAGEMENT AREA |  WILDLIFE REFUGE |
|  BOAT RAMP |  MARINA |  HUMAN-USE NUMBER |
|  COAST GUARD |  NATIONAL PARK |  MANAGEMENT AREA BOUNDARY |
| | |  STATE BOUNDARY |

SENSITIVE BIOLOGICAL RESOURCES

- | | | |
|--|--|--|
|  BIRD |  MARINE MAMMAL |  REPTILE / AMPHIBIAN |
|  DIVING BIRD |  DOLPHIN |  ALLIGATOR |
|  GULL / TERN |  MANATEE |  TURTLE |
|  PASSERINE BIRD |  WHALE | BENTHIC MARINE HABITAT |
|  PELAGIC BIRD |  TERRESTRIAL MAMMAL |  AQUATIC VEGETATION |
|  RAPTOR |  BEAR |  DEEP SEA CORAL |
|  SHOREBIRD |  INVERTEBRATE |  OYSTER REEF |
|  WADING BIRD |  BIVALVE |  SEAGRASS |
|  WATERFOWL |  CEPHALOPOD |  SAV |
|  NESTING SITE |  CRAB |  RAR NUMBER |
|  FISH |  CRAYFISH |  MULTI-GROUP |
|  FISH |  SHRIMP |  THREATENED / ENDANGERED |

29°30'00"

90°30'00"

29°30'00"

PRESENT IN ALL WATERS

OYSTER LEASES PRESENT IN AREA

PRESENT IN FRESH MARSHES

PRESENT IN INTERMEDIATE MARSHES

PRESENT IN BRACKISH MARSHES

PRESENT IN SALT MARSHES

PRESENT IN MARSHES WEST OF CHAUVIN

PRESENT IN AREA

CHAUVIN

40

57

778

316

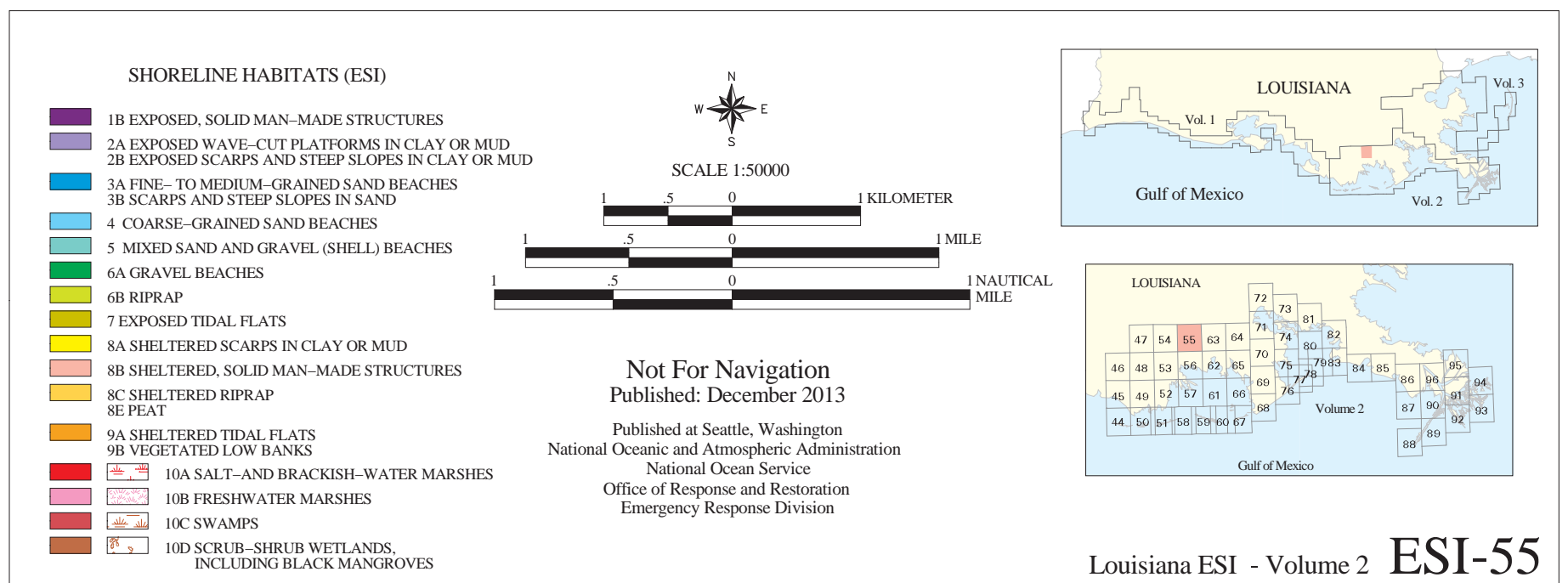
336

49

824

29°22'30"

90°30'00"



Louisiana: ESIMAP 55

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	S F Conc.	J F M A M J J A S O N D	Nesting	Migrating	Molting
47	Bald eagle	E	X X X X X	X X X X	NOV-APR	-
180	American coot	UP TO 353 IND/SQ MI	X X X X	X X X X	-	-
	American white pelican	1000S	X X X X X X X X	X X X X	-	-
	American wigeon	UP TO 90 IND/SQ MI	X X X X	X X X	-	-
	Blue-winged teal	UP TO 87 IND/SQ MI	X X X X	X X X X	-	-
	Canvasback	UP TO 3 IND/SQ MI	X X X	X X	-	-
	Gadwall	UP TO 800 IND/SQ MI	X X X X	X X X	-	-
	Green-winged teal	UP TO 164 IND/SQ MI	X X X X	X X X	-	-
	Hooded merganser	UP TO 3 IND/SQ MI	X X X X	X X X	-	-
	Mallard	UP TO 35 IND/SQ MI	X X X X	X X X	-	-
	Mottled duck	UP TO 28 IND/SQ MI	X X X X X X X X	X X X X	MAR-JUN	-
	Northern pintail	UP TO 11 IND/SQ MI	X X X X	X X X	-	-
	Northern shoveler	UP TO 32 IND/SQ MI	X X X X X	X X X X	-	-
	Ring-necked duck	UP TO 26 IND/SQ MI	X X X	X X	-	-
	Scaup	UP TO 90 IND/SQ MI	X X X X X	X X X	-	-
181	American coot	UP TO 1063 IND/SQ MI	X X X X	X X X X	-	-
	American white pelican	1000S	X X X X X X X X	X X X X	-	-
	American wigeon	UP TO 98 IND/SQ MI	X X X X	X X X	-	-
	Blue-winged teal	UP TO 99 IND/SQ MI	X X X X	X X X X	-	-
	Canvasback	UP TO 64 IND/SQ MI	X X X	X X	-	-
	Gadwall	UP TO 394 IND/SQ MI	X X X X	X X X	-	-
	Green-winged teal	UP TO 251 IND/SQ MI	X X X X	X X X	-	-
	Hooded merganser	UP TO 1 IND/SQ MI	X X X X	X X X	-	-
	Mallard	UP TO 338 IND/SQ MI	X X X X	X X X	-	-
	Mottled duck	UP TO 12 IND/SQ MI	X X X X X X X X	X X X X	MAR-JUN	-
	Northern pintail	UP TO 259 IND/SQ MI	X X X X	X X X	-	-
	Northern shoveler	UP TO 36 IND/SQ MI	X X X X X	X X X X	-	-
	Ring-necked duck	UP TO 289 IND/SQ MI	X X X	X X	-	-
	Scaup	UP TO 281 IND/SQ MI	X X X X X	X X X	-	-
182	American coot	UP TO 1058 IND/SQ MI	X X X X	X X X X	-	-
	American white pelican	100S	X X X X X X X X	X X X X	-	-
	American wigeon	UP TO 113 IND/SQ MI	X X X X	X X X	-	-
	Blue-winged teal	UP TO 103 IND/SQ MI	X X X X	X X X X	-	-
	Canvasback	UP TO 106 IND/SQ MI	X X X	X X	-	-
	Gadwall	UP TO 492 IND/SQ MI	X X X X	X X X	-	-
	Green-winged teal	UP TO 147 IND/SQ MI	X X X X	X X X	-	-
	Hooded merganser	UP TO 1 IND/SQ MI	X X X X	X X X	-	-
	Mallard	UP TO 32 IND/SQ MI	X X X X	X X X	-	-
	Mottled duck	UP TO 38 IND/SQ MI	X X X X X X X X	X X X X	MAR-JUN	-
	Northern pintail	UP TO 484 IND/SQ MI	X X X X	X X X	-	-
	Northern shoveler	UP TO 25 IND/SQ MI	X X X X X	X X X X	-	-
	Ring-necked duck	UP TO 403 IND/SQ MI	X X X	X X	-	-
	Scaup	UP TO 196 IND/SQ MI	X X X X X	X X X	-	-
184	American coot	UP TO 2 IND/SQ MI	X X X X	X X X X	-	-
	American white pelican	HIGH	X X X X X X X X	X X X X	-	-
	American wigeon	UP TO 19 IND/SQ MI	X X X X	X X X	-	-
	Blue-winged teal	UP TO 12 IND/SQ MI	X X X X	X X X X	-	-
	Canvasback	UP TO 2 IND/SQ MI	X X X	X X	-	-
	Gadwall	UP TO 181 IND/SQ MI	X X X X	X X X	-	-
	Green-winged teal	UP TO 232 IND/SQ MI	X X X X	X X X	-	-
	Hooded merganser	UP TO 8 IND/SQ MI	X X X X	X X X	-	-
	Mallard	UP TO 4 IND/SQ MI	X X X X	X X X	-	-
	Mottled duck	UP TO 17 IND/SQ MI	X X X X X X X X	X X X X	MAR-JUN	-
	Northern pintail	UP TO 6 IND/SQ MI	X X X X	X X X	-	-
	Northern shoveler	UP TO 9 IND/SQ MI	X X X X X	X X X X	-	-
	Ring-necked duck	UP TO 9 IND/SQ MI	X X X	X X	-	-
	Scaup	UP TO 468 IND/SQ MI	X X X X X	X X X	-	-
316	Dabbling ducks	10,000S	X X X X X	X X X X	-	-
	Diving ducks	1000S	X X X X X	X X X	-	-
	Snow goose	10,000S	X X X X	X X	-	-
336	American coot		X X X X	X X X X	-	-
	American wigeon		X X X X	X X X	-	-
	Blue-winged teal		X X X X	X X X X	-	-
	Canvasback		X X X	X X	-	-
	Gadwall		X X X X	X X X	-	-
	Green-winged teal		X X X X	X X X	-	-
	Hooded merganser		X X X X	X X X	-	-
	Mallard		X X X X	X X X	-	-
	Mottled duck		X X X X X X X X	X X X X	-	-
	Northern pintail		X X X X	X X X	-	-
	Northern shoveler		X X X X X	X X X X	-	-
	Ring-necked duck		X X X	X X	-	-

FISH:

RAR#	Species	S F Conc.	J F M A M J J A S O N D	Spawning	Eggs	Larvae	Juveniles	Adults
223	Alligator gar	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	American eel	PRESENT	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Anchovies	PRESENT	X X X X X X X X X X X X	MAR-SEP	MAR-SEP	MAR-SEP	JAN-DEC	JAN-DEC
	Black drum	PRESENT	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Blue catfish	PRESENT	X X X X X X X X X X X X	APR-JUL	APR-JUL	-	JAN-DEC	JAN-DEC
	Bowfin	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Bream	PRESENT	X X X X X X X X X X X X	MAR-AUG	MAR-AUG	MAR-NOV	JAN-DEC	JAN-DEC
	Buffalo	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Channel catfish	PRESENT	X X X X X X X X X X X X	APR-JUL	APR-JUL	-	-	JAN-DEC
	Crappie	PRESENT	X X X X X X X X X X X X	FEB-MAY	FEB-MAY	FEB-JUN	JAN-DEC	JAN-DEC
	Croakers	COMMON		X X	-	-	-	-
	Flathead catfish	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Freshwater drum	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Killifish	PRESENT	X X X X X X X X X X X X	APR-SEP	-	-	JAN-DEC	JAN-DEC
	Longnose gar	PRESENT	X X X X X X X X X X X X	MAR-APR	MAR-APR	MAR-APR	MAR-JUN	JAN-DEC
	Paddlefish	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Red drum	ABUNDANT	X X X X X X X X X X X X	-	-	-	JAN-DEC	-
	Shad	COMMON	X X X X X X X X X X X X	MAR-MAY	MAR-MAY	MAR-JUN	MAR-JUL	JAN-DEC
	Sheepshead	ABUNDANT	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Southern flounder	ABUNDANT	X X X		-	-	OCT-MAR	OCT-MAR
	Spotted gar	COMMON	X X X X X X X X X X X X	MAR-APR	MAR-APR	MAR-APR	MAR-JUN	JAN-DEC
	Spotted seatrout	COMMON	X X		X X X	-	OCT-FEB	OCT-FEB
	Striped mullet	COMMON	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	White bass	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
225	Alligator gar	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	American eel	PRESENT	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Anchovies	ABUNDANT	X X X X X X X X X X X X	MAR-SEP	MAR-SEP	MAR-SEP	JAN-DEC	JAN-DEC
	Atlantic spadefish	ABUNDANT		X X X X X X	-	-	-	-
	Atlantic tripletail	PRESENT		X X X X X X X	-	-	APR-OCT	APR-OCT
	Black drum	HIGHLY ABUNDANT	X X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Blue catfish	PRESENT	X X X X X X X X X X X X	APR-JUL	APR-JUL	-	JAN-DEC	JAN-DEC
	Bowfin	PRESENT	X X X X X X X X X X X X	-	-	-	-	-
	Bream	PRESENT	X X X X X X X X X X X X	MAR-AUG	MAR-AUG	MAR-NOV	JAN-DEC	JAN-DEC

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. The LDWF-LNHP provided information for some of the federally and state listed species and species of conservation concern for display in the ESI atlas and accompanying digital data in 2013. The available LNHP data sets are to be used for oil spill response and spill response planning only. These data represent existing information known to the LNHP at the time of the request and should never be substituted for consultation with the LNHP. The more spatially generalized 2011 polygonal waterbird colony data was provided by LNHP and the more spatially specific 2006 point waterbird colony data was provided by BTNEP. The display of these two data sets does not imply that EITHER or BOTH sets of polygons and/or points (especially if counts are aggregated) reflect current nest locations OR counts, but rather are to be used as a guide for what species could be present.

Louisiana: ESIMAP 55 (cont.)

BIOLOGICAL RESOURCES: (cont.)

FISH: (cont.)

RAR#	Species	S F Conc.	J F M A M J J A S O N D	Spawning	Eggs	Larvae	Juveniles	Adults
225	Buffalo	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	Bull shark	COMMON	X X X X X X X X X	-	-	MAY-SEP	MAR-OCT	-
	Channel catfish	COMMON	X X X X X X X X X X X	APR-JUL	APR-JUL	-	-	JAN-DEC
	Crappie	PRESENT	X X X X X X X X X X X	FEB-MAY	FEB-MAY	FEB-JUN	JAN-DEC	JAN-DEC
	Croakers	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	-	-
	Flathead catfish	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	Forage fish	ABUNDANT	X X X X X X X X X X X	-	-	-	-	-
	Freshwater drum	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	Gafftopsail catfish	ABUNDANT	X X X X X X X X X	-	-	-	-	-
	Gray snapper	ABUNDANT	X X X X X	-	-	-	JUN-OCT	-
	Gulf menhaden	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Killifish	ABUNDANT	X X X X X X X X X X X	APR-SEP	-	-	JAN-DEC	JAN-DEC
	Kingfishes	ABUNDANT	X X X X X X X X X X X	-	-	-	-	-
	Largemouth bass	PRESENT	X X X X X X X X X X X	JAN-MAY	-	-	JAN-DEC	JAN-DEC
	Longnose gar	PRESENT	X X X X X X X X X X X	MAR-APR	MAR-APR	MAR-APR	MAR-JUN	JAN-DEC
	Paddlefish	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	Pipefish	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	Red drum	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	-
	Shad	ABUNDANT	X X X X X X X X X X X	MAR-MAY	MAR-MAY	MAR-JUN	MAR-JUL	JAN-DEC
	Sheepshead	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Southern flounder	HIGHLY ABUNDANT	X X X X X X X X X	-	-	-	OCT-JUL	OCT-JUL
	Spotted gar	PRESENT	X X X X X X X X X X X	MAR-APR	MAR-APR	MAR-APR	MAR-JUN	JAN-DEC
	Spotted seatrout	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	Striped mullet	ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	White bass	PRESENT	X X X X X X X X X X X	-	-	-	-	-
	White trout	ABUNDANT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC

INVERTEBRATE:

RAR#	Species	S F Conc.	J F M A M J J A S O N D	Spawning	Eggs	Larvae	Juveniles	Adults
223	Blue crab	ABUNDANT	X X X X X X X X X	-	-	-	OCT-FEB	OCT-FEB
	Red swamp crawfish	PRESENT	X X X X X X X X X X X	MAR-MAY	JAN-DEC	JAN-DEC	JAN-DEC	JAN-DEC
	River shrimp	PRESENT	X X X X X X X X X X X	-	-	APR-JUL	JUL-SEP	JAN-DEC
225	Atlantic rangia	PRESENT	X X X X X X X X X X X	MAR-NOV	-	MAR-NOV	JAN-DEC	JAN-DEC
	Atlantic seabob shrimp	COMMON	X X	-	-	-	-	-
	Blue crab	ABUNDANT	X X X X X X X X X X X	APR-NOV	APR-NOV	APR-NOV	JAN-DEC	JAN-DEC
	Brown shrimp	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	FEB-NOV	JAN-DEC	-
	Fiddler crab	PRESENT	X X X X X X X X X X X	JUN-AUG	-	-	-	-
	Grass shrimp	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	-	-	-
	Red swamp crawfish	PRESENT	X X X X X X X X X X X	MAR-MAY	JAN-DEC	JAN-DEC	JAN-DEC	JAN-DEC
	River shrimp	PRESENT	X X X X X X X X X X X	-	-	APR-JUL	JUL-SEP	JAN-DEC
	Squid	ABUNDANT	X X X X X X X X X X X	MAR-NOV	MAR-NOV	MAR-NOV	JAN-DEC	JAN-DEC
	Stone crab	PRESENT	X X X X X X X X X X X	-	-	-	JAN-DEC	JAN-DEC
	White shrimp	HIGHLY ABUNDANT	X X X X X X X X X X X	-	-	MAY-NOV	JAN-DEC	-
307	Eastern oyster	PRESENT	X X X X X X X X X X X	MAR-NOV	MAR-NOV	MAR-NOV	JAN-DEC	JAN-DEC

REPTILE:

RAR#	Species	S F Conc.	J F M A M J J A S O N D	Nesting	Hatching	Interesting	Juveniles	Adults
39	American alligator	76-125 AC/NEST	X X X X X X X X X X X	MAY-JUL	JUL-SEP	-	JAN-DEC	JAN-DEC
40	American alligator	<75 AC/NEST	X X X X X X X X X X X	MAY-JUL	JUL-SEP	-	JAN-DEC	JAN-DEC
177	Diamondback terrapin		X X X X X X X X	-	-	-	-	-

HUMAN USE RESOURCES:

BOAT RAMP:

HUN#	Name	Contact	Phone
49	LIZ'S LAUNCH		
57	PUBLIC BOAT RAMP		
64	TERREBONNE SHERIFF		

MANAGEMENT AREA:

HUN#	Name	Contact	Phone
778	POINTE AUX CHENES WMA	LDWF	

MARINA:

HUN#	Name	Contact	Phone
824	PAT'S BAYOUSIDE MARINA	NATHAN PELLEGRIN	985/594-8269

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APPENDIX B: TABLES

Table B-1: Project history timeline of authorizations, studies, and tropical storm events from 1985 through 2012

1985	Hurricane Juan caused extensive flooding in Terrebonne and Lafourche parishes.
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).
1995	In the Energy and Water Development Appropriation Act of 1995 (PL 103-316), Congress directed the USACE to consider the interrelationship of studies and projects that impact the coastal area of Louisiana, including the Morganza feasibility study, the Lower Atchafalaya Basin reevaluation study, and several projects being pursued under the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) program, and directed the USACE to consider improvements at and/or within the HNC. The Feasibility Cost Share Agreement was executed in June 1995.
1996	Section 425 of WRDA 96 (PL 104-303) required the USACE to develop a study of the HNC lock as an independent feature of the Morganza to the Gulf project.
1997	USACE completed the HNC lock study, which recommended a 200-ft wide lock in the HNC south of Bayou Grand Caillou and concluded that a lock structure would provide direct and indirect benefits to the environmental (marsh) habitat in the study area (USACE, 1997). The report recommended that the HNC lock continue to be investigated as part of comprehensive Morganza to the Gulf hurricane and storm damage reduction plans and that the detailed design phase of the lock be expedited and proceed concurrently with the feasibility study.
1998	Congress authorized the USACE to initiate detailed design of the multipurpose HNC lock.
2000	The Morganza to the Gulf of Mexico project was conditionally authorized in WRDA 2000 at a cost of \$550 million subject to having a favorable Chief of Engineer's report completed by December 2000; the terms of this conditional authorization were not met. The PED phase on the HNC lock complex was initiated in advance of the PED phase for the Morganza to the Gulf of Mexico hurricane and storm damage reduction project. The PED Agreement for the HNC lock was signed in January 2000.
2002	The Morganza to the Gulf feasibility study and PEIS were completed in March 2002 (USACE, 3/2002). The PED Agreement for the overall project was signed in May 2002. In August 2002, the USACE issued a Chief of Engineers report (USACE, 9/2002). In September and October, Tropical Storm Isidore and Hurricane Lili impacted the study area.
2003	In July 2003, the USACE issued a supplemental Chief of Engineers report (USACE, 2003), which made changes to the non-Federal sponsor's in-kind services.
2004	Section 158 of the Energy and Water Development Appropriations Act, 2004 (Public Law 108-137) authorized construction on Reach J-1, which had been previously identified as work-in-kind.
2005	The PED Amendment 1 executed in March 2005 combined the two PED efforts into one and allowed the non-Federal sponsor to advance funds on the combined PED effort. In August and September, Hurricanes Katrina and Rita impacted the study area.
2007	WRDA 2007 authorized the Morganza to the Gulf of Mexico, Louisiana project for hurricane and storm damage reduction at a total cost of \$886.7 million.

2008	A recon-level analysis and programmatic cost estimate (ARCADIS, 2008) was completed to determine whether or not there would still be a Federal interest in the project with post-Katrina interim criteria (USACE, 2007) incorporated and whether a feasibility-level PAC report should be initiated. Based on an analysis of four alternatives, the general alignment strategy for the PAC report was determined, but not the final level of risk reduction. Phase I Design for the HNC lock and floodgate was finalized in a 50 percent Design Documentation Report (URS, 2008). In September, Hurricanes Gustav and Ike impacted the study area.
2011	The PED Amendment 2 executed in January 2011 increased the funding ceiling and changed the name of the non-Federal sponsor from Louisiana Department of Transportation and Development (DOTD) to the Louisiana Coastal Protection and Restoration Authority.
2012	Legislation changed the former Office of Coastal Protection and Restoration (OCPR) to the Coastal Protection and Restoration Authority (CPRA) and changed the former Coastal Protection and Restoration Authority (CPRA) to the Coastal Protection and Restoration Authority Board (CPRAB).

Table B-2. Previously Constructed Wetland or Ecosystem Restoration Projects in the Deltaic Plain (From Figure A-3c)

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
BERM (BA-40): Riverine Sand Mining/Scofield Island Restoration	Plaquemines	2013	The goal of this project was to transport sediments from the Mississippi River to restore dune and marsh habitat on Scofield Island.^	No	No
BERM (BA-110): Shell Island East Berm	Plaquemines	2014	The purpose of this project was to restore the integrity of Shell Island, reduce wave energies within the bay area, and re-establish productive habitat to Bastian Bay and the surrounding area. ^	No	No
DOTD: I-310 Mitigation	St. Charles	1993	Mitigation for environmental impacts associated with the construction of Interstate 310 which was completed in 1993 in St. Charles Parish, Louisiana (USACE 2013).	No	No
CIAP (BA-15-X2): Lake Salvador Shoreline Protection-Phase III	St. Charles	2009	A shoreline protection project, located near Bayou des Allemands along the northwestern Lake Salvador shoreline, tying into the western BA-15 CWPRA shoreline protection feature and extending approximately 1.5 miles east. *+^	No	No
CIAP (BA-30-EB): East Grand Terre	Plaquemines	2010	The project goal is to restore barrier shoreline and marsh by dredging 3.3 million cubic yards of shore material and rebuilding the island. The project was designed under the CWPRA program and constructed under the CIAP program. ^	No	No
CIAP (BA-36-EB): Barataria Land Bridge Dedicated Dredging	Jefferson	2010	Located along the southern shoreline of Bayou Perot and Rigolettes, the project created and/or nourished approximately 1,200 acres of marsh in conjunction with CWPRA project BA-36 (Dedicated Dredging on the Barataria Basin Landbridge). ^	No	No
CIAP (BA-43-EB): Mississippi River Long Distance Sediment Pipeline	Jefferson	2016	The deposition of dredged material from the Mississippi River by long distance pipeline from the Mississippi River to locations within central Barataria Basin for marsh creation and restoration. *+ @^	No	No
CIAP (BA-45-EB): Caminada Headlands	Lafourche	2014	The proposed project will restore and protect beach and dune habitat across the Caminada Headland through the direct placement of sediment from offshore borrow areas. ^	No	No
CIAP (BA-58): Fringe Marsh Repair	Plaquemines	2014	This program involves the reestablishment of critical areas of fragile marsh in lower Plaquemines Parish to help minimize the continued fragmentation of wetland systems throughout the coast. ^@	No	No
CIAP (BA-59): Waterline Booster Pump Station, West Bank	St. James	2010	The project includes the installation of a waterline booster pump station in Welcome, Louisiana along Louisiana Highway 18 on the west bank of the Mississippi River in St. James Parish. *+	No	No
CIAP (BA-61): West Bank Wetland Conservation and Protection	St. James	2010	Acquisition and preservation of approximately 235 acres of existing wetlands along Louisiana Highway 20 in St. James Parish near the communities of South Vacherie and Chackbay to protect the natural habitat from future development. The purchase was completed in 2010. *+	No	No
CIAP (BA-155): Fifi Island Restoration	Jefferson	2015	This shoreline protection projection includes the construction of approximately 10,000 linear feet of rock to protect island habitat.^	No	No
CIAP (BA-161): Mississippi River Water Reintroduction Into Bayou Lafourche - BLWFD	Assumption; Lafourche	2016	The implementation of features and improvements determined to be the most beneficial in order to improve the capacity of Bayou Lafourche to allow for increased flows through the bayou. The project is anticipated to benefit the Terrebonne and Barataria Basins through reductions in the salinities and/or nourishment of wetlands with the introduction and distribution of sediment and nutrients from the river. ^@ #	No	No
CIAP (BA-162-SPER): Shoreline Protection Emergency Restoration	Plaquemines	2013	This project consists of a series of submerged wave breaks surrounding shoreline segments in Lower Plaquemines Parish to protect the oil damaged shores along the existing island remnants from further wave damage while also collecting sediment in order to naturally rebuild the degraded infrastructure of the islands.^	No	No
CIAP (PO-36EB): Orleans Land Bridge Shoreline Protection and Marsh Creation	Orleans	2013	This project provides shoreline protection on the northwest rim of Lake Borgne west of Alligator Point.^	No	No
CIAP (PO-39): Bald Cypress/Tupelo Coastal Forest	Livingston	2011	Acquisition and preservation of approximately 2,600 contiguous acres of coastal wetland forest, specifically bald cypress-tupelo swamp within the Maurepas Swamp in Livingston Parish, Louisiana (USACE 2013).	No	No
CIAP (PO-43): East Labranche Shoreline Protection	St. Charles	2015	A shoreline protection project which includes the construction of a rock dike along the southern shoreline of Lake Pontchartrain tying into the existing PO-03b LaBranche Wetland shoreline protection project, and continuing east along the shoreline. The project is designed to stop wave-induced shoreline erosion and protect the wetland habitat behind the structure (USACE 2013).	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
CIAP (PO-48): Green Property Preservation Project	St. Tammany	2011	Property acquisition and preservation of approximately 27 acres of cypress swamp and bottomland hardwood forests within the Bayou Lacombe watershed in St. Tammany Parish, Louisiana. Purchase completed August 2011 (USACE 2013).	No	No
CIAP (PO-49): French Property Preservation Project	St. Tammany	2009	Property acquisition of approximately 40 acres of pine trees and mixed hardwoods to aid in the extension of the wildlife corridor between critical habitats along Bayou Liberty in St. Tammany Parish, Louisiana. The property will also be utilized for educating the public on wetland value (USACE 2013).	No	No
CIAP (PO-51): Mandeville Aquatic Ecosystem Restoration Project	St. Tammany	2010	Upgrade of the existing wastewater treatment plant including the addition of a wetland assimilation system for disbursement of treated sewerage effluent into an adjacent wetland area on to the western border of the City of Mandeville, Louisiana. Added benefits of the assimilation will be the increase of wetland vegetation to an area impacted during Hurricanes Katrina and Rita (USACE 2013).	No	No
CIAP (PO-73-2): Central Wetlands Demonstration	Orleans	2016	This demonstration project investigates the beneficial use of Ferrate as an alternative to chlorine to treat effluent at the East Bank Sewer Treatment Plant.^	No	No
CIAP (PO-73-1): Central Wetlands-Riverbend	St. Bernard	2015	This project involves the discharge of effluent from the oxidation plant to be discharged into the Central Wetlands. This would allow vegetation to prosper once again in the area.^	No	No
CIAP (PO-73-3): Central Wetlands Demonstration Expansion	Orleans	2016	The project would restore up to 17.2 acres of critical wetlands within the Central Wetlands area. ^	No	No
CIAP (PO-148): Living Shoreline	St. Bernard, Jefferson, Orleans	2017	The primary project objective involves the construction of bioengineered oyster reefs along coastal fringe marsh in St. Bernard Parish. The installation will take place from Eloi Point to the mouth of Bayou La Loutre around Lydia Point and Paulina Point extending around the southern shore of Treasure Bay. Other related Living Shoreline projects are in Plaquemines Parish and Jefferson Parish.^	No	No
CIAP (TE-43-EB): GIWW Bank Restoration of Critical Areas in Terrebonne	Terrebonne	2011	The project restored critical lengths of deteriorated channel banks with shoreline stabilization materials. ^	No	No
CIAP (TE-125): Bush Canal and Bayou Terrebonne Bank Stabilization	Terrebonne	2007	This project reconstructed the south bank of Bush Canal using material dredged from the canal. The restored bank-line was then covered with geotextile fabric and armored with stone rip-rap. The rebuilt bank-line will help to diminish storm surge as well as reduce saltwater intrusion. This project was funded by the CIAP of 2001 (CPRA 2014).	No	No
CWPPRA (AT-02): Atchafalaya Sediment Delivery	St. Mary	1998	The enhancement of natural delta growth by re-opening Natal Channel and Castille Pass. Material dredged as a result of construction was strategically placed at elevations mimicking natural delta lobes.^	No	No
CWPPRA (AT-03): Big Island Mining	St. Mary	1998	Creation of a western delta lobe behind Big Island to enhance the accretion of land beyond the west bank of the Atchafalaya River.^	No	No
CWPPRA (BA-02): GIWW to Clovelly Hydrologic Restoration	Lafourche	2000	Impede increasing salinity within the project area by the use of hydrologic restoration features such as plugs and weirs to hinder salt water intrusion and decrease marsh loss. Shoreline protection features along the Bay L'Ours were also constructed to lessen wave induced erosion and reduce marsh loss. The project is located east of the communities of Larose and Cutoff in Lafourche Parish, Louisiana and adjacent to Little Lake. *^	No	No
CWPPRA (BA03C): Naomi Outfall Management	Jefferson; Plaquemines	2002	The management of freshwater, sediment, and nutrients diverted from the Mississippi River via the Naomi Siphon (BA-03) into the project area located between the communities of Naomi/La Reussite and Lafitte in Jefferson Parish, Louisiana including The Pen. The project goal is to decrease salinities and reduce marsh loss.*^	No	No
CWPPRA (BA-15): Lake Salvador Shoreline Protection Demonstration	St. Charles	1998	The maintenance of shoreline integrity along the northern Lake Salvador shoreline east of Baie du Cabanage and help re-establish the natural hydrology of interior marsh. Phase I of the project was constructed to demonstrate the effectiveness of four separate types of segmented breakwaters in a poor soil environment. Phase II of the project included the installation of continuous rock structure along the western section of the lake.*^	No	No
CWPPRA (BA-19): Barataria Bay Waterway Wetland Restoration	Jefferson	1996	The project beneficially used dredge material to enlarge Queen Bess Island.^	No	No
CWPPRA (BA-20): Jonathan Davis Wetland Restoration	Jefferson	2003; 2012	The goal of this project is to restore the natural hydrologic conditions of the area and reduce shoreline erosion. The goal was partly accomplished through constructing a series of water control structures. Additional features were constructed as part of unit 4 consisting of rock rip rap revetment, concrete sheetpile wall, plugs, and marsh creation.*^	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
CWPPRA (BA-23): Barataria Bay Waterway (BBWW) West Side Shoreline Protection	Jefferson	2000	Construction of approximately 1.75 miles of rock dike along the west bank of BBWW near Dupre Cut to protect the adjacent marsh from unnatural water exchange and subsequent erosion. ^	No	No
CWPPRA (BA-26): Barataria Bay Waterway (BBWW) East Side Shoreline Protection	Jefferson	2001	Construction of approximately 3.3 miles of levee and rock armor along the eastern bank of BBWW near Dupre Cut to protect the adjacent marsh from excessive tidal action and saltwater intrusion.^	No	No
CWPPRA (BA-27): Barataria Basin Landbridge Shoreline Protection, Phase 1 & 2	Jefferson; Lafourche	2009	Construction of approximately 13.5 miles of shoreline protection along the eastern bank of Bayou Rigolettes to inhibit the erosion on the southwestern shoreline of Bayou Perot and the southeastern shoreline of Bayou Rigolettes. ^	No	No
CWPPRA (BA-27C): Barataria Basin Landbridge Shoreline Protection, Phase 3 CU 7 and 8	Jefferson; Lafourche	1999, 2008, 2017	Construction of shoreline protection along the southern end of Bayous Perot and Rigolettes confluence with Little Lake and Harvey Cutoff Canal. The project tested sections of different shoreline protection types such as concrete panel wall, rock, and light rock. Portions were constructed in 1999, 2008, and 2017. ^@	No	No
CWPPRA (BA-27D): Barataria Basin Landbridge Shoreline Protection, Phase 4	Jefferson	2006	This project consists of a foreshore rock dike with incorporated fish passages and openings at historic natural channels to inhibit shoreline erosion and deterioration of the Barataria landbridge. ^	No	No
CWPPRA (BA-28): Vegetative Plantings of a Dredged Material Disposal Site on Grand Terre Island	Jefferson	2001	This project involved the installation of vegetative plantings on previously constructed marsh and dune platform on Grand Terre Island. ^	No	No
CWPPRA (BA-34-2): Hydrologic Restoration and Vegetative Planting in the Des Allemands Swamp	St. James	2018	The project goal is to increase the health of the swamp ecosystem by increasing water flow via gaps cut in the spoil bank, breaching internal impediments, and reestablishing natural channels. Native vegetation will also be planted at the site.^	No	No
CWPPRA (BA-35): Pass Chalant to Grand Bayou Pass	Plaquemines	2009	This project involves the creation of a dune and marsh platform on the north side of the Gulf of Mexico adjacent to Bay Joe Wise.^	No	No
CWPPRA (BA-36): Dedicated Dredging on the Barataria Basin Landbridge	Jefferson	2010	The construction of approximately 1,211 acres of intertidal marsh utilizing dredge material in two contained marsh creation areas. In addition, material was placed in adjoining fill areas to nourish approximately 1,578 acres of marsh in conjunction with CIAP BA-36(EB). ^	No	No
CWPPRA (BA-37): Little Lake Shoreline Protection/Dedicated Dredging Near Round Lake	Lafourche	2007	This project protects the Little Lake shoreline, creates intertidal wetlands, and nourishes fragmented, subsiding marsh. This project is designed to protect area wetlands, which currently experience high rates of shoreline erosion. ^	No	No
CWPPRA (BA-38): Pelican Island and Pass La Mer to Chalant Pass Restoration	Plaquemines	2012	The objective of this project is to create barrier island habitat, enhance storm-related surge and wave protection, prevent overtopping during storms, and increase the volume of sand within the active barrier system. ^	No	No
CWPPRA (BA-39): Bayou Dupont Sediment Delivery System	Jefferson; Plaquemines	2010	Dredged material from the Mississippi River near La Reussite, Louisiana was pumped into confined open water areas south of Cheniere Traverse Bayou and adjacent to the West Plaquemines non-federal levee using a pipeline conveyance system to create and restore marsh. Additional grant funded received by the State of Louisiana from The American Recovery and Reinvestment Act of 2009 (ARRA) was added to this project to create approximately 100 additional acres of marsh. *^	No	No
CWPPRA (BA-41): South Shore of the Pen Shoreline Protection and Marsh Creation	Jefferson	2012	This project involves the construction of concrete pile and panel wall and 2 miles of rock revetment along the south shore of The Pen and Bayou Dupont. Dedicated dredging was used to create and nourish marsh, within the triangular area bounded by the south shore of The Pen, the Barataria Bay Waterway (Dupre Cut) and the Creole Gas Pipeline Canal. ^	No	No
CWPPRA (BA-42): Lake Hermitage Marsh Creation	Plaquemines	2015	The creation of wetlands and the reduction of tidal exchange in marshes surrounding Lake Hermitage using material dredged from the Mississippi River. ^	No	No
CWPPRA (BA-48): Bayou Dupont Marsh and Ridge Creation	Jefferson	2016	Long distance pumping of Mississippi River sediment to create marsh, to nourish marsh and create a maritime ridge.^@	No	No
CWPPRA (BA-68): Grand Laird Marsh and Ridge Restoration	Plaquemines	2015	This project will create and nourish marsh and build about 20,000 ft of ridge.^	No	No
CWPPRA (BA-164): Bayou Dupont Sediment Delivery - Marsh Creation #3 and Terracing	Plaquemines	2018	This project involves dedicated dredging from the Mississippi River to create and nourish marsh in the vicinity of Bayou Dupont.^	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
CWPPRA (BS-03A): Caernarvon Diversion Outfall Management	Plaquemines	2002	The enhancement of marsh to increase the utilization of freshwater, nutrients, and sediments provided by the Mississippi Rive through the Caernarvon Freshwater Diversion Structure.^	No	No
CWPPRA (BS-11): Delta Management at Fort St. Phillip	Plaquemines	2006	Enhancement of the delta building process occuring due to the crevasse at Fort St. Phillip.^	No	No
CWPPRA (BS-16): South Lake Lery Shoreline and Marsh Restoration	Plaquemines	2017	The project involves dredging sediment to create approximately 400 acres of marsh and restore 32,000 feet of southern Lake Lery shoreline. ^	No	No
CWPPRA (LA-05): Floating Marsh Creation Demonstration	Terrebonne	2006	A demonstration project developed and tested the creation of floating marsh made of bouyant vegetated mats or artificial islands.^	No	No
CWPPRA (LA-09): Sediment Containment System for Marsh Creation Demonstration	St. Charles	2013	The demonstration project utilizes an unconventional sediment containment system for marsh creation.^	No	No
CWPPRA (MR-03): West Bay Sediment Diversion	Plaquemines	2003	This project consists of a conveyance channel for large-scaled uncontrolled diversion of freshwater and sediments from the Mississippi River.^	No	No
CWPPRA (MR-06): Channel Armor Gap Crevasse	Plaquemines	1997	The project consists of deepening the invert of the existing 150 foot wide gap in the Mississippi River Channel bank armor. The existing invert was lowered to -4.0 feet NGVD. In addition, an existing earthen channel leading from the armored gap to the open water area beyond the bank were enlarged. Excavated material from the outfall channel was cast adjacent to the channel in a manner conducive to marsh nourishment.^	No	No
CWPPRA (MR-09): Delta Wide Crevasse	Plaquemines	1999	The objective of this project is to promote the formation of emergent freshwater and intermediate marsh in shallow, open water areas of the Pass-a-Loutre Wildlife Management Area and the Delta National Wildlife Refuge by either cleaning existing splays of creating new ones.^	No	No
CWPPRA (MR-10): Dustpan Maintenance Dredging Operations for Marsh Creation in the Mississippi River Delta Demonstration	Plaquemines	2002	This project demonstrated the beneficial use of dredged material from routine maintenance of the Mississippi River Navigation Channel by using a dustpan hydraulic dredge to create and restore adjacent marsh. Approximately 40 acres of deteriorated marsh that had converted to shallow open water were restored with approximately 222,000 cubic yards of dredging material. ^	No	No
CWPPRA (PO-06): Fritchie Marsh Restoration	St. Tammany	2001	Remediation of the causes of wetland loss in the area and to improve habitat for wildlife and fisheries by increasing the flow of freshwater into the marsh and managing the outfall.^	No	No
CWPPRA (PO-16): Bayou Sauvage National Wildlife Refuge Hydrologic Restoration, Phase 1	Orleans	1996	Removal of excess water during the spring and summer from the isolated units 3 and 4 of the of the Bayou Sauvage Wildlife Refuge created by the Lake Pontchartrain Hurricane Protection levee. ^	No	No
CWPPRA (PO-17): Bayou Labranche Wetland Creation	Orleans	1994	The project involves dredging sediments from the Lake Pontchartrain to create vegetated wetlands in an area roughly bounded by I-10, Lake Pontchartrain, Bayou Lafourche.^	No	No
CWPPRA (PO-18): Bayou Sauvage National Wildlife Refuge Hydrologic Restoration, Phase 2	St. Charles	1997	Maintenance of water levels at 05. feet above or below marsh elevation to promote vegetation growth in the project area.^	No	No
CWPPRA (PO-19): Mississippi River Gulf Outlet Disposal Area Marsh Protection	St. Bernard	1999	Preservation of vegetated wetlands by repairing the lateral and rear dikes of the Mississippi River Gulf Outlet disposal area.^	No	No
CWPPRA (PO-22): Bayou Chevee Shoreline Protection	Orleans	2001	The project consists of constructing an earthen, erodible dike to contain dredged material from Lake Pontchartrain and create about 150 acres of marsh.^	No	No
CWPPRA (PO-24): Hopedale Hydrologic Restoration	St. Bernard	2005	The replacement of collapsed culverts installed in the 1950s near Yscloskey to abate site-specific wetland loss.^	No	No
CWPPRA (PO-27): Chandeleur Islands Marsh Restoration	St. Bernard	2001	Vegetation plantings to assist and accelerate the recovery of barrier island areas overwashed by Hurricane Georges in 1998.^	No	No
CWPPRA (PO-30): Lake Borgne Shoreline Protection	St. Bernard	2008	Maintenance of the integrity of the narrow strip of marsh that separates Lake Borgne from the Mississippi River Gulf Outlet through the construction of a continuous nearshore rock breakwater.^	No	No
CWPPRA (PO-33): Goose Point/Point Platte Marsh Creation	St. Tammany	2009	The creation of marsh and nourishment of degraded marsh along the northern shoreline of Lake Pontchartrain.^	No	No
CWPPRA (PO-104): Bayou Bonfouca Marsh Creation	St. Tammany	2018	Creation of emergent brackish marsh to stabilize the landform separating Lake Borgne from the MRGO.^	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
CWPPRA (TE-17): Falgout Canal Planting Demonstration	Terrebonne	1996	Vegetation planting and wave dampening devices placed along the Falgout Canal.^	No	No
CWPPRA (TE-18): Timbalier Island Planting Demonstration	Terrebonne	1996	The installation of sand fences and vegetation plantings in several areas of Timbalier Island to trap sand and buffer wind and wave energy.^	No	No
CWPPRA (TE-20): Isles Dernieres Restoration East Island	Terrebonne	1999	Restoration of coastal dunes and wetlands of the Eastern Isles Dernieres barrier island chain. Hydraulically filled area on the island to create an elevated marsh platform. Sand fences and vegetation were also installed to stabilize the sand and minimize wind-driven transport.^	No	No
CWPPRA (TE-22): Point au Fer Canal Plugs	Terrebonne	1997	The reduction of saltwater intrusion into Point au Fer marshes without reducing freshwater back flooding from the Atchafalaya River. ^	No	No
CWPPRA (TE-23): West Belle Pass Headland Restoration	Lafourche	1998	The project reduces the encroachment of Timbalier Bay into the marshes on the west side of Bayou Lafourche with the use of dedicated dredged materials to create marsh on the west side of Belle Pass. A water control structure was placed in the Evans Canal and plugs on the other canals.^	No	No
CWPPRA (TE-24): Isles Dernieres Restoration Trinity Island	Terrebonne	1999	The restoration of Trinity Island wetlands of the Isles Dernieres chain, enhance the physical integrity of the island, and protect the lower Terrebonne estuary.^	No	No
CWPPRA (TE-25): East Timbalier Island Sediment Restoration, Phase 1	Lafourche	2001	The placement of sediment in three embayments along the landward shoreline of East Timbalier Island. The project also included aerial seeding of the dune platform, installation of sand fencing, and dune vegetation plantings.^	No	No
CWPPRA (TE-26): Lake Chapeau Sediment Input and Hydrologic Restoration, Point Au Fer Island	Terrebonne	1999	The restoration of marshes west of Lake Chapeau, re-establishment of the hydrologic separation of the Locust Bayou and Alligator Bayou watersheds, and re-establishment of the natural drainage patterns within the Lake Chapeau area.^	No	No
CWPPRA (TE-27): Whiskey Island Restoration	Terrebonne	2000	The project created and restored beaches and back island marshes on Whiskey Island.^	No	No
CWPPRA (TE-28): Brady Canal Hydrologic Restoration	Terrebonne	2000	The maintenance of fragile, highly-fragmented transitional marshes between the fresh and estuarine zones by enhancing freshwater, sediment, and nutrient delivery to the area. ^	No	No
CWPPRA (TE-29): Raccoon Island Breakwaters Demonstration	Terrebonne	1997	The project protects the replenished beaches and wetlands of Raccoon Island and protect back barrier and mainland marshes with segmented breakwaters. ^	No	No
CWPPRA (TE-30): East Timbalier Island Sediment Restoration, Phase 2	Lafourche	2000	The project places dredged material along the landward shoreline of East Timbalier Island. Additional rock has been placed on the existing breakwater in front of the island, which will help protect the created area from erosion.^	No	No
CWPPRA (TE-34): Penchant Basin Natural Resources Plan, Increment 1	Terrebonne	2011	The diversion of freshwater flow from northwestern to southeastern sub project area coupled with protection measures to reduce inundation of fragile marsh areas in overall Penchant Basin in Terrebonne Parish.^	No	No
CWPPRA (TE-36): Thin Mat Floating Marsh Enhancement Demonstration	Terrebonne	2000	The objective of this project was to induce the development of thick-mat, continuously floating marsh from a thin-mat flotant using various combinations of treatments including fertilization, herbivory reduction, and transplanting healthy, thick-mat marsh plugs into the thin-mat flotant.^	No	No
CWPPRA (TE-37): New Cut Dune and Marsh Restoration	Terrebonne	2008	The closure of the breach between East and Trinity Islands that was originally created by Hurricane Carmen in 1974 and subsequently enlarged by Hurricanes Juan (1985) and Andrew (1992).^	No	No
CWPPRA (TE-39): South Lake Decade Freshwater Introduction	Terrebonne	2011	This project involves the construction of a water control structure in the southern bank of Lake DeCade. The structure increases the amount of Atchafalaya River water and sediment introduced into the marshes south of the lake. In addition, shoreline protection was implemented adjacent to the proposed structure, and a weir in Lapeyrouse Bayou was removed.^	No	No
CWPPRA (TE-40): Timbalier Island Dune and Marsh Creation	Lafourche	2004	The objective of this project was to restore the eastern end of the Timbalier Island by the direct creation of beach, dunes, and marsh. ^	No	No
CWPPRA (TE-41): Mandalay Bank Protection Demonstration	Terrebonne	2003	The development of new techniques for protecting and restoring organic soils, which can be easily eroded. Intact banks and breakthroughs were treated to determine the cost-effectiveness of demonstrated approaches. The project allows the evaluation of several low-cost solutions for restoring habitat in blowout areas and preventing bank erosion. ^	No	No
CWPPRA (TE-43): GIWW Bank Restoration of Critical Areas in Terrebonne	Terrebonne	2014	The project objective was to restore critical lengths of deteriorated channel banks and stabilize/armored selected critical lengths of deteriorated channel banks with shoreline stabilization materials. ^	No	No
CWPPRA (TE-44): North Lake Mechant Landbridge Restoration	Terrebonne	2009	The maintenance and restoration of the landbridge between Lake Mechant north shoreline and the Small Bayou La Pointe Ridge, which provides a hydrologic barrier between brackish and low-salinity habitats.^	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
CWPPRA (TE-45): Terrebonne Bay Shoreline Protection Demonstration	Terrebonne	2007	The project was intended to evaluate several different shoreline protection methods, including concrete mats, artificial oyster reefs, and A-Jacks. ^	No	No
CWPPRA (TE-46): West Lake Boudreaux Shoreline Protection and Marsh Creation	Terrebonne	2008	The creation and nourishment of marsh along the western shoreline of Lake Boudreaux to protect the shoreline from erosion due to direct exposure to lake wave energy and to restore interior marsh lost to subsidence and saltwater intrusion. ^	No	No
CWPPRA (TE-48): Raccoon Island Shoreline Protection and Marsh Creation	Terrebonne	2007, 2013	The protection of the existing southern shoreline of the Raccoon Island by constructing rock breakwaters and creating marsh on the landward side of the island using dredged material. ^	No	No
CWPPRA (TE-50): Whiskey Island Back Barrier Marsh Creation	Terrebonne	2010	The recreation of a back barrier marsh platform on which the barrier island can migrate to increase the longevity of the previously restored and natural portions of the island. ^	No	No
CWPPRA (TE-52): West Belle Pass Barrier Headland Restoration	Lafourche	2012	The re-establishment of the West Belle headland by rebuilding a large portion of the beach, dune, and back barrier marsh that once existed. ^	No	No
CWPPRA (TE-53): Enhancement of Barrier Island Vegetation Demonstration	Terrebonne	2011	The project focused specifically on enhancing the establishment and growth of transplants of both dune and marsh vegetation and black mangrove. ^	No	No
CWPPRA (TV-04): Cote Blanche Hydrologic Restoration	St. Mary	1998	The reduction of future shoreline loss from wave erosion, reduction of excess tidal fluctuations and rapid tidal exchange to prevent scouring of interior marsh, develop a hydrologic regime conducive to sediment and nutrient deposition, and to re-establish vegetation in eroded areas. ^	No	No
CWPPRA (TV-15): Sediment Trapping at "The Jaws"	St. Mary	2005	The construction of wetland terraces to reduce wave fetch and promote sedimentation for the creation of emergent vegetated wetlands. Distributary channels were dredged to deliver water and sediment to the project area. ^	No	No
FEDERAL (TE-82): Lost Lake Vegetation	Terrebonne	2011	This coastal vegetative planting project is for erosion control and habitat restoration in the Lost Lake area of southwestern Terrebonne Parish ^	No	No
FEMA (TE-133): Isle Dernieres (Whiskey Island)	Terrebonne	2000	This project involved the installation of sand fencing and the planting of vegetation to repair areas of Whiskey Island damaged by tropical storms and hurricanes during the fall of 1998. ^	No	No
HSDRRS (PO-146): LPV Mitigation, Manchac WMA Marsh Creation	St. John the Baptist	2012	The creation of marsh and reduction of erosion by containment dikes with rock and fill areas with dredge material within the Manchac WMA. ^	No	No
HSDRRS: HSDRRS Mitigation LPV Milton Island Floodside Intermediate Marsh	St. Tammany	2018	This alternative consists of 115 acres of intermediate marsh restoration that would be achieved by placing dredged material in open water adjacent to the bottomland hardwood site to an elevation conducive for wetland development, followed by plating of wetland vegetation. Temporary containment features would be constructed to keep material in place. A shoreline restoration feature is proposed to repair a breach in the lake rim. Construction began in August 2015 and was completed in December 2018 (Erwin 2018b, USACE 2012d).	No	No
HSDRRS (PO-145): LPV Task Force Guardian Mitigation-Bayou Sauvage	St. John the Baptist	2018	This project is mitigating approximately 150 acres due to emergency levee work that utilized 2 borrow pits of about 57 acres. It provides for the elimination of non-native trees with spraying and mechanical clearing, and then the replanting of up to 89,000 trees and shrubs of native species. ^ The construction contract was awarded in 2012 and a Notification of Contract Completion was received in 2018 (Landry 2019b).	No	No
HSDRRS: HSDRRS Mitigation WBV General Protected Side BLH Wet	Lafourche	2015	Mitigation for West Bank and Vicinity Hurricane Protection Storm Damage Risk Reduction System project impacts to protected side wet bottomland hardwoods (7.27 AAHUs impacted) occurred with the purchase of 11.1 acres from Enterprise Wetlands mitigation bank in February 2015 (USACE 2017b).	No	No
HSDRRS: HSDRRS Mitigation WBV JLNHPP Park/404c Millaudon and Horseshoe Canal Floodside Swamp Enhancement	Jefferson	2017	Mitigation for WBV HSDRRS project impacts to Jean Lafitte National Historical Park and Preserve (JLNHPP)/Bayou aux Carpes 404c area swamp (7.19 AAHUs impacted) to occur within the JLNHPP along the north side of the Millaudon and Horseshoe Canals near the WBV levee. Existing spoil berms will be gapped to improve exchange of surface water between swamp habitats in the area (USACE 2015). The project would involve restoring hydrologic connection and natural sheet flow across existing impounded swamp habitat to compensate for Park/404c swamp impacts. The project would produce approximately 8.4 AAHUs of swamp benefits on JLNHPP. (Behrens 2019a, USACE 2017b).	No	No
HSDRRS: HSDRRS Mitigation WBV JLNHPP Park/404c Hwy 45 Floodside BLH-Wet Restoration	Jefferson	2017	Mitigation for WBV HSDRRS project impacts to JLNHPP/Bayou aux Carpes 404c area to include approximately 6 acres of BLH-Wet restoration by filling a portion of a borrow pit in the northern part of Jean Lafitte National Park. The pit would be filled with clay and sand material trucked in from an offsite source, and native BLH-Wet species would be planted (Behrens 2019a; USACE 2012g).	No	No

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LWCPRA (BA-187): Grand Isle Bay Side Breakwaters	Jefferson	1995	The purpose of this project was to reduce erosion on the bay side of Grand Isle. Fifteen 300-foot breakwaters were constructed on the back-bay side of Grand Isle. This project included construction of segmented breakwaters on bay side of Grand Isle. ^	No	No
LWCPRA (BA-200): North Grand Isle Breakwaters	Jefferson	1995	Approximately 1,500 linear feet of breakwater constructed on the south side of the Northern Grand Isle. ^&	No	No
LWCPRA (PO-01): Violet Siphon Diversion	St. Bernard	1992	Enlargen the size of the diversion so that more sediment and freshwater are available to offset marsh subsidence and saltwater intrusion. ^	No	No
LWCRPA (BA-03): Naomi Siphon Diversion	Jefferson; Plaquemines	1992	The Naomi Siphon diversion is located on the west bank of the Mississippi River near the communities of Naomi and LaReussite, Louisiana. The maximum flow capacity of the diversion is 2,100 cfs and is designed to divert freshwater, nutrients, and sediment from the Mississippi River into the adjacent wetlands near Naomi, Louisiana. * ^	No	No
LWCRPA (BA-04): West Pointe a la Hache Siphon Diversion	Plaquemines	1992	The construction of siphon to divert water from the Mississippi River into the adjacent wetlands on the west side of the river near Pointe a la Hache, Louisiana at a maximum discharge of 2,100 cfs. ^	Yes	Yes
LWCRPA (BA-05B): Queen Bess Island	Jefferson	1993	The purpose of this project is to restore Queen Bess Island as a brown pelican rookery. Dredged material was added to the island to increase its size in 1991, and a rock dike was installed around the perimeter of the original island in 1992 to armor the shoreline. The area has become vegetated and the number of pelican nests on the island increased after the project. ^	No	No
LWCRPA (BA-05C): Baie De Chactas	St. Charles	1990	Construction of a rock shoreline protection features between the northwest shoreline of Lake Salvador and Baie du Cabanage in order to reduce erosion, stabilize the shoreline, and inhibit shoreline breaching. * ^	No	No
LWCRPA (BA-15-X1): Lake Salvador Shoreline Protection Extension	St. Charles	2005	The shoreline protection project included the construction of a rock dike along the northeastern shoreline of Lake Salvador tying into the BA-15 Phase II CWPPRA project and extending approximately 2 miles northeast. The project is designed to maintain the shoreline integrity and reduce interior marsh loss. * ^	No	No
LWCRPA (BA-16): Bayou Segnette	Jefferson	1994; 1998/99	A shoreline protection feature along a narrow strip of spoil bank and marsh which separates the Bayou Segnette Waterway from Lake Salvador and a barrier across an abandoned canal that connects the two water bodies was constructed in 1994 to reduce wave induced erosion of marsh habitats within the JLNHPP. Maintenance of the structure occurred in 1998-1999. * ^	No	No
LWCRPA (BA-25): Bayou Lafouche Freshwater Introduction	Lafourche	2011	The Mississippi River diversion into Bayou Lafourche will restore coastal marshes and provide drinking water to over 300,000 residents. This project funded the dredging of the first 6.2 miles of the bayou to accommodate a proposed increased flow of 1,000 cfs. ^	No	No
LWCRPA (BA-168): Grand Isle-Fifi Island Breakwaters	Jefferson	2015	The project will construct breakwaters along the southwestern portion of Fifi Island to reduce erosion on Fifi Island and the bay side of Grand Isle in order to protect commercial and residential infrastructure, wetlands, and fisheries. The project includes renourishment of 1,450 feet of existing breakwaters of an elevation of 8 feet and construction of 1,450 feet of new breakwaters to an elevation of 8 feet. ^	No	No
LWCRPA (BS-06): Lake Lery Hydrologic Restoration	St. Bernard	1997	The construction of a pumping station located along the south-central edge of the St. Bernard Parish Ridge. This will discharge collected rainfall into the marsh north of Lake Lery and help prevent saltwater intrusion. ^	No	No
LWCRPA (LA-01A): Dedicated Dredging Program – Lake Salvador	St. Charles	1999	The deposition of dredge material into two sites in open water areas of Baie du Cabanage within the Salvador Wildlife Management Area where narrow marsh strips exists between Lake Salvador and the bay. The project goal is the restoration of marsh habitat and the reduction of shoreline breaching into the adjacent Lake Salvador as part of the coastwide State Dedicated Dredging Program. * ^	No	No
LWCRPA (LA-01B): Dedicated Dredging Program – Bayou Dupont	Jefferson	2000	The deposition of dredge material into three sites adjacent to Bayou Dupont and The Pen to nourish and/or rebuild threatened coastal marshes as part of the coastwide State Dedicated Dredging Program. ^	No	No
LWCRPA (LA-01C): Dedicated Dredging Program – Pass a Loutre	Plaquemines	2000	The project created approximately 26 acres of sustainable freshwater marsh in the vicinity of Pass a Loutre, Louisiana. This project is part of the coastwide state Dedicated Dredging Program. The goal of this program is to use a small, mobile hydraulic dredge along inland waterways in Louisiana's coastal zone to deposit dredged material, and thereby nourish and/or rebuild threatened coastal marshes adjacent to the waterways. ^	No	No
LWCRPA (LA-01D): Terrebonne School Board Site - Dedicated Dredging	Terrebonne	2006	The creation of approximately 40 acres of marsh just north of Lake DeCade along the western back of Minors Canal as part of the Dedicated Dredging Program. ^	No	No
LWCRPA (LA-01E): Grand Bayou Blue Site - Dedicated Dredging	Lafourche	2007	The creation of approximately 40 acres of marsh near Catfish Lake as part of the Dedicated Dredging Program. ^	No	No
LWCRPA (LA-01F): Dedicated Dredging - Point au Fer	Terrebonne	2007	The creation of approximately 67 acres of marsh on Point au Fer Island as part of the Dedicated Dredging Program. ^	No	No

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LWCRPA (MR-01B): Small Sediment Diversions	Plaquemines	1993	The project involved the excavation of 13 crevasses through the levees of the Mississippi River distributary channels within the Balize Delta in order to create self sustaining emergent marsh. ^	Yes	Yes
LWCRPA (PO-01): Violet Siphon	St. Bernard	1992	Repair and enlargement of the existing siphon to allow increased flow of freshwater and nutrients into the surrounding marsh areas to enhance wetland vegetation growth and decrease salinity. ^	No	No
LWCRPA (PO-02C): Bayou Chevee	Orleans	1994	This project installed 2,000 feet of brush fences at the mouth of Bayou Chevee. ^	No	No
LWCRPA (PO-03): Labranche Shoreline Stabilization and Canal Closure	St. Charles	1987	The restoration of the integrity of the shoreline, which separates Lake Pontchartrain from the western edge of Labranche wetlands. ^	No	No
LWCRPA (PO-03B): Labranche Shoreline Protection	St. Charles	1996	A rock breakwater was constructed along the Lake Pontchartrain shoreline, east of Bayou Labranche to inhibit breaching of the hydrologic boundary between the lake and the wetlands. ^	No	No
LWCRPA (PO-08): Central Wetlands Pump Outfall	St. Bernard	1992	This project was designed to provide freshwater, nutrients, and sediment associated with storm water runoff to an area of marsh near the Violet Siphon. ^	No	No
LWCRPA (PO-10): Turtle Cove Shore Protection	St. John the Baptist	1994	The project involved the construction of a rock-filled gabion breakwater to maintain and protect the Lake Pontchartrain shoreline that shelters "The Prairie" from high wave energies and to encourage sediment deposition behind the gabion structure. ^	No	No
LWCRPA (PO-72): Biloxi Marsh	St. Bernard	2014	This project involved the construction of approximately four miles of shoreline protection along the southeastern shoreline of Lake Borgne. ^	No	No
LWCRPA (PO-161): Lake Pontchartrain Hurricane Mitigation	St John the Baptist	1996	This project consisted of a near-shore, segmented breakwater system in Lake Pontchartrain parallel to a five-mile reach of the Manchac Wildlife Management Area. The project specifically mitigated for damages resulting from construction of the Lake Pontchartrain Hurricane Protection project. ^	No	No
LWCRPA (PO-4355NP4): Fontainebleau State Park Mitigation	St. Tammany	1999	A mitigation project for impacts associated with the construction of park cabins along the northern Lake Pontchartrain shoreline east of Bayou Castine within the Fontainebleau State Park, St. Tammany Parish. The project involved the deposition of sand in the nearshore zone to supply sediment to close approximately 600 feet of breaches east of the Fontainebleau State Park cabins along the shoreline (USACE 2013).	No	No
LWCRPA (TE-01): Montegut Wetland	Terrebonne	1993	The objective of Montegut Wetland project was to protect and enhance degraded wetland habitat in the Pointe au Chein Wildlife Management Area southeast of Montegut, Louisiana. ^	No	No
LWCRPA (TE-02): Falgout Canal Wetland	Terrebonne	1993, 1995	The primary objectives of this project were to protect marsh and cypress-tupelo swamp, reduce saltwater intrusion, and improve wildlife habitat by moderating water flux and tidal energy in the deteriorating wetland community. ^	No	No
LWCRPA (TE-03): Bayou Lacache Wetland	Terrebonne	1991, 1996	The goal of the project was to minimize the effects of saltwater intrusion by increasing the retention of freshwater derived from local runoff and establish control over saltwater flow into the project area. ^	No	No
LWCRPA (TE-06): Pointe-aux-Chenes Hydrologic Restoration	Lafourche	2006	Restoration of brackish-intermediate marsh within the Pointe Aux Chenes Wildlife Management Area. ^	No	No
LWCRPA (TE-07B): Lower Petit Caillou	Terrebonne	1995, 2007	The objective of this project was to decrease saltwater intrusion into the project area by re-routing freshwater discharge from the Lashbrook pumping station through the project area prior to entry into Lake Boudreaux. ^	No	No
LWCRPA (TE-14): Point Farm Refuge Planting	Terrebonne	1995	This project was developed to create bottomland hardwood forest in former Point Farm Refuge Area. ^	No	No
LWCRPA (TE-106): Raccoon Island Repair	Terrebonne	1994	This project was a cooperative effort that utilized dredged material and vegetation to repair storm damage to Raccoon Island. ^	No	No
LWCRPA (TE-107): Spoilbank Along the GIWW	Terrebonne	1993	Trees planted along approximately 8,000 feet of the GIWW spoilbank in an effort to reduce further bank erosion. ^	No	No
LWCRPA (TV-02A): Hammock Lake	St. Mary	1990	The construction of 28 wave-dampening fences at Hammock Lake in an effort to reduce turbulence and resuspension of sediments by slowing currents and reducing wave action (Bahlinger 1994).	No	No
LWCRPA (TV-02B): Yellow Bayou	St. Mary	1992	The objectives of the project were to maintain the integrity of the interior marsh between Jackson Bayou and the British-American Canal and to stabilize the East Cote Blanche Bay shoreline. This was achieved by constructing an oyster shell berm adjacent to the water's edge to reduce shoreline erosion. ^	No	No
LWCRPA (TV-06): Marsh Island Control Structures	St. Mary	1993	The project objectives were to reduce the rate of land loss, re-vegetate shallow open-water areas, and increase waterfowl food within the water management units (^; CPRA 2017c).	No	No
LWCRPA (TV-72): Quintana Canal/Cypremort Point	St. Mary	1998	The project features rock breakwaters along the Vermilion Bay shoreline and foreshore rock dike along the Vermilion Bay/ Quintana Canal intersect and the south bank of the Quintana Canal. ^	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
National Park Service/USACE: Jean Lafitte National Historical Park & Preserve Beneficial Use Site	Jefferson	2011	The beneficial use of dredged material from Bayou Segnette Waterway and additional material from Algiers Canal associated with the construction of the West Closure Complex/HSDRSS were placed in the site bounded by the 1997 NPS wave break features on the west, existing marsh lands to the north and south, and the 1994 State of Louisiana BA-16 rock dike to the east. The project will provide improved shoreline stability (Minton, 2011).	No	No
National Park Service/USACE: Lake Salvador Shoreline Protection 1997 Shoreline Protection	Jefferson	1997	A shoreline protection barrier was built by the USACE under the authority of the National Parks and Recreation Act of November 10, 1978 (PL 95-625) to protect the Jean Lafitte National Historical Park and Preserve lands from wave induced erosion in an area of the central eastern Lake Salvador shoreline where potential breaching was possible between the Lake Salvador shoreline and the Bayou Segnette Waterway. The wave break is approximately 8,000 feet long (USACE, 1995).	No	No
National Park Service/USACE: Lake Salvador Shoreline Protection 2005	Jefferson	2004-2005	Shoreline protection features were constructed by the USACE within the Jean Lafitte National Historical Park and Preserve along the northeastern Lake Salvador shoreline from the entrance of Bayou Bardeaux southeast along the Lake Salvador shoreline until it meets the National Park Service breakwater constructed in 1997. The goal of this project is to protect the JLNHPP lands and archaeological sites from wave induced erosion (USACE, 2004b).	No	No
National Park Service/USACE: Lake Salvador Shoreline Protection 2011	Jefferson	2011	Construction consisted of placement of rock on the floodside of the geocrib area and repairing existing rock dike on the Jean Lafitte National Historical Park and Preserve along the eastern Lake Salvador shoreline adjacent to the geocrib constructed in 1997. The feature is owned by NPS (O'Cain, 2012).	No	Yes
National Park Service: 2010 Jean Lafitte National Historical Park & Preserve Canal Partial Back Fillings	Jefferson	2010	Jean Lafitte National Historical Park & Preserve canals backfilled in 2010 to restore marsh integrity (Haigler, 2011).	No	No
National Park Service: 2002 Jean Lafitte National Historical Park & Preserve Canal Partial Back Fillings	Jefferson	2002	Jean Lafitte National Historical Park & Preserve canals backfilled in 2002 to restore marsh integrity (Haigler, 2011).	No	No
NFWF (BA-143): Caminada Headland Beach and Dune Restoration Increment 2	Jefferson; Lafourche	2016	This project will retore protect beach and dune habitat across the Caminada Headland through the direct placement of sandy material from Ship Shoal. The project footprint begins near Bayou Mareau and extends approximately 9 miles east towards Caminada Pass.^	No	No
NOAA (BA-186): Fisheries Habitat Restoration on West Grand Terre Island at Fort Livingston	Jefferson	2003	This project consists of a rock dike built to protect the Gulf shoreline of West Grand Terre Island and Fort Livingston. This project was expedited because erosion rates along West Grand Terre rapidly accelerated due to the impacts of tropical storms in 2002. ^	No	No
NOAA (TE-105): Brown Marsh	Lafourche	2002	Project features consisted of a thin layer marsh creation and nourishment covering 44 acres in Lafourche Parish. ^	No	No
NRDA (BA-111): Shell Island West - NRDA	Plaquemines	2017	This project aims to restore the integrity of the Shell Island West barrier island, reduce wave energies within the bay area, and reestablish productive habitat to Bastian Bay and the surrounding area. ^	No	No
NRDA (BA-141): Lake Hermitage Marsh Creation Increment 2	Plaquemines	2014	This project will create 101 acres of marsh in conjunction with the BA-42 Lake Hermitage CWPPRA project. ^	No	No
NRDA (TE-100): NRDA Caillou Lake Headlands	Terrebonne	2018	This project aims to restore the Whiskey Island Barrier Island in order to retain its geomorphologic form and ecologic function. It will create 170 acres of marsh habitat and 917 acres of dune and beach habitat. ^	No	No
SECTION 204/1135: Barataria Waterway/Grand Terre Island Phase 1 & 2	Jefferson	1996 P1; 2002 P2	This Section 204 project provided for the beneficial placement of approximately 500,000 cubic yards of material dredged from the Barataria Bay Waterway to create wetlands on Grand Terre Island.^	No	No
SECTION 204/1135: MRGO, Breton Island Berm Mile -2 to -3	Plaquemines	1999	This Section 204 project utilized material from maintenance dredging activities along the Mississippi River Gulf Outlet to nourish the littoral system that feeds Breton Island.^	No	No
SECTION 204/1135: MRGO, Breton Island Restoration Mile -2.3 to 4.0	Plaquemines	1999	This Section 204 project utilized material from maintenance dredging activities along the Mississippi River Gulf Outlet to repair Breton Island.^	No	No
Texaco Oil Spill Mitigation: Texaco Oil Discharge Mitigation 1991 (Netherlands Area)	St. Charles	1991	Mitigation for the 1991 Texaco oil well discharge into southwestern portion of Lake Salvador. The mitigation feature was constructed in the Netherlands area and consists of a timber pile/tire breakwater approximately 835 feet in length separating the Netherlands area from Lake Cataouatche. The objective of the project is to reduce erosion and enhance submerged aquatic vegetation habitat. The breakwater is anticipated to maintain existing conditions for 50 years (USDOI, 1991).	No	No

Program	Parish	Year Constructed	Project Description	Direct Overlap	Extended Boundary Overlap
US Army Corps of Engineers: LPV Pre-Katrina Mitigation (Manchac Shoreline)	St. John the Baptist	1995	The project is located along the Lake Pontchartrain shoreline south of Pass Manchac near the southern border of the Manchac Wildlife Management Area (WMA) and consists of approximately 5 miles of segmented rock breakwater designed for wetland habitat protection in the WMA (USACE 2013).	No	No
US Army Corps of Engineers: Davis Pond Freshwater Diversion Structure and Guide Levees	St. Charles	2002	The Structure is located on the west bank of the Mississippi River near Luling, Louisiana in St. Charles Parish. Approximately 19 miles of guide levees were also constructed to control the diverted freshwater, nutrients and sediments from the Mississippi River through the diversion structure into the Barataria Basin for the enhancement of the wetland habitat. The maximum flow capacity of the diversion is 10,650 cfs (USACE, 2000).	No	No
USACE (PO-93 and PO-94): MRGO O&M (Bayou Dupre Segment)	St. Bernard	1992	The project is located along the eastern bank of the MRGO in the vicinity of Bayous Bienvenue and Dupre. It consists of approximately 24,000 feet of rock breakwaters to provide wave reduction and protect the marshes behind the structure. Additional maintenance was performed on the structure in 2007/2008 to repair damages from Hurricane Katrina (USACE 2013).	No	No
USACE (PO-95): MRGO O&M 3rd and 4th Supplemental and MRGO O&M (MRGO East Bank Shoreline Protection in the Vicinity of Bayou Yscloskey)	St. Bernard	2008	The project is located along the eastern bank of the MRGO in the vicinity of MRGO river mile 39 to 44 near Bayou Yscloskey. The reach consists of approximately four miles of segmented foreshore rock dikes to reduce wave action and enhance protection to the marshes behind the structure (USACE 2013).	No	No
USACE (PO-152): MRGO O&M 3rd and 4th Supplemental (Doulluts Canal to Jahncke's Ditch)	St. Bernard	2008	This shoreline protection project is located along the southeastern shoreline of Lake Borgne between Doulluts Canal and Jahnckes Ditch. The design for this reach was funded and completed in 2005 by CWPPRA PO-29 project; however, the reach was funded and built with 3rd Supplemental funds (USACE 2013).	No	No
USACE: MRGO O&M (MRGO West Bank Shoreline Protection in the vicinity of Stump Bayou)	St. Bernard	Late 1990s	The project is located along the western bank of the MRGO in the vicinity of Stump Bayou. It consists of approximately 3,000 feet of rock breakwaters to provide wave reduction and enhance protection to the marshes behind the structure (USACE 2013).	No	No
USACE: MRGO O&M 3rd and 4th Supplemental (West of Shell Beach Shoreline Protection)	St. Bernard	2008	A rock shoreline protection feature is to be constructed along the Lake Borgne shoreline south of Proctor Point in the vicinity of Shell Beach to provide protection to the adjacent marshlands. Also, marsh creation will be implemented at specific locations behind the shoreline protection features (USACE 2013).	No	No
WRDA (BA-01): Davis Pond Freshwater Diversion and Forced Drainage Area	Jefferson; Lafourche; Plaquemines; St. Charles	2002	The management of the diverted freshwater, nutrients and sediment from the Mississippi River through the Davis Pond freshwater diversion structure into the surrounding marsh areas to maintain and enhance the ecosystem of the Barataria Basin. *^	Yes	Yes
WRDA (BA-191): Spanish Pass Ridge and Marsh Restoration	Plaquemines	2018	Construction of approximately 1 mile of ridge backed by a marsh platform that would serve as a means to reduce wave energy on the leeward side of the marsh through the use of dredge material. This project is part of the Louisiana Coastal Area, Beneficial Use of Dredged Material Program. ^@	No	No
WRDA (BS-08): Caernarvon Freshwater Diversion	Plaquemines; St. Bernard	1991	This project diverts freshwater and its accompanying nutrients and sediment from the Mississippi River into coastal bays and marshes in Breton Sound for fish and wildlife enhancement. ^	No	No

(^Data source is CPRA 2018; @Data source is CPRA 2017a; # Data source is CPRA 2017b; &Data source is CPRA 2017c; *Data source is CPRA 2012; +Data source is CPRA 2010)

Table 2. Reasonably Foreseeable Wetland or Ecosystem Restoration Projects in the Deltaic Plain

Program	Parish	Description	Direct Overlap	Extended Boundary Overlap
CDBG (TE-78): Cut-Off/Pointe aux Chene Levee	Lafourche	This project will fill in the missing gap that is currently in the existing levee system. The 2.5 miles levee will be constructed along Grand Bayou and tie into the existing levee systems on each end. Construction began in August 2017 and is anticipated for completion in January 2020.^@	No	No
CIAP (PO-148): Living Shoreline	St. Bernard, Jefferson, Orleans	The construction of bio-engineered oyster reefs along coastal fringe marsh in St. Bernard Parish. The installation will take place from Eloi Point to the mouth of Bayou La Loutre around Lydia Point and Paulina Point extending around the southern shore of Treasure Bay. Other related Living Shoreline projects are in Plaquemines Parish and Jefferson Parish. Construction began in February 2018 and is anticipated for completion in 2018. ^@	No	No
CWPPRA (BA-125): Northwest Turtle Bay Marsh Creation	Jefferson	This project involves the creation and nourishment of marsh using sediment dredged from Turtle Bay or Little Lake. Construction began in August 2018 and is anticipated for completion in February 2020.^@	No	No
CWPPRA (TE-72): Lost Lake Marsh Creation and Hydrologic Restoration	Terrebonne	The restoration of an important feature of structural framework between Lake Paige and Bayou Decade to prevent the coalescence of those two water bodies and increase the delivery of fresh water, sediments, and nutrients into the marshes north and west of Lost Lake including the reduction of fetch in open water area via construction of a terrace field. Construction began in September 2016 and is anticipated for completion in January 2019.^	No	No
HSDRRS (BA-156): Plaquemines TFU Mitigation - Braithwaite to Scarsdale - Big Mar	Plaquemines	This environmental mitigation project is being led by USACE and is 100% federally funded. It provides for marsh creation in the vicinity of Braithwaite to Scarsdale - Big Mar and is paired with a Plaquemines Parish marsh creation project.^ This project is still in the planning stage, however, a contract award is anticipated for 2021 with an anticipated completion in 2023 (Landry 2019a).	No	No
HSDRRS (BA-158): New Orleans to Venice Mitigation - Plaquemines Non-Federal	Plaquemines	This project will provide BLH wet/dry, swamp, freshwater marsh, and brackish marsh habitat restoration as part of environmental mitigation for impacts incurred as a result of the construction of New Orleans to Vencie Mitigation - Plaquemines Non-Federal levee components. It being led by USACE and is 100% federally funded.^ If the remaining components are selected for construction, construction is anticipated to begin in 2021 with anticipated completion by 2023 (Landry 2019a).	No	No
HSDRRS (BA-159): New Orleans to Venice Mitigation - Federal	Plaquemines	This project will provide BLH wet/dry, intermediate marsh, freshwater marsh, brackish marsh, and saline marsh habitat as part of environmental mitigation for impacts incurred as a result of the construction of New Orleans to Vencie Mitigation - Federal. It being led by USACE and is 100% federally funded.^ If the remaining components are selected for construction, construction is anticipated to begin in 2021 with anticipated completion by 2023 (Landry 2019a).	No	No
HSDRRS: HSDRRS Mitigation LPV Bayou Sauvage Floodside Brackish Marsh	Orleans	This alternative consists of 302 acres of brackish marsh restoration that would be achieved by placing dredged material in open water to elevations conducive for wetland development, followed by planting of marsh vegetation. Features also include the temporary placement of sheet pile along Irish Bayou to contain dredged material and the construction and rehabilitation of rock dikes along the shoreline of Lake Pontchartrain. Construction began in May 2016 and is anticipated for completion in July 2019. (Erwin 2018b, USACE 2012c).	No	No
HSDRRS: HSDRRS Mitigation LPV Turtle Bayou Protected Side Intermediate Marsh	Orleans	This alternative consists of 155 acres of bottomland hardwood (wet) restoration that would be accomplished by placing fill material to elevation conducive to the successful establishment of planted native hardwood species. The 142 acres of intermediate marsh restoration would be achieved by placing dredged material in open water adjacent to the bottomland hardwood site to an elevation conducive for wetland development, followed by planting of wetland vegetation. Construction began in May 2016 and is anticipated for completion in July 2019. (Erwin 2018b;USACE 2012b).	No	No

Program	Parish	Description	Direct Overlap	Extended Boundary Overlap
HSDRRS: HSDRRS Mitigation LPV New Zydeco Ridge Protected Side Bottomland Hardwood Wet and Floodside Brackish Marsh	St. Tammany	The New Zydeco Ridge (NZR) restoration is located on the north shore of Lake Pontchartrain in the north east quadrant of the lake, northwest of U.S. Highway 90, and approximately 5 miles east of Slidell, Louisiana on the Big Branch National Wildlife Refuge. The approved NZR projects in SIER 1 consisted of creating approximately 159 acres of BLH-Wet habitat and 160 acres of intermediate/brackish marsh habitat. Design 1 expands the current design of the NZR Brackish Marsh restoration project by approximately 60 acres, making the total acreage for that project approximately 220 acres; it moves the approved NZR BLH-Wet footprint northward. Design 2 maintains the alignment of the NZR BLH-Wet and Brackish Marsh layouts approved in SIER 1 and adds a 60 acre brackish marsh cell to the north of the BLH-Wet footprint. Construction began in November 2016 and is anticipated for completion in June 2020 (Erwin 2018b, USACE 2016a).	No	No
HSDRRS: HSDRRS Mitigation WBV JLNHPP Park Yankee Pond and Geocrib Floodside Fresh Marsh Restoration	Jefferson	Approximately 115 acres of fresh marsh would be restored by filling Yankee Pond with material dredged from Lake Cataouatche. A rock dike with fish dips would be built on the eastern perimeter to separate the marsh from Bayou Segnette. Additionally, 50 acres of marsh would be restored by grading an existing dredge material disposal site to achieve target marsh elevations and completing a rock dike with fish dips adjacent to Lake Salvador. This project assumes natural recruitment and no planting would be required at either site to establish marsh vegetation. Supplemental planting would only occur if the initial vegetation success criteria are not achieved (USACE 2012e). Approximately 20 acres of fresh marsh would be restored by filling a canal immediately abutting Yankee Pond in the northern part of Jean Lafitte National Park. The canal would be filled in with dredged material from Lake Cataouatche. This project assumes that natural recruitment would occur and no planting would be required to establish marsh vegetation. Supplemental planting would only occur if the initial vegetation success criteria are not achieved. (USACE 2012f). Construction began in 2017 and is anticipated for completion in 2019 (Behrens 2019b).	No	No
HSDRRS: HSDRRS Mitigation WBV Avondale Protected Side BLH-Dry Restoration		Approximately 920 acres of predominantly invasive and nuisance species would be eradicated and the area planted with native, high quality tree and shrub species. This project would involve enhancing an existing degraded BLH habitat as mitigation for general protected side BLH-Dry impacts incurred through construction of HSDRSS WBV (USACE 2016b). Construction began in 2016 and is anticipated for completion in 2020 (Behrens 2019a).	No	No
HSDRRS: Previously Authorized Mitigation WBV	Jefferson; St. Charles	Mitigation for Pre-Katrina West Bank and Vicinity Hurricane Protection project impacts by land acquisition, preservation, and management of lands along the St. Charles Parish ridge and adjacent to Bayou Segnette State Park. This mitigation is partially completed. The Bayou Segnette mitigation construction was awarded in September 2014 and was completed in 2018. St. Charles land acquisition was completed in December 2017 and is awaiting readjustment of the mitigation plan to move forward into construction (Behrens 2019a).	No	No
LWCRPA (PO-142): Hydrologic Restoration of the Amite River Diversion Canal	Livingston	The purpose of this project was to reestablish hydrologic connectivity between the Maurepas Swamps and natural water bodies, plant vegetation in highly degraded swamp habitat. ^@	No	No
NRDA (BA-76 aka BA-142): Cheniere Ronquille Barrier Island Restoration	Plaquemines	The project goal is to maintain shoreline integrity and create and restore saline marsh on Chenier Ronquille.^@	No	No
RESTORE (BA-197): West Grand Terre Beach Nourishment and Stabilization	Jefferson	The project involvest the construction of beach and dune, restoration of back barrier marsh, and construction of a rock revetment to protect restored marsh. ^@	No	No
SMP 2017: 000.BH.00 Barrier Island Program	Plaquemines; Jefferson; Lafourche; Terrebonne	Barrier islands and headlands will be addressed through CPRA's Barrier Island Program.#	No	No
SMP 2017: 001.DI.02 Lower Breton Diversion (BS-23)	Plaquemines	Sediment diversion of 50,000 cfs into Lower Breton Sound to build and maintain land.#	Yes	Yes
SMP 2017: 001.DI.100 Manchac Landbridge Diversion	St. Charles; St. John the Baptist	A structure in the existing western spillway guide levee to divert 2,000 cfs thereby increasing freshwater exchange with adjacent wetlands.#	No	No

Program	Parish	Description	Direct Overlap	Extended Boundary Overlap
SMP 2017: 001.DI.101 Ama Sediment Diversion	St. Charles	Sediment diversion into Upper Barataria near Ama to provide sediment for emergent marsh creation and freshwater to sustain existing wetlands, 50,000 cfs capacity.#	Yes	Yes
SMP 2017: 001.DI.102 Union Freshwater Diversion	Ascension	Diversion into West Maurepas swamp near Burnside to provide sediment for emergent marsh creation and freshwater and fine sediment to sustain existing wetlands, 25,000 cfs capacity.#	No	No
SMP 2017: 001.DI.104 Mid-Breton Sound Diversion	Plaquemines	Sediment diversion into Mid-Breton Sound in the vicinity of White's Ditch to build and maintain land, 35,000 cfs capacity.#	No	No
SMP 2017: 001.DI.18 Central Wetlands Diversion	St. Bernard	Diversion into Central Wetlands near Violet to provide sediment for emergent marsh creation and freshwater to sustain existing wetlands, 5,000 cfs capacity.#	No	No
SMP 2017: 001.DI.21 East Maurepas Diversion	St. John	Diversion into East Maurepas near Angelina to provide sediment for emergent marsh creation and freshwater to sustain existing wetlands, 2,000 cfs capacity.#	No	No
SMP 2017: 001.HR.100 LaBranche Hydrologic Restoration	St. Charles	Construction of a 750 cfs hybrid pump-siphon structure, intake structure, and an approximately 1 mile long conveyance system to LaBranche wetlands via the Mississippi River to restore the historically fresh to intermediate marshes. Features also include a conveyance channel roadway and railroad crossings.#	No	No
SMP 2017: 001.MC.05 New Orleans East Landbridge Restoration	Orleans; St. Tammany	Marsh creation in the New Orleans East Landbridge to create new wetland habitat and restore degraded marsh.#	No	Yes
SMP 2017: 001.MC.06a Breton Marsh Creation - Component A	St. Bernard	Marsh creation in the Breton Marsh east of Delacroix Island to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.07a Lake Borgne Marsh Creation - Component A	St. Bernard	Marsh creation along the south shoreline of Lake Borgne near Proctors Point to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.08a Central Wetlands Marsh Creation - Component A	Orleans; St. Bernard	Marsh creation in Central Wetlands near Bayou Bienvenue to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.101 Uhlan Bay Marsh Creation	Plaquemines	Marsh creation on the east bank of Plaquemines Parish around Uhlan Bay to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.102 Pointe a la Hache Marsh Creation	Plaquemines	Marsh creation on the east bank of Plaquemines Parish near Pointe a la Hache to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.104 East Bank Land Bridge Marsh Creation	Plaquemines	Marsh creation in Plaquemines Parish between Grand Lake and Lake Lery to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.105 Spanish Lake Marsh Creation	Plaquemines	Marsh creation in Plaquemines Parish along the eastern shore of Spanish Lake to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.106 St. Tammany Marsh Creation	St. Tammany	Marsh creation in St. Tammany Parish along the northern shore of Lake Pontchartrain to create new wetland habitat and restore degraded marsh.#	Yes	Yes
SMP 2017: 001.MC.107 Tiger Ridge/Maple Knoll Marsh Creation	Plaquemines	Marsh creation in Plaquemines Parish near Tiger Ridge to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.108 Guste Island Marsh Creation	St. Tammany	Marsh creation in St. Tammany Parish along the northwest Lake Pontchartrain shoreline to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.MC.13 Golden Triangle Marsh Creation	Orleans; St. Bernard	Marsh creation in Golden Triangle Marsh between the MRGO and GIWW to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 001.RC.01 Bayou LaLoutre Ridge Restoration	St. Bernard	Restoration of historic ridge to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Bayou LaLoutre.#	No	No
SMP 2017: 001.RC.100 Bayou Terre aux Boeufs Ridge Restoration	St. Bernard	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Bayou Terre aux Boeufs.#	No	No
SMP 2017: 001.RC.103 Carlisle Ridge Restoration	Plaquemines	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation near Carlisle.	No	No

Program	Parish	Description	Direct Overlap	Extended Boundary Overlap
SMP 2017: 001.SP.01 Manchac Landbridge Shoreline Protection	Tangipahoa	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the west side of Lake Pontchartrain north of Pass Manchac near Stinking Bayou to preserve shoreline integrity and reduce wetland degradation.#	No	No
SMP 2017: 001.SP.101 Unknown Pass to Rigolets Shoreline Protection	Orleans	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the east side of the New Orleans Landbridge from Unknown Pass to the Rigolets to preserve shoreline integrity and reduce wetland degradation.#	No	No
SMP 2017: 001.SP.104 LaBranche Wetlands Shoreline Protection	St. Charles	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the southern shore of Lake Pontchartrain near the LaBranche wetlands to preserve shoreline integrity and reduce wetland degradation.#	No	No
SMP 2017: 002.DI.102 Mid-Barataria Diversion	Plaquemines	Sediment diversion into Mid-Barataria near Myrtle Grove to build and maintain land, 75,000 cfs capacity.#	Yes	Yes
SMP 2017: 002.MC.04a Lower Barataria Marsh Creation - Component A	Jefferson	Marsh creation in Jefferson Parish on the east shore of Little Lake and Turtle Bay to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 002.MC.05e Large-Scale Barataria Marsh Creation - Component E	Plaquemines; Jefferson	Marsh creation in the Barataria Basin south of the Pen to the Barataria Landbridge to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 002.RC.02 Spanish Pass Ridge Restoration	Plaquemines	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation west of Venice along the banks of Spanish Pass.#	No	No
SMP 2017: 002.RC.100 Red Pass Ridge Restoration	Plaquemines	Historic ridge restoration in southwest of Venice to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along the banks of Red Pass.#	No	No
SMP 2017: 002.RC.101 Adams Bay Ridge Restoration	Plaquemines	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Adams Bay.#	No	No
SMP 2017:002.RC.102 Bayou Eau Noire Ridge Restoration	Plaquemines	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Bayou Eau Noire.#	No	No
SMP 2017: 002.RC.103 Grand Bayou Ridge Restoration	Plaquemines	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Grand Bayou. #	Yes	Yes
SMP 2017: 002.SP.100 Lake Hermitage Shoreline Protection	Plaquemines	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 around the southern shore of Lake Hermitage to preserve shoreline integrity and reduce wetland degradation from wave erosion.#	No	No
SMP 2017: 002.SP.102 East Snail Bay Shoreline Protection	Lafourche	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the northeastern shore of Snail Bay south of Little Lake to preserve shoreline integrity and reduce wetland degradation from wave.#	No	No
SMP 2017: 002.SP.103 West Snail Bay Shoreline Protection	Lafourche	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the western shoreline of Snail Bay south of Little Lake to preserve shoreline integrity and reduce wetland degradation from wave.#	No	No
SMP 2017: 002.SP.106 Bayou Perot Shoreline Protection	Lafourche	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the western shore of Bayou Perot to preserve shoreline integrity and reduce wetland degradation from wave erosion.#	No	No
SMP 2017: 03a.DI.01 Bayou Lafourche Diversion	Ascension; Assumption; Lafourche	Diversion of the Mississippi River into Bayou Lafourche to increase freshwater flow down Bayou Lafourche with 1,000 cfs capacity.#	No	No
SMP 2017: 03a.DI.05 Atchafalaya River Diversion	Terrebonne	Sediment diversion off the Atchafalaya River to benefit the Penchant Basin and southwest Terrebonne marshes with 30,000 cfs capacity.#	No	No
SMP 2017: 03a.HR.02 Central Terrebonne Hydrologic Restoration	Terrebonne	Construction of a rock plug in Grand Pass with a 150- foot by 15-foot navigable section to prevent saltwater intrusion from Caillou Lake into Lake Mechant.#	No	No
SMP 2017: 03a.HR.100 Grand Bayou Hydrologic Restoration	Lafourche	Dredging of Margaret's Bayou and Grand Bayou in conjunction with the construction of a fixed crest structure at Grand Bayou and the installation of (5) 48-inch flap-gated culverts on the western bank of Grand Bayou.#	No	No

Program	Parish	Description	Direct Overlap	Extended Boundary Overlap
SMP 2017: 03a.MC.03p Terrebonne Bay Rim Marsh Creation Study	Lafourche; Terrebonne	Planning, engineering, and design of marsh creation features to provide benefits to communities in Terrebonne Parish and the Morganza to the Gulf protection system.#	No	No
SMP 2017: 03a.MC.07 Belle Pass-Golden Meadow Marsh Creation	Lafourche	Marsh creation from Belle Pass to Golden Meadow to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 03a.MC.09b North Terrebonne Bay Marsh Creation - Component B	Terrebonne	Marsh creation south of Montegut between Bayou St. Jean Charles and Bayou Pointe Aux Chenes to create new wetland habitat and restore degraded marsh.	No	No
SMP 2017: 03a.MC.100 South Terrebonne Marsh Creation	Terrebonne	Marsh creation south of Dulac between Bayou Dularge and Houma Navigation Canal to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 03a.MC.101 North Lake Mechant Marsh Creation	Terrebonne	Marsh creation between Lake Decade and Lake Mechant to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 03a.RC.02 Bayou Dularge Ridge Restoration	Terrebonne	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along Bayou Dularge.#	No	No
SMP 2017: 03a.RC.04 Mauvais Bois Ridge Restoration	Terrebonne	Historic ridge restoration to an elevation of 5 feet NAVD88 at Mauvais Bois to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation.#	No	No
SMP 2017: 03a.RC.05 Bayou Terrebonne Ridge Restoration	Terrebonne	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along the southern portions of Bayou Terrebonne.#	No	No
SMP 2017: 03a.RC.06 Bayou Pointe Aux Chenes Ridge Restoration	Terrebonne	Historic ridge restoration to an elevation of 5 feet NAVD88 to provide coastal upland habitat, restore natural hydrology, and provide wave and storm surge attenuation along the southern portions of Bayou Pointe Aux Chenes.#	No	No
SMP 2017: 03a.SP.100 North Lake Boudreaux Shoreline Protection	Terrebonne	Shoreline protection through rock breakwaters designed to an elevation of 3.5 feet NAVD88 along the northern shore of Lake Boudreaux east of Hog Point to preserve shoreline integrity and reduce wetland degradation#	No	No
SMP 2017: 03b.DI.04 Increase Atchafalaya Flow to Terrebonne	Assumption; St. Mary; Terrebonne	Dredging of the Gulf Intracoastal Waterway (GIWW) and construction of a bypass structure at the Bayou Boeuf Lock from the Atchafalaya River to Terrebonne marshes with 20,000 cfs capacity.#	No	No
SMP 2017: 03b.MC.09 Point Au Fer Island Marsh Creation	Terrebonne	Marsh creation on Point Au Fer Island to create new wetland habitat and restore degraded marsh.#	No	No
SMP 2017: 03b.SP.06a Vermilion Bay and West Cote Blanche Bay Shoreline Protection (Critical Areas)	Vermilion; Iberia	Shoreline protection through rock breakwaters of critical areas on the east shoreline of Vermilion Bay to preserve shoreline integrity and reduce wetland degradation from wave erosion.#	No	No

(^Data source is CPRA 2018; @Data source is CPRA 2017a; #Data source is CPRA 2017d)

Table B-3: Common Wildlife Species Found in the Terrebonne Basin

Common Name	Scientific Name
American alligator	<i>Alligator mississippiensis</i>
American beaver	<i>Castor canadensis</i>
American coot	<i>Fulica americana</i>
American crow	<i>Corvus brachyrhynchos</i>
American eel	<i>Anguilla rostrata</i>
American kestrel	<i>Falco sparverius</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
American widgeon	<i>Anas americana</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Banded water snake	<i>Nerodia fasciata</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Black skimmer	<i>Rynchops niger</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-winged teal	<i>Anas discors</i>
Boat-tailed grackle	<i>Quiscalus major</i>
Bobcat	<i>Lynx rufus</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Bronze frog	<i>Rana clamitans</i>
Brown pelican	<i>Pelecanus occidentalis</i>
Bufflehead	<i>Bucephala albeola</i>
Bullfrog	<i>Rana catesbeiana</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cattle egret	<i>Bubulcus ibis</i>
Clapper rail	<i>Rallus longirostris</i>
Common grackle	<i>Quiscalus quiscula</i>
Common moorhen	<i>Gallinula chloropus</i>
Common snapping turtle	<i>Chelydra serpentina</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Coyote	<i>Canis latrans</i>
Diamondback terrapin	<i>Malaclemys terrapin</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Eastern pipistrelle	<i>Pipistrellus subflavus</i>
Eastern cottontail rabbit	<i>Sylvilagus floridanus</i>
Eastern wood-pewee	<i>Contopus virens</i>
Evening bat	<i>Nycticeius humeralis</i>
Feral hog	<i>Sus scrofa</i>
Forster's tern	<i>Sterna forsteri</i>
Fox squirrel	<i>Sciurus niger</i>
Fulvous harvest mouse	<i>Reithrodontomys fulvescens</i>
Gadwall	<i>Anas strepera</i>

Glossy ibis	<i>Plegadis falcinellus</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Great blue heron	<i>Ardea Herodias</i>
Great egret	<i>Casmerodius albus</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Great horned owl	<i>Bubo virginianus</i>
Grebe	<i>Podilymbus sp.</i>
Green anole	<i>Anolis carolinensis</i>
Green-backed heron	<i>Butorides striatus</i>
Green sea turtle	<i>Chelonia mydas</i>
Green treefrogs	<i>Hyla cinerea</i>
Green-winged teal,	<i>Anas crecca</i>
Ground skink	<i>Scincella lateralis</i>
Gulf coast toad	<i>Bufo valliceps</i>
Gull-billed tern	<i>Sterna nilotica</i>
Herring gull	<i>Larus argentatus</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Hooked Mussel	<i>Ischadium recurvum</i>
House mouse	<i>Mus musculus</i>
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>
Killdeer	<i>Chardrius vociferous</i>
Lane snapper	<i>Lutjanus synagris</i>
Laughing gull	<i>Larus atricilla</i>
Lesser scaup	<i>Aythya affinis</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Loggerhead sea turtle	<i>Caretta caretta</i>
Longnose gar	<i>Lepisosteus osseus</i>
Lesser Scaup	<i>Aythya affinis</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh rice rat	<i>Oryzomys palustris</i>
Marsh wren	<i>Cistothorus palustris</i>
Mink	<i>Mustela vison</i>
Mottled duck	<i>Anas fulvigula</i>
Mourning Dove	<i>Zenaida macroura</i>
Muskrat	<i>Ondatra zibethicus</i>
Nine-banded armadillo	<i>Dasypus novemcinctus</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Northern pintail	<i>Anas acuta</i>
Northern raccoon	<i>Procyon lotor</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern yellow bat	<i>Lasiurus intermedius</i>
Norway rat	<i>Rattus norvegicus</i>
Nutria	<i>Myocastor coypus</i>

Olivaceous cormorant	<i>Phalacrocorax brasilianus</i>
Opposum	<i>Didelphis virginiana</i>
Pig frog	<i>Rana grylio</i>
Rafinesque's big-eared bat	<i>Plecotus rafinesquii</i>
Red bat	<i>Lasiurus borealis</i>
Red-breasted merganser	<i>Mergus serrator</i>
Red-eared slider	<i>Trachemys scripta</i>
River otter	<i>Lutra canadensis</i>
Red fox	<i>Vulpes vulpes</i>
Redhead	<i>Aythya americana</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ring-billed gull	<i>Larus delawarensis</i>
Ring-necked duck	<i>Aythya collaris</i>
Roof rat	<i>Rattus rattus</i>
Seaside sparrow	<i>Ammodramus maritimus</i>
Snowy egret	<i>Egretta thula</i>
Southern leopard frog	<i>Rana sphenoccephala</i>
Squirrel treefrogs	<i>Hyla squirella</i>
Stinkpot	<i>Sternotherus odoratus</i>
Striped skunk	<i>Mephitis mephitis</i>
Swamp rabbit	<i>Sylvilagus aquaticus</i>
Tricolored heron	<i>Egretta tricolor</i>
West Indian manatee	<i>Trichechus manatus</i>
Western cottonmouth	<i>Agkistrodon piscivorus</i>
White-eyed vireo	<i>Vireo griseus</i>
White-faced ibis	<i>Plegadis chihi</i>
White-footed mouse	<i>Peromyscus leucopus</i>
White ibis	<i>Eudocimus albus</i>
White-tail deer	<i>Odocoileus virginianus</i>
Willet	<i>Tringa semipalmata</i>
Wood duck	<i>Aix sponsa</i>
Yellow-crowned night-heron	<i>Nycticorax violaceus</i>

Table B-3: Fish and Aquatic Species Found in the Terrebonne Basin

Common Name	Scientific Name
Atlantic croaker	<i>Micropogonias undulatus</i>
American oyster	<i>Crassostrea virginica</i>
Asiatic clam	<i>Corbicula fluminea</i>
bay anchovy	<i>Anchoa mitchilli</i>
bighead carp	<i>Hypophthalmichthys nobilis</i>
black crappie	<i>Pomoxis nigromaculatus</i>
black drum	<i>Pogonias cromis</i>
blue crab	<i>Callinectes sapidus</i>
blue catfish	<i>Ictalurus furcatus</i>
bluegill	<i>Lepomis macrochirus</i>
bowfin	<i>Amia calva</i>
brown shrimp	<i>Farfantepenaeus aztecus</i>
smallmouth bass	<i>Micropterus dolomieu</i>
smallmouth buffalo	<i>Ictiobus bubalus</i>
channel catfish	<i>Ictalurus punctatus</i>
common carp	<i>Cyprinus carpio</i>
crawfish	<i>Procambarus sp.</i>
flathead catfish	<i>Pylodictis olivaris</i>
freshwater drum	<i>Aplodinotus grunniens</i>
gizzard shad	<i>Dorosoma cepedianum</i>
grass carp	<i>Ctenopharyngodon idella</i>
grass shrimp	<i>Palaemonetes pugio</i>
gray snapper	<i>Lutjanus griseus</i>
Gulf menhaden	<i>Brevoortia patronus</i>
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>
hardhead catfish	<i>Ariopsis felis</i>
inland silverside	<i>Menidia beryllina</i>
lane snapper	<i>Lutjanus synagris</i>
largemouth bass	<i>Micropterus salmoides</i>
least killifish	<i>Heterandria formosa</i>
longnose gar	<i>Lepisosteus osseus</i>
mosquitofish	<i>Gambusia affinis</i>
mud crab	<i>Eurypanopeus depressus</i>
mysid shrimp	<i>Mysidopsis bahia</i>
paddlefish	<i>Polyodon spathula</i>
pallid sturgeon	<i>Scaphirhynchus albus</i>
pink shrimp	<i>Farfantepenaeus duorarum</i>
rainwater killifish	<i>Lucania parva</i>
reardear sunfish	<i>Lepomis microlophus</i>
redfish/ red drum	<i>Sciaenops ocellatus</i>
ribbed mussel	<i>Geukensia demissa</i>
Rio Grande cichlid	<i>Cichlasoma cyanoguttatum</i>
roughneck shrimp	<i>Trachypenaeus constrictis</i>
saltwater topminnow	<i>Fundulus jenkinsi</i>
sand seatrout	<i>Cynoscion arenarius</i>
sailfin molly	<i>Poecilia latipinna</i>
sheepshead	<i>Archosargus probatocephalus</i>
sheepshead minnow	<i>Cyprinodon variegatus</i>

shortnose gar	<i>Lepisosteus platostomus</i>
shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>
southern flounder	<i>Paralichthys lethostigma</i>
southern kingfish	<i>Menticirrhus americanus</i>
Spanish mackerel	<i>Scomberomorus maculatus</i>
spot	<i>Leiostomus xanthurus</i>
spotted gar	<i>Lepisosteus oculatus</i>
spotted seatrout	<i>Cynoscion nebulosus</i>
striped mullet	<i>Mugil cephalus</i>
warmouth	<i>Lepomis gulosus</i>
white crappie	<i>Pomoxis annularis</i>
white shrimp	<i>Litopenaeus setiferus</i>
yellow bass	<i>Morone mississippiensis</i>
yellow bullhead	<i>Ameiurus natalis</i>
zebra mussel	<i>Dreissena polymorpha</i>
silver carp	<i>Hypophthalmichthys molitrix</i>

Table B-4a. Louisiana's 2020 Section 303(d) List for subsegments within the study area.

Subsegment Number	Subsegment Description	Water Body Type	Size (mi)	PCR	SCR	FWP	OYS	Impaired Use for Suspected Cause	Suspected Causes of Impairment	Suspected Sources of Impairment
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	FWP	DISSOLVED OXYGEN	INTRODUCTION OF NON-NATIVE ORGANISMS (ACCIDENTAL OR INTENTIONAL)
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	FWP	DISSOLVED OXYGEN	MARINA/BOATING SANITARY ON-VESSEL DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	FWP	DISSOLVED OXYGEN	MUNICIPAL POINT SOURCE DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	FWP	DISSOLVED OXYGEN	SYSTEMS (SEPTIC SYSTEMS AND SIMILAR DECENTRALIZED SYSTEMS)
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	FWP	DISSOLVED OXYGEN	PACKAGE PLANT OR OTHER PERMITTED SMALL FLOWS DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	PCR	ENTERO-COCCUS	MARINA/BOATING SANITARY ON-VESSEL DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	PCR	ENTERO-COCCUS	MUNICIPAL POINT SOURCE DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	PCR	ENTERO-COCCUS	SYSTEMS (SEPTIC SYSTEMS AND SIMILAR DECENTRALIZED SYSTEMS)
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	PCR	ENTERO-COCCUS	PACKAGE PLANT OR OTHER PERMITTED SMALL FLOWS DISCHARGES
LA120602_00	Bayou Terrebonne-From Company Canal to Humble Canal (Estuarine)	River	9.5	N	F	N	N	PCR	ENTERO-COCCUS	SILVICULTURE HARVESTING
LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	OYS	FECAL COLIFORM	INTRODUCTION OF NON-NATIVE ORGANISMS (ACCIDENTAL OR INTENTIONAL)
LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	OYS	FECAL COLIFORM	MARINA/BOATING SANITARY ON-VESSEL DISCHARGES
LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	OYS	FECAL COLIFORM	SEWAGE DISCHARGES IN UNSEWERED AREAS
LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	PCR	ENTERO-COCCUS	MARINA/BOATING SANITARY ON-VESSEL DISCHARGES

LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	PCR	ENTERO-COCCUS	SEWAGE DISCHARGES IN UNSEWERED AREAS
LA120704_00	Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)	River	14.8	N	F	F	N	PCR	ENTERO-COCCUS	SILVICULTURE HARVESTING

Note: PCR = Primary Contact Recreation (swimming), SCR = Secondary Contact Recreation (boating), FWP = Fish and Wildlife Propagation (fishing), OYS = Oyster Propagation, F = Fully supporting designated use, N = Not supporting designated use.

Table B-4b. Subsegment 120704 designated use support

Year	Designated Use Support			
	PCR	SCR	FWP	OYS
2012	Full	Full	Not	Not
2014	Not	Full	Full	Not
2016	Not	Full	Full	Not
2018	Not	Full	Full	Not
2020	Not	Full	Full	Not

Table B-4c

Causes and sources of impairment for subsegment 120704 - Bayou Terrebonne-From Humble Canal to Lake Barre (Estuarine)						
Year	Designated Use					
	PCR		FWP		OYS	
	Causes	Sources	Causes	Sources	Causes	Sources
2012			Fishing Advisory - No Restriction	Accidental Release/Spill	Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas
			Foam/Flocs/Scum/Oil Slicks Other	Accidental Release/Spill Accidental Release/Spill	Fishing Advisory - No Restriction Foam/Floac/Scum/Oil Slicks Other	Accidental Release/Spill Accidental Release/Spill Accidental Release/Spill
2014	Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas			Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas
2016	Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas			Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas
2018	Enterococcus	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas			Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas
2020	Enterococcus	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas			Fecal Coliform	Marina/Boating Sanitary On-Vessel Discharges Sewage Discharges In Unsewered Areas

Table B-4d Water Quality Summary for LDEQ monitoring stations 0349 and 3001 (located approximately 3.5 miles from the project area)
 *Note: highlighted cells exceed criteria for the parameter.

Group	Parameter	Units	0349								3001								LDEQ						EPA					
			n	Avg	St Dev	5th	25th	Median	75th	95th	n	Avg	St Dev	5th	25th	Median	75th	95th	Freshwater ¹		Estuarine		Marine		0349	3001	Freshwater		Marine	
			Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic			Acute	Chronic		
Field Parameters	Dissolved Oxygen	mg/L	51	6.0	2.3	2.0	4.6	5.9	7.8	9.8	23	7.5	2.0	4.8	6.1	7.2	8.9	10.4	5.0		4.0		5.0				30 day mean of 5.5 mg/L; 7 day mean of 6 mg/L (early life stages); 7 day mean minimum of 4 mg/L; 1 day minimum of 5 mg/L (early life stages)			
	Dissolved Oxygen Percent Saturation	%	51	66	20	26	59	70	79	94	23	89	16	65	79	87	97	112												
	pH	SU	51	7.3	0.3	6.7	7.1	7.4	7.5	7.8	23	7.8	0.3	7.2	7.6	7.9	7.9	8.1			6-9						6.5 - 9	6.5 - 8.5		
	Salinity	ppt	51	1.0	1.8	0.1	0.1	0.2	0.9	4.6	23	7.9	4.1	0.7	5.4	8.3	10.1	14.5												
	Specific Conductance	µmhos/cm	51	1,792	3,106	225	304	425	1,367	8,217	23	13,432	6,765	1,324	9,631	14,354	17,283	23,986												
	Water Temperature	°F	51	72	13	51	62	76	84	88	23	73	11.1	53	63	76	81	86	90		95		95				See EPA Gold Book ²			
Laboratory General Parameters	Alkalinity	mg/L	51	88	21	63	73	84	101	136	24	103	21	76	85	104	113	144									20,000			
	Chloride (As Cl)	mg/L	50	453	920	21	33	76	383	1,812	24	3,860	2,404	276	1,685	4,350	5,698	7,518	Average plus three standard deviations					3,214	11,072	860,000	230,000			
	Hardness (As CaCO3)	mg/L	51	330	468	78	97	136	320	980	24	1,483	815	177	755	1,610	1,945	2,758												
	Total Dissolved Solids	mg/L	50	1,062	1,842	137	226	304	854	4,951	24	8,400	4,370	825	6,203	8,830	10,950	14,845	Average plus three standard deviations				6,589	21,511	Criteria corresponds to the appropriate background value plus ten percent					
	Total Suspended Solids	mg/L	48	23	21	6	10	15	31	51	24	27	28	12	17	20	25	43								Criteria corresponds to the appropriate background value plus ten percent				
	Turbidity	NTU	48	23	14	7	12	19	31	46	24	15	13	6	8	11	18	21	Criteria corresponds to the appropriate background value plus ten percent								17.5			
Major ions	Calcium	µg/L	12	26,617	8,523	17,075	20,400	25,500	29,800	40,790																				
	Fluoride	mg/L	12	0.16	0.05	0.11	0.14	0.15	0.18	0.26																				
	Potassium	µg/L	12	6,480	5,089	3,206	3,833	4,160	6,655	15,375																				
	Sodium	µg/L	12	110,092	129,769	19,340	38,125	55,950	115,225	342,900																				
	Silicon Oxide	mg/L	12	6.5	2.0	4.1	4.8	6.4	7.4	9.5																				
	Sulfate	mg/L	50	74	107	11	23	35	57	277	24	852	1,537	69	366	580	776	990	Average plus three standard deviations				394	5,463						
Metals	Arsenic	µg/L	4	1.8	0.7	1.1	1.4	1.6	2.0	2.7									339.8	150	69	36	69	36			340	150	69	36
	Cadmium	µg/L	3	0.021	0.007	0.014	0.018	0.022	0.026	0.028									77.43	2.49	Minimum of freshwater and marine criteria		45.35	10			2	0.25	40	8.8
	Copper	µg/L	4	1.7	0.2	1.5	1.7	1.8	1.8	1.9									56.80	34.10	Minimum of freshwater and marine criteria		3.63	3.63				9	4.8	3.1
	Iron	µg/L	12	308	250	94	119	261	379	726																				
	Lead	µg/L	3	0.053	0.040	0.019	0.025	0.033	0.071	0.101									38.63	5.22	Minimum of freshwater and marine criteria		209	8.8			65	2.5	210	8.1
	Magnesium	µg/L	12	18,206	16,674	7,368	8,945	11,300	18,850	47,275																				
	Manganese	µg/L	10	40	28	17	22	30	44	89																				
	Nickel	µg/L	4	0.9	0.4	0.5	0.7	0.9	1.1	1.4									3,889	432	Minimum of freshwater and marine criteria		74	8.2			470	52	74	8.2
Nutrients	Zinc	µg/L	4	3.4	2.2	1.2	2.0	2.8	4.2	6.3									315	288	Minimum of freshwater and marine criteria		90	81			120	120	90	81
	Ammonia Nitrogen	mg/L	34	0.21	0.09	0.12	0.14	0.19	0.26	0.37	13	0.18	0.08	0.11	0.13	0.15	0.20	0.31									17	1.9	5	0.75
	Nitrate+Nitrite Nitrogen	mg/L	42	0.4	0.2	0.1	0.2	0.3	0.4	0.7	8	0.3	0.1	0.1	0.1	0.3	0.3	0.5									0.76 (total nitrogen [nitrate/nitrite plus Kjeldahl nitrogen])			
	Nitrogen, Kjeldahl	mg/L	45	1.0	0.4	0.6	0.8	1.0	1.2	1.7	23	1.2	0.4	0.6	0.9	1.2	1.3	1.7												
	Phosphorus (As P)	mg/L	45	0.2	0.3	0.1	0.1	0.2	0.2	0.4	22	0.2	0.1	0.1	0.1	0.2	0.3	0.4									128			
Organic Contaminants	Bromomethane	µg/L	1	2.3	0.0	2.3	2.3	2.3	2.3	2.3																				
	Chloromethane	µg/L	3	4.0	2.5	1.5	2.3	3.3	5.4	7.0									55,000	27,500	27,000	13,500	27,000	13,500						
	Methylene Chloride	µg/L	1	0.5	0.0	0.5	0.5	0.5	0.5	0.5									19,300	9,650	25,600	12,800	19,300	9,650						
	Toluene	µg/L	1	0.58	0.00	0.58	0.58	0.58	0.58	0.58									1,270	635	950	475	950	475						
Pathogens	Enterococci	COL/100ml	7	1,273	1,751	258	405	480	960	4,210	5	540	394	103	290	373	840	1,080	Mean less than 35 colonies/100 mL and no more than 10% above 130 colonies/100 mL											
	Fecal Coliform	COL/100ml	50	721	1,377	89	183	260	490	4,065	19	770	1,599	12	50	112	375	4,740	Primary contact recreation: no more than 25% of monthly samples above 400 colonies/100 mL. Secondary contact recreation: no more than 25% of monthly samples above 2,000 colonies/100 mL.											

¹Freshwater criteria for cadmium, copper, lead, nickel, and zinc are based on average hardness concentrations for LDEQ Site 0349

²EPA Gold Book (<https://www.epa.gov/wqc/quality-criteria-water-gold-book>)

Table B-5. Typical Noise Levels Associated with Common Activities

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation (Caltrans) 2013. Technical Noise Supplement to the Caltrans Traffic Noise Analysis Protocol. Pg 2-20.

Key: dBA = A-weighted decibels

**APPENDIX C: Project Information Sheet for Wetland Value
Assessment (US Fish and Wildlife)**



MEMORANDUM

DATE: May 18, 2021

TO: U.S. Army Corps of Engineers (NOD)

FROM: U.S. Fish and Wildlife Service (Service)

SUBJECT: Project Information Sheet for the Wetland Value Assessment (WVA) for the proposed Humble Canal Preload Project – Fresh Marsh Impacts.

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees. The USACE-certified Coastal Marsh (Fresh-Intermediate WVA Model (version 2.0) was used for the marsh creation analysis. Target Years (TY) were set as follow: 0, 1, and 50.

Habitat Assessment Method

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index (SI) for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

Land Loss/ Sea Level Rise Effects

The project area is located northeast of Humble Canal and within the community of Montegut forced drainage area. The area was once tidal low-salinity marsh prior to being leveed and forced drained. Pumping and elimination of saltwater inputs has promoted conversion to a fresh marsh. The area is impounded and receives no tidal input. Results will remain constant for all sea level rise (SLR) scenarios.

Figure 1. Map of Preload footprint and fresh marsh impact areas.



Variable V₁ – Percent of Wetland area covered by emergent vegetation

Persistent emergent vegetation (i.e., emergent marsh) plays an important role in coastal wetlands by providing foraging, resting, and breeding habitat for a variety of fish and wildlife species; and by providing a source of detritus and energy for lower trophic organisms that form the basis of the food chain. An area with no emergent vegetation (i.e., shallow open water) is assumed to have minimal habitat suitability in terms of this variable, and is assigned an SI of 0.1. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0).

FWOP – due the impounded and forced drained conditions of the site, a land loss rate was not applied to the existing marsh. Emergent vegetation is expected to remain constant through all target years.

Table 1. FWOP % Emergent Vegetation by site and TY.

Site	TY0	TY1	TY50
Fresh	100	100	100

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₂ – Percent of open water covered by aquatic vegetation

FWOP- A site visit was conducted on April 22, 2021, no aquatic vegetation was observed. Conditions are expected to remain constant through all target years.

Table 3. FWOP % Submerged Aquatic Vegetation

Fresh	
	% SAV
TY0	0
TY1	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₃ – Marsh edge and interspersions

This variable takes into account the relative juxtaposition of marsh and open water for a given marsh:water ratio.

FWOP- Interspersion classes were determined utilizing aerial imagery and site data collected during the field trip. Based on imagery and field observations, the area is considered a “carpet marsh.”

Table 5. Interspersion Class and % Cover

Fresh		
	Class	%
TY0	3	100
TY1	3	100
TY50	3	100

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₄ – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

FWOP- Shallow water areas are assumed to be more biologically productive than deeper water due to a general reduction in sunlight, oxygen, and temperature as water depth increases. Field site visits were conducted on 22 April 2021. No shallow open was observed. Existing conditions are not expected to change.

Table 7. % SOW ≤ 1.5 feet

Fresh	
Water ≤ 1.5ft (%)	
TY0	0
TY1	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₅ – Salinity

The proposed site is currently impounded and receives no tidal input (0.05ppt was used to represent the lowest salinity).

Fresh Marsh

FWOP- Existing conditions are expected to remain static through all TYs.

TYs	Fresh
TY0	0.05 ppt
TY1	0.05 ppt
TY50	0.05 ppt

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

TYs	Fresh
TY0	0.00 ppt
TY1	0.00 ppt
TY50	0.00 ppt

Variable V₆ – Aquatic Organisms (% wetland accessible & type of access)

FWOP – The proposed site is currently leveed and under forced drainage. It is assumed that aquatic organisms have no access to the site.

Table 9. Aquatic Organism Access

Fresh	
Access	
TY0	0.00
TY1	0.00
TY50	0.00

FWP – The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Project Impacts

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact fresh marsh of 1.77 Average Annual Habitat Units (AAHUs). Results will remain constant for all SLR scenarios.

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (Low SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (Int. SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (High SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

Literature Cited

Coastal Protection and Restoration Authority of Louisiana. 2017. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Louisiana Office of Coastal Protection and Restoration. 2019. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. <http://cims.coastal.louisiana.gov>. Accessed March 2021.



MEMORANDUM

DATE: May 18, 2021

TO: U.S. Army Corps of Engineers (NOD)

FROM: U.S. Fish and Wildlife Service (Service)

SUBJECT: Project Information Sheet for the Wetland Value Assessment (WVA) for the proposed Humble Canal Preload Project- Brackish Marsh Impacts

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees. The USACE-certified Coastal Marsh (Brackish WVA Model (version 2.0) was used for the marsh creation analysis.

Habitat Assessment Method

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index (SI) for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

Land Loss/ Sea Level Rise Effects

Land loss rates estimated by the Service were adjusted to project the effects of the low, intermediate and high relative sea level rise (RSLR) scenario for these analyses. The land loss rate for the Wonder Lake-Terrebone Basin was used (-1.67% per year for the period 1985-2016) based on USGS data for the area. An average accretion rate of 6.70 mm/year was used for this site (SE Madison Bay). An estimated subsidence rate of 4.6 mm/yr was used in the Bayou Petit Caillou at Cocodrie (gauge 76305). Targets years (TY) were adjusted for each SLR scenario to represent the year when marsh acreage reaches zero.

Figure 1. Map of Preload footprint and brackish marsh impact areas.



Variable V₁ – Percent of Wetland area covered by emergent vegetation

Persistent emergent vegetation (i.e., emergent marsh) plays an important role in coastal wetlands by providing foraging, resting, and breeding habitat for a variety of fish and wildlife species; and by providing a source of detritus and energy for lower trophic organisms that form the basis of the food chain. An area with no emergent vegetation (i.e., shallow open water) is assumed to have minimal habitat suitability in terms of this variable and is assigned an SI of 0.1. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0).

FWOP – a predetermined land loss rate of -1.67% was applied to the existing marsh acreage for lifespan of the project. In each coastal marsh model, this variable is weighted the highest and thus influences project impacts the most (calculations were made using the MIMS 3.10 marsh model).

Table 1. FWOP % Emergent Vegetation by site, TY and SLR scenario.

Site (Brackish)	TY0	TY1	TY24	TY50
Low-SLR	67	64	0.00	0.00

Site (Brackish)	TY0	TY1	TY19	TY50
Int-SLR	62	59	0.00	0.00

Site (Brackish)	TY0	TY1	TY11	TY50
High-SLR	47	43	0.00	0.00

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₂ – Percent of open water covered by aquatic vegetation

FWOP A site visit was conducted on April 22, 2021, no aquatic vegetation was observed. Conditions are expected to remain constant through all target years and SLR scenarios.

Table 3. FWOP % Submerged Aquatic Vegetation

Brackish (all SLR scenarios)	
	% SAV
TY0	0
TY1	0
TY11	0
TY19	0
TY24	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₃ – Marsh edge and interspersions

This variable takes into account the relative juxtaposition of marsh and open water for a given marsh:water ratio.

FWOP- Interspersion classes were determined utilizing aerial imagery and site data collected during the field trip.

Table 5. Interspersion Class and % Cover

Brackish (Low-SLR)			Brackish (Int-SLR)		
Class		%	Class		%
TY0	1	63	TY0	1	55
	3	37		3	45
TY1	1	60	TY1	1	52
	3	40		3	48
TY24	5	100	TY19	5	100
TY50	5	100	TY50	5	100

Brackish (High-SLR)		
Class		%
TY0	1	38
	3	62
TY1	1	34
	3	66
TY11	5	100
TY50	5	100

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₄ – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

FWOP- Shallow water areas are assumed to be more biologically productive than deeper water due to a general reduction in sunlight, oxygen, and temperature as water depth increases. Field site visits were conducted on 22 April 2021. Existing conditions are expected to gradually degrade as sea level rise rates and marsh loss increases across the project area.

Table 7. % SOW ≤ 1.5 feet

Brackish (Low-SLR)		Brackish (Int-SLR)	
Water ≤ 1.5ft (%)		Water ≤ 1.5ft (%)	
TY0	100	TY0	100
TY1	100	TY1	100
TY24	0	TY19	0
TY50	0	TY50	0

Brackish (High-SLR)	
Water \leq 1.5ft (%)	
TY0	100
TY1	95
TY11	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₅ – Salinity

Brackish Marsh

An estimate for area salinity was calculated from data recorded at CRMS0385 and CRMS0315 (CRMS 2020) which are in the vicinity of the project area. An average of the two sites was used to account for seasonal freshwater input.

The mean salinity recorded at:

CRMS0385 was approximately 3.65 ppt.
CRMS0315 was approximately 8.72 ppt.
Average: 6.19 ppt

The FISS spreadsheet 1.0 was used to predict future salinity averages. It takes into account both the effects of local subsidence and SLR to the area. A third CRMS location (CRMS3296) was chosen to aid in these calculations. CRMS3296 is a more saline environment and represent future conditions if subsidence and SLR continue to increase.

The mean salinity recorded at:

CRMS3296 was approximately 12.67 ppt.

FWOP– With time, existing salinities are expected to gradually increase through the life of the project.

Salinity FWOP:

Brackish			
TYs	(Low-SLR)	(Int-SLR)	(High-SLR)
TY0	6.20 ppt	6.20 ppt	6.20 ppt
TY1	6.20 ppt	6.20 ppt	6.81 ppt
TY 11	-	-	7.17 ppt
TY19	-	7.17 ppt	-
TY24	7.17 ppt	-	-
TY50	7.26 ppt	7.28 ppt	7.32 ppt

Salinities will gradually increase.

FWP – The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₆ – Aquatic Organisms (% wetland accessible & type of access)

FWOP – The proposed preload site is not currently impounded or hydrologically controlled by any structures. However, there is limited access for aquatic organisms. Two bridge access points exist but may limit aquatic organism access and deter entrance therefore a structure rating of 0.5 (SI unit 0.5) was given to the site.

Table 9. Aquatic Organism Access

Brackish (all SLR scenarios)	
Access	
TY0	0.5
TY1	0.5
TY11	0.5
TY19	0.5
TY24	0.5
TY50	0.5

FWP – Following construction (TY1), aquatic organisms will have no access to the created preload platform.

PROJECT IMPACTS

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact to brackish marsh of 0.67 (Low SLR), 0.58 (Int. SLR) and 0.43 (High SLR) Average Annual Habitat Units (AAHUs).

Brackish Marsh- Low SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.52
B. Open Water Habitat Net AAHUs =	-1.06
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.67

Brackish Marsh- Int. SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.38
B. Open Water Habitat Net AAHUs =	-1.11
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.58

Brackish Marsh- High SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.14
B. Open Water Habitat Net AAHUs =	-1.17
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.43

Literature Cited

Coastal Protection and Restoration Authority of Louisiana. 2017. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Louisiana Office of Coastal Protection and Restoration. 2019. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. <http://cims.coastal.louisiana.gov>. Accessed March 2021.

Humble Canal Preload Project
Bottomland Hardwood Forest Impacts
Project Information Sheet
3-May 2021

Direct and Indirect Impacts: The red polygon in Figure 1 shows the portion of the preload footprint that would impact bottomland hardwood habitat (BLH), identified in the green polygon. In addition to direct impacts from construction activities, BLH and fresh-intermediate marsh would be indirectly impacted via impoundment between the preload site and the existing levee. The combined BLH impact direct and indirect impact zone is 0.48 acres (see Figure 1 green polygon).

With construction of the new levee and sector gate along Humble Canal, the old levee could be degraded to unimpound these wetlands. However, construction funding availability and scheduling are unknown. Rather than attempt to predict when unimpoundment might occur, it is assumed that the impounded wetlands (indirect impact) will be impacted concurrently with direct impacts from the constructed preload footprint.

Figure 1. Map of Preload footprint and BLH direct and indirect impact areas.



BLH Variable # 1: Tree Species Composition

Within an observation area approximately 0.10 acre, the following trees were observed on 22-Apr-2021.

Table 1. Observed trees and estimated diameter at breast height (dbh) . Seedlings not included.

Tree species	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)
Water oak	14								
Chinese tallow	14	5	4	3	3	4	5	3	10
Black willow	16	4	10						
Honey locust	6								

The canopy coverage was approximately 25%, midstory was 25%, and herbaceous cover 100%. A number of small black willow were observed in other portions of the area as were a number of very small water oak seedlings. Based on early aerial imagery of this BLH area, it appears that the woody vegetation has replaced what was previously tidal marsh, growing larger canopies as a result of forced drainage from the levee. Sugarberry and a few small live oaks were also observed beyond the 0.10 acre observation area. Given the presence of several water oak seedlings and live oaks nearby, it is assumed that hard mast producers will increase over time. Table 2 provides V1 values used in the wetland value assessment (WVA) for BLH.

Table 2. Variable 1 values used.

TY	FWOP	FWP
0	Class 1	Class 1
1	Class 1	Class 1
25	Class 1	Class 1
50	Class 2	Class 1

Variable 2: Stand Maturity

The in-growth spreadsheet was used to calculate diameter at breast height (dbh) change over time. Given the diversity of trees and the presence of slower growing varieties (compared to black willow and Chinese tallow), the dbh growth rate associated with the “cedar elm, winged elm, black tupelo, hickories, or sugarberry dominated stands” was selected for use in the in-growth spreadsheet. This spreadsheet’s mortality function was zeroed out. Instead, windthrow mortality is assumed to occur during tropical storms which would occur once every 8 years and would affect only trees ≥ 20 inches dbh. The Microsoft Excel random number function was used to generate random numbers for each storm event target year (TY). It was assumed that two >20 in dbh trees would be thrown down if

random# < 0.33, one > 20in dbh tree would be thrown down if random# between 0.33 and 0.66, and no trees down if random# > 0.66. The random number results are shown in Table 3. The loss of trees due to windthrow within the spreadsheet was done manually as the in-growth spreadsheet is not set up to do this. Additionally, the < 6in dbh trees (including seedlings) were entered into the in-growth spreadsheet in order to capture recruitment into the >6inch dbh class used in the WVA.

Table 3. Windthrow tree mortality using random numbers.

Storm Event Tys	<div> <div><0.33</div> <div>two trees > 20 in dbh down</div> </div> <div> <div>0.33 to 0.66</div> <div>one tree > 20 in dbh down</div> </div> <div> <div>>0.66</div> <div>no trees down</div> </div>	
	Rand #	Outcome
0	0.385	no trees > 20 in dbh
8	0.396	no trees > 20 in dbh
16	0.739	no trees > 20 in dbh
24	0.040	only one > 20 in - 1 down
32	0.660	1 tree down (largest)
40	0.508	1 tree down (largest)
48	0.023	2 trees down (largest)

As described above, the in-growth spreadsheet results factor in both mortality and recruitment, which are very important drivers of dbh and basal area change over a 50 year time period. V2 values used in the WVA are provided in Table 4.

Table 4. Variable 2 values used.

TY	FWOP	FWP
0	11.7 in	11.7 in
1	11.9 in	0 in
25	9.6 in	0 in
50	13.0 in	0 in

Variable 3: Understory and Midstory

Over time as the canopy matures and closes, it is assumed that the midstory will gradually decrease. Likewise, it is assumed that the herbaceous understory will also gradually decrease. Table 5 lists the V3 values used.

Table 5. Variable 3 values used.

TY	FWOP Understory	FWOP Midstory	FWP Understory	FWP Midstory
0	100%	25%	100%	25%
1	100%	25%	0%	0%
25	85%	20%	0%	0%
50	75%	18%	0%	0%

Variable 4: Hydrology:

Because the BLH site is located within a forced drainage area and is likely on a higher elevation site than the adjoining marshes, it is assumed that there is no water exchange and flooding is temporary if ever it occurs. Table 6 provides V4 values used.

Table 6. Variable 4 values used.

TY	FWOP Exchange	FWOP Duration	FWP Exchange	FWP Duration
0	None	Temporary	None	Temporary
1	None	Temporary	None	Temporary
25	None	Temporary	None	Temporary
50	None	Temporary	None	Temporary

Variable 5: Size of Contiguous Forest

There is no forest adjoining the project area BLH. Therefore, V5 is a Class 1 (0 to 5 acres adjoining forest) for FWOP and FWP under all TYs.

Variable 6: Suitability and Traversability of Surrounding Land Uses:

Within a 0.5 mile radius of the project area center, there is marsh, water, and developed lands. Table 7 provides percentages of each. Given the high loss rate of tidal marsh, all tidal marsh is predicted to be lost by TY19, thus, percent of water increases by TY25. V6 values are the same under FWOP and FWP.

Table 7. Land use within 0.5 mile radius of the project site (FWOP and FWP).

TY	Forest/marsh	Water	Developed
0	33%	45%	22%
1	33%	45%	22%
25	17%	61%	22%
50	17%	61%	22%

Variable 7: Disturbance

The major disturbance to project area BLH is the existing road along the base of the levee which is being used for hauling dirt to build levee reaches located to the east. Disturbance types and distances within both 50 foot and 500 foot buffers around the BLH area are provided in Table 8 and used to calculate the final weighted V7 Suitability Index (SI). The resulting value was inserted manually into the WVA spreadsheet for both FWOP and FWP.

Table 8. Calculation of V7 value for FWOP and FWP.

Disturbance		SI	Percent	Weighted
Distance	Type			SI
0 to 50	1	0.01	0	0
0 to 50	2	0.26	4.5	1.17
0 to 50	3	0.41	0	0
0 to 50	4	1	5.5	5.5
50 -500	1	0.26	0	0
50 -500	2	0.5	9	4.5
50 -500	3	0.65	18	11.7
50 -500	4	1	63	63
			100	85.87
			overall weighted SI =	0.859

Under FWP, it is assumed that the BLH site is converted entirely to a pre-levee, hence it no longer exists beginning in TY1. As long as the FWP acreages are zero (as shown in Table 9), the entries for many of the FWP variables do not matter as no habitat value will be generated in terms of Habitat Units.

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact to BLH of 0.18 Average Annual Habitat Units (AAHUs).

Table 9. AAHU calculation worksheet and WVA results.

AAHU CALCULATION

Project: Humble Canal PreLoad - direct & indirect impacts

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	0.48	0.37	0.18	
1	0.48	0.38	0.18	0.18
25	0.48	0.31	0.15	3.98
50	0.48	0.48	0.23	4.75
Max TY= 50			Total	
			AAHUs =	8.91
			AAHUs =	0.18

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	0.48	0.37	0.18	
1	0		0.00	0.06
25	0		0.00	0.00
50	0		0.00	0.00
Max TY= 50			Total	
			AAHUs =	0.06
			AAHUs =	0.00

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future Without Project AAHUs =	0.18
B. Future With Project AAHUs =	0.00
Net Change (FWP - FWOP) =	-0.18

APPENDIX D: COORDINATION LETTERS



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
Phone: (337) 291-3100 Fax: (337) 291-3139



In Reply Refer To:

April 13, 2021

Consultation Code: 04EL1000-2021-SLI-1214

Event Code: 04EL1000-2021-E-03404

Project Name: Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

***Due to the Louisiana Governor's mandatory quarantine order for the coronavirus (COVID-19), and in order to keep our staff and the public safe, we are unable to accept or respond in a timely manner to consultation request or project review/concurrence that we receive through the U.S. Mail. Please submit your request electronically to lafayette@fws.gov or call 337-291-3100.**

The enclosed species list identifies threatened, endangered and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337/291-3126) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services website (www.fws.gov/lafayette) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the “Endangered Species Consultation Handbook” at <http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF> or by contacting our office at the number above.

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). The Service 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: <http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf>. Those 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. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting any necessary consultation. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm> ; <http://www.towerkill.com>; and <http://fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: www.fws.gov/lafayette or by calling 337/291-3100.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Louisiana Ecological Services Field Office

200 Dulles Drive
Lafayette, LA 70506
(337) 291-3100

Project Summary

Consultation Code: 04EL1000-2021-SLI-1214

Event Code: 04EL1000-2021-E-03404

Project Name: Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee

Project Type: DREDGE / EXCAVATION

Project Description: The proposed project, Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee, is located in Terrebonne Parish, off Highway 55 (Montegut Road) by way of Exxon Company Road, and involves construction of an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The proposed preload levee would tie-in to the existing Morganza to the Gulf of Mexico flood protection levees. Borrow material for the proposed preload levee would be obtained from government-furnished off-site borrow source adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. Additional features include a road extension from the Hilcorp Energy facility to Pointe Barre Road and clearing roadside right-of-way and a +4.0 ft NAVD88 elevated section of Pointe Barre Road. To support hydrologic connectivity for adjacent wetlands, culverts will be considered in the design of the proposed road extension.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@29.4309449,-90.56148930722912,14z>



Counties: Terrebonne County, Louisiana

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee <i>Trichechus manatus</i> There is final critical habitat for this species. The location of the critical habitat is not available. <i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i> Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506



May 24, 2021

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

Dear Colonel Murphy:

The U.S. Army Corps of Engineers (USACE), Mississippi River Valley Division, Regional Planning and Environmental Division South, has prepared Environmental Assessment #583 for New Orleans District (CEMVN) to evaluate the impacts of constructing an initial, or preload levee, to prepare the site for the future construction of the Humble Canal Floodgate which is a feature of the Morganza to the Gulf project.

The Morganza to the Gulf project was re-authorized by Section 7002(3)5 of the Water Resource Development Act 2014, PL 113-121, as follows: "SEC. 7002. AUTHORIZATION OF FINAL FEASIBILITY STUDIES. The following final feasibility studies for water resources development and conservation and other purposes are authorized to be carried out by the Secretary substantially in accordance with the plan, and subject to the conditions, described in the respective reports designated in this section: (3) HURRICANE AND STORM DAMAGE RISK REDUCTION."

This draft report from the Fish and Wildlife Service's (Service) Louisiana Ecological Services Office does not constitute the final report of the Secretary of the Interior on this project, as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This draft report has been provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and National Marine Fisheries Service (NMFS) for comments. Their comments will be incorporated into our final report.

INTRODUCTION

This draft report addresses project-associated impacts that would result from the proposed action which consists of clearing and filling a total of approximately 9.0 acres of marsh wetland habitat and 0.48-acre of bottomland hardwood (BLH) habitat.

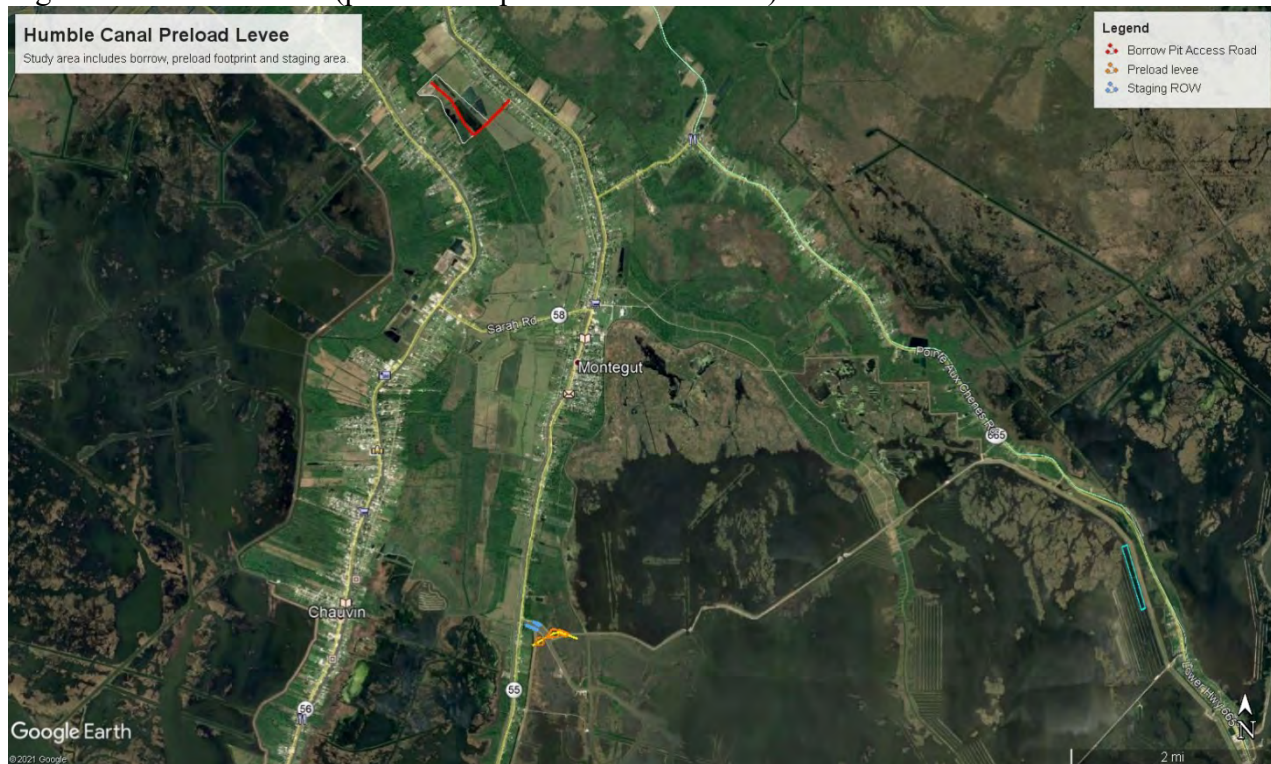
The intent of the proposed action is to construct a preload levee, to prepare the site for the future construction of the Humble Canal floodgate. The preload levee will provide a base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees that will eventually connect to the Morganza to the Gulf levee system.

STUDY AREA

The main project site is approximately 3 miles south of the town of Montegut, LA, and 2 miles east of Chauvin, LA, in Terrebonne Parish. It is located on Humble Canal approximately $\frac{1}{3}$ -mile east of the Bayou Terrebonne/Humble Canal intersection. A portion of the project site extends into the Pointe-aux-Chenes Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately 500 linear feet and tie-in to existing Reach “I-3” Levee. The north alignment will extend from the channel approximately 1,150 linear feet and tie-in to the existing Reach “J-2” Levee. Approximately 150,000 cubic yards of fill will be required. The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District’s off-site borrow source (“J-1 borrow site”) adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is approximately 5 miles north of the main project site. The main project site is located off LA Highway 55 (Montegut Road) by way of Exxon Company Road on the south side and an unnamed local access road on the north side.

Figure 1. Humble Canal (preload footprint and borrow site).



EXISTING FISH AND WILDLIFE RESOURCES

Description of Habitats

Habitat types in the project area include forested wetlands [i.e., bottomland hardwoods (BLH)], fresh marsh, and brackish marsh.

Project area BLH is located northeast of Humble Canal in the Montegut forced drainage system. Historically, this area was tidal marsh, but after being leveed and pumped, trees have colonized a portion of the area adjacent to Humble Canal. Trees include black willow, Chinese tallow, sugarberry, water oak, and live oak.

Project area fresh marsh is located northeast of Humble Canal and within the community of Montegut's forced drainage area. The area was once tidal, low-salinity marsh prior to being leveed and force-drained. Pumping and elimination of saltwater inputs has promoted conversion of this marsh to a thickly vegetated fresh marsh. Vegetation is dominated by leafy three square, California bullwhip, cattail, and Roseau cane.

Project area brackish marsh is located southwest of Humble Canal. The extreme northwestern corner of the tidal marsh impact area includes some intermediate marsh plant species which very quickly transition into species typical of brackish and saline marsh. Plants include cattail, bacopa, spike rushes, iris, seashore paspalum, salt meadow cordgrass, roseau cane, and smooth cordgrass.

Fish and Wildlife Resources

In addition to providing nesting habitat for numerous bird species, BLH found within the project area are very important stopover habitat for trans-Gulf migrating songbirds. The adjacent fresh marshes may also be used by those bird species. Rails, migratory waterfowl, swamp rabbit, and other non-migratory birds can be expected to use the BLH and fresh marsh areas.

Project area tidally influenced brackish marsh provides habitat for migratory waterfowl, wading birds, rails, osprey, nutria, rabbits, alligators, and other wildlife species. Those marshes also provide important nursery habitat for juvenile estuarine-dependent species such as blue crab, white shrimp, brown shrimp, Atlantic croaker, red drum, spotted seatrout, southern flounder, Gulf menhaden, striped mullet, and other species.

ENDANGERED AND THREATENED SPECIES

The federally-listed threatened West Indian manatee (*Trichechus manatus*) could be encountered in the project area. The USACE should consult with the NMFS regarding sea turtles. For additional information and guidance on best management practices refer to the appendices for additional information (see Appendix A).

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) offer protection to many bird species within the project area including colonial nesting birds, osprey, and the bald eagle (*Haliaeetus leucocephalus*). We continue to recommend that a qualified biologist inspect proposed work sites for the presence of undocumented colonial nesting colonies during the nesting season (e.g., February through September depending on the species). If colonies exist, work should not be conducted within 1,000 feet of the colony during the nesting season.

On-site personnel should also be informed of the possible presence of nesting bald eagles and ospreys within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is located within 660 feet of the proposed activities, the

Corps should complete an on-line evaluation at <http://www.fws.gov/southeast/birds/Eagle/tamain.html> to determine potential disturbance to nesting bald eagles and any protective measures necessary. A copy of that evaluation should be provided to this office. If assistance is needed in completing the evaluation please contact this office.

AT-RISK SPECIES

Saltmarsh Topminnow

The saltmarsh topminnow (*Fundulus jenkinsi*) is a species at-risk for federal listing as threatened or endangered. At-risk species are those taxa for which the Service has defined as at-risk and have either been proposed for listing, are candidates for listing, or have been petitioned for listing. The saltmarsh topminnow is a small, approximately 2 inch coastal fish within the Fundulidae family. It is considered a resident species of coastal marsh and closely related to other killifish species such as the Gulf killifish (*Fundulus grandis*).

Typically found in coastal marsh habitats characterized by smooth cordgrass (*Spartina alterniflora*), big cordgrass (*Spartina cynosuroides*), and black rush (*Juncus roemerianus*), the topminnow also occurs in the Atchafalaya River Delta and has been documented within portions of Terrebonne Parish. The topminnow prefers high-elevation marshes and uses small tidal creeks during low-water periods. The saltmarsh topminnow is a species of concern that could use the study area's tidal marshes and potentially be impacted by the proposed project.

ESSENTIAL FISH HABITAT

The project is located within an area identified as Essential Fish Habitat (EFH) by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, Magnuson-Stevens Act; P.L. 104-297). The updated and revised 2006 generic amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council, identifies EFH in the project area to be estuarine emergent wetlands, submerged aquatic vegetation, soft bottom, sand, shell, oyster reef, and hard bottom substrates, and estuarine water column. Under the MSFCMA, wetlands and associated estuarine waters in the project area are identified as EFH for various federally managed species including larvae/postlarvae and juvenile brown and white shrimp; eggs, larvae/postlarvae, juvenile, and adult red drum; larvae and juvenile lane snapper; juvenile and adult gray snapper. The 2017 Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan should be consulted for additional information on habitats identified as shark EFH (<https://www.federalregister.gov/documents/2017/09/07/2017-18961/atlantic-highly-migratory-species-essential-fish-habitat>).

In addition to being designated as EFH for these species, water bodies and wetlands in the project area provide nursery and foraging habitats supportive of a variety of economically important marine fishery species, such as striped mullet, Eastern oyster, pinfish, spot, Gulf killifish, bay anchovy, Atlantic croaker, Gulf menhaden, spotted seatrout, sand seatrout, southern flounder, black drum, white and brown shrimp, and blue crab. Some of these species also serve as prey for other fish species managed under the Magnuson-Stevens Act by the GMFMC (i.e., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (i.e., billfishes and sharks).

EVALUATION METHODS FOR SELECTED PLAN AND ALTERNATIVES

Wetland Value Assessment (WVA)

Evaluations of fish and wildlife resource impacts were conducted using the WVA methodology. Implementation of the WVA requires that habitat quality and quantity (acreage) are measured for baseline conditions, and predicted for future without-project and future with-project conditions. Each WVA model utilizes an assemblage of variables considered important to the suitability of that habitat type to support a diversity of fish and wildlife species. The WVA provides a quantitative estimate of project-related impacts to fish and wildlife resources. Although the WVA may not include every environmental or behavioral variable that could affect fish and wildlife habitat usage, it is widely acknowledged to provide a cost-effective means of assessing restoration measures in coastal wetland communities.

The WVA models operate under the assumption that optimal conditions for fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated and expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of: (1) a list of variables that are considered important in characterizing community-level fish and wildlife habitat values; (2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values; and, (3) a mathematical formula that combines the Suitability Indices for each variable into a single value for wetland habitat quality, termed the Habitat Suitability Index (HSI).

The product of an HSI value and the acreage of available habitat for a given target year is known as the Habitat Unit (HU) and is the basic unit for measuring project effects on fish and wildlife habitat. HUs are annualized over the project life to determine the Average Annual Habitat Units (AAHUs) available for each habitat type. The change (increase or decrease) in AAHUs for each future with-project scenario, compared to future without-project conditions, provides a measure of anticipated impacts. A net gain in AAHUs indicates that the project is beneficial to the fish and wildlife community within that habitat type; a net loss of AAHUs indicates that the project would adversely impact fish and wildlife resources.

The USACE-certified Coastal Marsh (Fresh-Intermediate) and (Brackish) WVA Model (version 2.0) and BLH WVA Model (version 1.2) were used in the impact assessment analysis. Target years (TY) were adjusted to represent time intervals when environmental changes are expected to occur. Any proposed change in impacts or plans should be coordinated in advance with the Service, NMFS, and LDWF.

IMPACTS OF SELECTED PLAN AND ALTERNATIVES

Project implementation would result in the direct loss of approximately 0.48-acre (-0.18 AAHUs) of BLH habitat, 4.4 acres of fresh marsh habitat (-1.77 AAHUs), and 4.6 acres of brackish marsh habitat (-0.58 AAHUs). These impacts should be avoided to the maximum extent practicable but will be unavoidable in some locations.

For more details on the WVAs refer to the Project Information Sheet (PIS) found in Appendix B.

Table 1. Project Impact Summary.

Site	Net Change (FWP - FWOP) = AAHUs
BLH habitat	-0.18
Fresh Marsh	-1.77
Brackish Marsh (Low SLR)	-0.67
Brackish Marsh (Int.SLR)	-0.58
Brackish Marsh (High SLR)	-0.43

SERVICE POSITION AND RECOMMENDATIONS

The President's Council on Environmental Quality regulations for implementing the National Environmental Policy Act define mitigation to include: (1) avoiding the impact; (2) minimizing the impact; (3) rectifying the impact; (4) reducing or eliminating the impact over time; and (5) compensating for impacts. The Service supports and adopts this definition and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. Through this process, the Service strives to make the project's goals co-equal to fish and wildlife resource conservation.

The Service's Mitigation Policy (Federal Register, Vol. 46, pp. 7644-7663, January 23, 1981) has designated four resource categories which are used to ensure that the level of mitigation recommended will be consistent with the fish and wildlife resources involved. The mitigation planning goals and associated Service recommendations should be based on those four categories, as follows:

Resource Category 1 - Habitat to be impacted is of high value for evaluation species and is unique and irreplaceable on a national basis or in the ecoregion section. The mitigation goal for this Resource Category is that there should be no loss of existing habitat value.

Resource Category 2 - Habitat to be impacted is of high value for evaluation species and is relatively scarce or becoming scarce on a national basis or in the ecoregion section. The mitigation goal for habitat placed in this category is that there should be no net loss of in-kind habitat value.

Resource Category 3 - Habitat to be impacted is of high to medium value for evaluation species and is relatively abundant on a national basis. The Service's mitigation goal here is that there be no net loss of habitat value while minimizing loss of in-kind habitat value.

Resource Category 4 - Habitat to be impacted is of medium to low value for evaluation species. The mitigation goal is to minimize loss of habitat value.

Habitats associated with the proposed project are designated as Resource Category 2, the mitigation goal for which is no net loss of in-kind habitat value.

To achieve fish and wildlife resource conservation, the Service recommends the following:

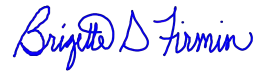
1. Forest clearing associated with project features should be conducted during the fall and winter to minimize impacts to nesting migratory songbirds.
2. Important fish and wildlife habitat (emergent wetlands, forested wetlands, and non-wetland forest) should be conserved by avoiding and minimizing the acreage of those habitats directly and indirectly impacted by project features.
3. Avoid impacts to threatened and endangered species, at-risk species, and species of concern such as the bald eagle, and wading bird nesting colonies.
4. West Indian manatee conservation measures should be included in all contracts, plans, and specifications for in-water work in areas where the manatee may occur.
5. A survey should be conducted to determine if a bald eagle nest is present within or adjacent to the project area. If a bald eagle nest occurs within 660 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 <http://www.fws.gov/southeast/birds/Eagle/tamain.html>.

The Service developed the National Bald Eagle Management Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles. A copy of the guidelines is available at: <https://ecos.fws.gov/ServCat/DownloadFile/36458?Reference=36436>

6. Any 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.
7. Compensation should be provided for any unavoidable losses of BLH and marsh habitat, caused (directly or indirectly) by project features. All mitigation should be developed/coordinated with the Service, LDWF, and other natural resource agencies.
8. Any proposed change in project features or plans should be coordinated in advance with the Service, LDWF, NMFS and other resource agencies.
9. The Service recommends that the USACE contact the Service for additional consultation if:
1) the scope or location of the proposed project is changed significantly; 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in your consultation should occur before changes are made and or finalized.

We will continue to work closely with your staff to ensure that fish and wildlife resources are conserved. If you require further assistance in this matter, please contact Hannah Sprinkle (337-291-3121) of this office.

Sincerely,



Brigette D. Firmin
Acting Field Supervisor
Louisiana Ecological Services Office

cc: LDWF, Baton Rouge, LA
NMFS, Baton Rouge, LA

Appendix A

West Indian Manatee

The threatened West Indian manatee (*Trichechus manatus*) is known to regularly occur in Lakes Pontchartrain and Maurepas and their associated coastal waters and streams. It also can be found less regularly in other Louisiana coastal areas, most likely while the average water temperature is warm. Based on data maintained by the Louisiana Natural Heritage Program (LNHP), over 80 percent of reported manatee sightings (1999-2011) in Louisiana have occurred from the months of June through December. Manatee occurrences in Louisiana appear to be increasing and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of southeastern Louisiana. Manatees may also infrequently be observed in the Mississippi River and coastal areas of southwestern Louisiana. Cold weather and outbreaks of red tide may adversely affect these animals. However, human activity is the primary cause for declines in species number due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution.

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

- All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). We recommend the following to minimize potential impacts to manatees in areas of their potential presence:
- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).
- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at “no wake/idle” speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all

employees operating the vessel, a temporary sign at least 8½ " X 11" reading language similar to the following: "CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT". A second temporary sign measuring 8½ " X 11" should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: "CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION".

- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service's Louisiana Ecological Services Office (337-291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225-765-2821). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.
- To ensure manatees are not trapped due to construction of containment or water control structures, we recommend that the project area be surveyed prior to commencement of work activities. Should a manatee be observed within those areas, the contractor should immediately contact the Service's Louisiana Ecological Services Office (337-291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225-765-2821).

Should a proposed action directly or indirectly affect the West Indian manatee, further consultation with this office will be necessary.

Appendix B

U.S. Fish and Wildlife Service, Ecological Services
200 Dulles Drive, Lafayette, LA 70506
(337) 291-3100, FAX (337) 291-3139



MEMORANDUM

DATE: May 18, 2021

TO: U.S. Army Corps of Engineers (NOD)

FROM: U.S. Fish and Wildlife Service (Service)

SUBJECT: Project Information Sheet for the Wetland Value Assessment (WVA) for the proposed Humble Canal Preload Project- Brackish Marsh Impacts

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees. The USACE-certified Coastal Marsh (Brackish WVA Model (version 2.0) was used for the marsh creation analysis.

Habitat Assessment Method

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index (SI) for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

Land Loss/ Sea Level Rise Effects

Land loss rates estimated by the Service were adjusted to project the effects of the low, intermediate and high relative sea level rise (RSLR) scenario for these analyses. The land loss rate for the Wonder Lake-Terrebone Basin was used (-1.67% per year for the period 1985-2016) based on USGS data for the area. An average accretion rate of 6.70 mm/year was used for this site (SE Madison Bay). An estimated subsidence rate of 4.6 mm/yr was used in the Bayou Petit Caillou at Cocodrie (gauge 76305). Targets years (TY) were adjusted for each SLR scenario to represent the year when marsh acreage reaches zero.

Figure 1. Map of Preload footprint and brackish marsh impact areas.



Variable V₁ – Percent of Wetland area covered by emergent vegetation

Persistent emergent vegetation (i.e., emergent marsh) plays an important role in coastal wetlands by providing foraging, resting, and breeding habitat for a variety of fish and wildlife species; and by providing a source of detritus and energy for lower trophic organisms that form the basis of the food chain. An area with no emergent vegetation (i.e., shallow open water) is assumed to have minimal habitat suitability in terms of this variable and is assigned an SI of 0.1. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0).

FWOP – a predetermined land loss rate of -1.67% was applied to the existing marsh acreage for lifespan of the project. In each coastal marsh model, this variable is weighted the highest and thus influences project impacts the most (calculations were made using the MIMS 3.10 marsh model).

Table 1. FWOP % Emergent Vegetation by site, TY and SLR scenario.

Site (Brackish)	TY0	TY1	TY24	TY50
Low-SLR	67	64	0.00	0.00

Site (Brackish)	TY0	TY1	TY19	TY50
Int-SLR	62	59	0.00	0.00

Site (Brackish)	TY0	TY1	TY11	TY50
High-SLR	47	43	0.00	0.00

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₂ – Percent of open water covered by aquatic vegetation

FWOP A site visit was conducted on April 22, 2021, no aquatic vegetation was observed. Conditions are expected to remain constant through all target years and SLR scenarios.

Table 3. FWOP % Submerged Aquatic Vegetation

Brackish (all SLR scenarios)	
	% SAV
TY0	0
TY1	0
TY11	0
TY19	0
TY24	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₃ – Marsh edge and interspersions

This variable takes into account the relative juxtaposition of marsh and open water for a given marsh:water ratio.

FWOP- Interspersion classes were determined utilizing aerial imagery and site data collected during the field trip.

Table 5. Interspersion Class and % Cover

Brackish (Low-SLR)			Brackish (Int-SLR)		
Class		%	Class		%
TY0	1	63	TY0	1	55
	3	37		3	45
TY1	1	60	TY1	1	52
	3	40		3	48
TY24	5	100	TY19	5	100
TY50	5	100	TY50	5	100

Brackish (High-SLR)		
Class		%
TY0	1	38
	3	62
TY1	1	34
	3	66
TY11	5	100
TY50	5	100

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₄ – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

FWOP- Shallow water areas are assumed to be more biologically productive than deeper water due to a general reduction in sunlight, oxygen, and temperature as water depth increases. Field site visits were conducted on 22 April 2021. Existing conditions are expected to gradually degrade as sea level rise rates and marsh loss increases across the project area.

Table 7. % SOW ≤ 1.5 feet

Brackish (Low-SLR)		Brackish (Int-SLR)	
Water ≤ 1.5ft (%)		Water ≤ 1.5ft (%)	
TY0	100	TY0	100
TY1	100	TY1	100
TY24	0	TY19	0
TY50	0	TY50	0

Brackish (High-SLR)	
Water \leq 1.5ft (%)	
TY0	100
TY1	95
TY11	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₅ – Salinity

Brackish Marsh

An estimate for area salinity was calculated from data recorded at CRMS0385 and CRMS0315 (CRMS 2020) which are in the vicinity of the project area. An average of the two sites was used to account for seasonal freshwater input.

The mean salinity recorded at:

CRMS0385 was approximately 3.65 ppt.
 CRMS0315 was approximately 8.72 ppt.
 Average: 6.19 ppt

The FISS spreadsheet 1.0 was used to predict future salinity averages. It takes into account both the effects of local subsidence and SLR to the area. A third CRMS location (CRMS3296) was chosen to aid in these calculations. CRMS3296 is a more saline environment and represent future conditions if subsidence and SLR continue to increase.

The mean salinity recorded at:

CRMS3296 was approximately 12.67 ppt.

FWOP– With time, existing salinities are expected to gradually increase through the life of the project.

Salinity FWOP:

Brackish			
TYs	(Low-SLR)	(Int-SLR)	(High-SLR)
TY0	6.20 ppt	6.20 ppt	6.20 ppt
TY1	6.20 ppt	6.20 ppt	6.81 ppt
TY 11	-	-	7.17 ppt
TY19	-	7.17 ppt	-
TY24	7.17 ppt	-	-
TY50	7.26 ppt	7.28 ppt	7.32 ppt

Salinities will gradually increase.

FWP – The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₆ – Aquatic Organisms (% wetland accessible & type of access)

FWOP – The proposed preload site is not currently impounded or hydrologically controlled by any structures. However, there is limited access for aquatic organisms. Two bridge access points exist but may limit aquatic organism access and deter entrance therefore a structure rating of 0.5 (SI unit 0.5) was given to the site.

Table 9. Aquatic Organism Access

Brackish (all SLR scenarios)	
Access	
TY0	0.5
TY1	0.5
TY11	0.5
TY19	0.5
TY24	0.5
TY50	0.5

FWP – Following construction (TY1), aquatic organisms will have no access to the created preload platform.

PROJECT IMPACTS

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact to brackish marsh of 0.67 (Low SLR), 0.58 (Int. SLR) and 0.43 (High SLR) Average Annual Habitat Units (AAHUs).

Brackish Marsh- Low SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.52
B. Open Water Habitat Net AAHUs =	-1.06
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.67

Brackish Marsh- Int. SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.38
B. Open Water Habitat Net AAHUs =	-1.11
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.58

Brackish Marsh- High SLR

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	-0.14
B. Open Water Habitat Net AAHUs =	-1.17
Net Benefits= (2.6xEMAAHUs+OWAAHUs)/3.6	-0.43

Literature Cited

Coastal Protection and Restoration Authority of Louisiana. 2017. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Louisiana Office of Coastal Protection and Restoration. 2019. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. <http://cims.coastal.louisiana.gov>. Accessed March 2021.



MEMORANDUM

DATE: May 18, 2021

TO: U.S. Army Corps of Engineers (NOD)

FROM: U.S. Fish and Wildlife Service (Service)

SUBJECT: Project Information Sheet for the Wetland Value Assessment (WVA) for the proposed Humble Canal Preload Project – Fresh Marsh Impacts.

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees. The USACE-certified Coastal Marsh (Fresh-Intermediate WVA Model (version 2.0) was used for the marsh creation analysis. Target Years (TY) were set as follow: 0, 1, and 50.

Habitat Assessment Method

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index (SI) for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The project area is located northeast of Humble Canal and within the community of Montegut forced drainage area. The area was once tidal low-salinity marsh prior to being leveed and forced drained. Pumping and elimination of saltwater inputs has promoted conversion to a fresh marsh. The area is impounded and receives no tidal input. Results will remain constant for all sea level rise (SLR) scenarios.

Persistent emergent vegetation (i.e., emergent marsh) plays an important role in coastal wetlands by providing foraging, resting, and breeding habitat for a variety of fish and wildlife species; and by providing a source of detritus and energy for lower trophic organisms that form the basis of the food chain. An area with no emergent vegetation (i.e., shallow open water) is assumed to have minimal habitat suitability in terms of this variable, and is assigned an SI of 0.1. Optimal vegetative coverage (i.e., percent marsh) is assumed to occur at 60-80 percent (SI=1.0).

Table 1. FWOP % Emergent Vegetation by site and TY.

Site	TY0	TY1	TY50
Fresh	100	100	100

Variable V₂ – Percent of open water covered by aquatic vegetation

Page 2 of 6

Table 3. FWOP % Submerged Aquatic Vegetation

Fresh	
	% SAV
TY0	0
TY1	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₃ – Marsh edge and interspersions

This variable takes into account the relative juxtaposition of marsh and open water for a given marsh:water ratio.

FWOP- Interspersion classes were determined utilizing aerial imagery and site data collected during the field trip. Based on imagery and field observations, the area is considered a “carpet marsh.”

Table 5. Interspersion Class and % Cover

Fresh		
	Class	%
TY0	3	100
TY1	3	100
TY50	3	100

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₄ – Percent of open water ≤ 1.5 feet deep, in relation to marsh surface

FWOP- Shallow water areas are assumed to be more biologically productive than deeper water due to a general reduction in sunlight, oxygen, and temperature as water depth increases. Field site visits were conducted on 22 April 2021. No shallow open was observed. Existing conditions are not expected to change.

Table 7. % SOW ≤ 1.5 feet

Fresh	
Water ≤ 1.5ft (%)	
TY0	0
TY1	0
TY50	0

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Variable V₅ – Salinity

The proposed site is currently impounded and receives no tidal input (0.05ppt was used to represent the lowest salinity).

Fresh Marsh

FWOP- Existing conditions are expected to remain static through all TYs.

TYs	Fresh
TY0	0.05 ppt
TY1	0.05 ppt
TY50	0.05 ppt

FWP- The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

TYs	Fresh
TY0	0.00 ppt
TY1	0.00 ppt
TY50	0.00 ppt

Variable V₆ – Aquatic Organisms (% wetland accessible & type of access)

FWOP – The proposed site is currently leveed and under forced drainage. It is assumed that aquatic organisms have no access to the site.

Table 9. Aquatic Organism Access

Fresh	
Access	
TY0	0.00
TY1	0.00
TY50	0.00

FWP – The preload footprint will be cleared and converted to a pre-levee. No habitat will remain.

Project Impacts

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact fresh marsh of 1.77 Average Annual Habitat Units (AAHUs). Results will remain constant for all SLR scenarios.

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (Low SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (Int. SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

TOTAL BENEFITS IN AAHUs DUE TO PROJECT (High SLR scenario)

A. Emergent Marsh Habitat Net AAHUs =	-2.62
B. Open Water Habitat Net AAHUs =	0.00
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1 =	-1.77

Literature Cited

Coastal Protection and Restoration Authority of Louisiana. 2017. Louisiana's Comprehensive Master Plan for a Sustainable Coast. Coastal Protection and Restoration Authority of Louisiana. Baton Rouge, LA.

Louisiana Office of Coastal Protection and Restoration. 2019. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. <http://cims.coastal.louisiana.gov>. Accessed March 2021.

Humble Canal Preload Project
Bottomland Hardwood Forest Impacts
Project Information Sheet
3-May 2021

Direct and Indirect Impacts: The red polygon in Figure 1 shows the portion of the preload footprint that would impact bottomland hardwood habitat (BLH), identified in the green polygon. In addition to direct impacts from construction activities, BLH and fresh-intermediate marsh would be indirectly impacted via impoundment between the preload site and the existing levee. The combined BLH impact direct and indirect impact zone is 0.48 acres (see Figure 1 green polygon).

With construction of the new levee and sector gate along Humble Canal, the old levee could be degraded to unimpound these wetlands. However, construction funding availability and scheduling are unknown. Rather than attempt to predict when unimpoundment might occur, it is assumed that the impounded wetlands (indirect impact) will be impacted concurrently with direct impacts from the constructed preload footprint.

Figure 1. Map of Preload footprint and BLH direct and indirect impact areas.



BLH Variable # 1: Tree Species Composition

Within an observation area approximately 0.10 acre, the following trees were observed on 22-Apr-2021.

Table 1. Observed trees and estimated diameter at breast height (dbh) . Seedlings not included.

Tree species	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)	Dbh (in)
Water oak	14								
Chinese tallow	14	5	4	3	3	4	5	3	10
Black willow	16	4	10						
Honey locust	6								

The canopy coverage was approximately 25%, midstory was 25%, and herbaceous cover 100%. A number of small black willow were observed in other portions of the area as were a number of very small water oak seedlings. Based on early aerial imagery of this BLH area, it appears that the woody vegetation has replaced what was previously tidal marsh, growing larger canopies as a result of forced drainage from the levee. Sugarberry and a few small live oaks were also observed beyond the 0.10 acre observation area. Given the presence of several water oak seedlings and live oaks nearby, it is assumed that hard mast producers will increase over time. Table 2 provides V1 values used in the wetland value assessment (WVA) for BLH.

Table 2. Variable 1 values used.

TY	FWOP	FWP
0	Class 1	Class 1
1	Class 1	Class 1
25	Class 1	Class 1
50	Class 2	Class 1

Variable 2: Stand Maturity

The in-growth spreadsheet was used to calculate diameter at breast height (dbh) change over time. Given the diversity of trees and the presence of slower growing varieties (compared to black willow and Chinese tallow), the dbh growth rate associated with the “cedar elm, winged elm, black tupelo, hickories, or sugarberry dominated stands” was selected for use in the in-growth spreadsheet. This spreadsheet’s mortality function was zeroed out. Instead, windthrow mortality is assumed to occur during tropical storms which would occur once every 8 years and would affect only trees ≥ 20 inches dbh. The Microsoft Excel random number function was used to generate random numbers for each storm event target year (TY). It was assumed that two >20 in dbh trees would be thrown down if

random# < 0.33, one > 20in dbh tree would be thrown down if random# between 0.33 and 0.66, and no trees down if random# > 0.66. The random number results are shown in Table 3. The loss of trees due to windthrow within the spreadsheet was done manually as the in-growth spreadsheet is not set up to do this. Additionally, the < 6in dbh trees (including seedlings) were entered into the in-growth spreadsheet in order to capture recruitment into the >6inch dbh class used in the WVA.

Table 3. Windthrow tree mortality using random numbers.

Storm Event Tys	<div> <div><0.33</div> <div>two trees > 20 in dbh down</div> </div> <div> <div>0.33 to 0.66</div> <div>one tree > 20 in dbh down</div> </div> <div> <div>>0.66</div> <div>no trees down</div> </div>	
	Rand #	Outcome
0	0.385	no trees > 20 in dbh
8	0.396	no trees > 20 in dbh
16	0.739	no trees > 20 in dbh
24	0.040	only one > 20 in - 1 down
32	0.660	1 tree down (largest)
40	0.508	1 tree down (largest)
48	0.023	2 trees down (largest)

As described above, the in-growth spreadsheet results factor in both mortality and recruitment, which are very important drivers of dbh and basal area change over a 50 year time period. V2 values used in the WVA are provided in Table 4.

Table 4. Variable 2 values used.

TY	FWOP	FWP
0	11.7 in	11.7 in
1	11.9 in	0 in
25	9.6 in	0 in
50	13.0 in	0 in

Variable 3: Understory and Midstory

Over time as the canopy matures and closes, it is assumed that the midstory will gradually decrease. Likewise, it is assumed that the herbaceous understory will also gradually decrease. Table 5 lists the V3 values used.

Table 5. Variable 3 values used.

TY	FWOP Understory	FWOP Midstory	FWP Understory	FWP Midstory
0	100%	25%	100%	25%
1	100%	25%	0%	0%
25	85%	20%	0%	0%
50	75%	18%	0%	0%

Variable 4: Hydrology:

Because the BLH site is located within a forced drainage area and is likely on a higher elevation site than the adjoining marshes, it is assumed that there is no water exchange and flooding is temporary if ever it occurs. Table 6 provides V4 values used.

Table 6. Variable 4 values used.

TY	FWOP Exchange	FWOP Duration	FWP Exchange	FWP Duration
0	None	Temporary	None	Temporary
1	None	Temporary	None	Temporary
25	None	Temporary	None	Temporary
50	None	Temporary	None	Temporary

Variable 5: Size of Contiguous Forest

There is no forest adjoining the project area BLH. Therefore, V5 is a Class 1 (0 to 5 acres adjoining forest) for FWOP and FWP under all TYs.

Variable 6: Suitability and Traversability of Surrounding Land Uses:

Within a 0.5 mile radius of the project area center, there is marsh, water, and developed lands. Table 7 provides percentages of each. Given the high loss rate of tidal marsh, all tidal marsh is predicted to be lost by TY19, thus, percent of water increases by TY25. V6 values are the same under FWOP and FWP.

Table 7. Land use within 0.5 mile radius of the project site (FWOP and FWP).

TY	Forest/marsh	Water	Developed
0	33%	45%	22%
1	33%	45%	22%
25	17%	61%	22%
50	17%	61%	22%

Variable 7: Disturbance

The major disturbance to project area BLH is the existing road along the base of the levee which is being used for hauling dirt to build levee reaches located to the east. Disturbance types and distances within both 50 foot and 500 foot buffers around the BLH area are provided in Table 8 and used to calculate the final weighted V7 Suitability Index (SI). The resulting value was inserted manually into the WVA spreadsheet for both FWOP and FWP.

Table 8. Calculation of V7 value for FWOP and FWP.

Disturbance		SI	Percent	Weighted
Distance	Type			SI
0 to 50	1	0.01	0	0
0 to 50	2	0.26	4.5	1.17
0 to 50	3	0.41	0	0
0 to 50	4	1	5.5	5.5
50 -500	1	0.26	0	0
50 -500	2	0.5	9	4.5
50 -500	3	0.65	18	11.7
50 -500	4	1	63	63
			100	85.87
overall weighted SI =				0.859

Under FWP, it is assumed that the BLH site is converted entirely to a pre-levee, hence it no longer exists beginning in TY1. As long as the FWP acreages are zero (as shown in Table 9), the entries for many of the FWP variables do not matter as no habitat value will be generated in terms of Habitat Units.

Based on the above assumptions, the Humble Canal Preload Project would result in a combined direct and indirect impact to BLH of 0.18 Average Annual Habitat Units (AAHUs) for all sea level rise (SLR) scenarios.

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Table 9. AAHU calculation worksheet and WVA results.

AAHU CALCULATION

Project: Humble Canal PreLoad - direct & indirect impacts

Future Without Project			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.48	0.37	0.18	
1	0.48	0.38	0.18	0.18
25	0.48	0.31	0.15	3.98
50	0.48	0.48	0.23	4.75
Max TY= 50			Total AAHUs =	8.91
			AAHUs =	0.18

Future With Project			Total HUs	Cummulative HUs
TY	Acres	x HSI		
0	0.48	0.37	0.18	
1	0		0.00	0.06
25	0		0.00	0.00
50	0		0.00	0.00
Max TY= 50			Total AAHUs =	0.06
			AAHUs =	0.00

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future Without Project AAHUs =	0.18
B. Future With Project AAHUs =	0.00
Net Change (FWP - FWOP) =	-0.18

June 8, 2021

Daniel Meden, Biologist
U.S. Army Corps of Engineers
Regional Planning and Environment Division South
New Orleans Environmental Branch
CEMVN-PDN-UDP
7400 Leake Avenue
New Orleans, LA 70118

RE: EA #583 – Morganza to the Gulf Hurricane Protection
Preload Levee – Humble Canal Floodgate

Dear Mr. Meden:

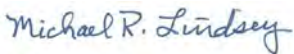
I have reviewed the above referenced project for potential requirements of the Farmland Protection Policy Act (FPPA) and potential impact to Natural Resource Conservation Service projects in the immediate vicinity.

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

The project map and narrative submitted with your request indicates that the proposed construction area (Preload Levee) will not impact prime farmland and therefore is exempt from the rules and regulations of the Farmland Protection Policy Act (FPPA)—Subtitle I of Title XV, Section 1539-1549. Furthermore, we do not predict impacts to NRCS work in the vicinity. For specific information about the soils found in the project area, please visit our Web Soil Survey at the following location: <http://websoilsurvey.nrcs.usda.gov/>

Please direct all future correspondence to me at the address shown below.

Respectfully,



Dr. Michael Lindsey
State Soil Scientist

Attachment



Natural Resources Conservation Service
State Office
3737 Government Street
Alexandria, Louisiana 71302
Voice: (318) 473-7751 Fax: (844) 325-6947

Helping People Help the Land

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request			
Name Of Project		Federal Agency Involved			
Proposed Land Use		County And State			
PART II (To be completed by NRCS)		Date Request Received By NRCS			
Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply -- do not complete additional parts of this form).		Yes <input type="checkbox"/>	No <input type="checkbox"/>	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount Of Farmland As Defined in FPPA Acres: %			
Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By NRCS			
PART III (To be completed by Federal Agency)		Alternative Site Rating			
		Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly					
B. Total Acres To Be Converted Indirectly					
C. Total Acres In Site					
PART IV (To be completed by NRCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland					
B. Total Acres Statewide And Local Important Farmland					
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted					
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value					
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)					
PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))		Maximum Points			
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS		160			
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100			
Total Site Assessment (From Part VI above or a local site assessment)		160			
TOTAL POINTS (Total of above 2 lines)		260			
Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input type="checkbox"/>			
Reason For Selection:					

July 23, 2021

Daniel Meden, Biologist
U.S. Army Corps of Engineers
Regional Planning and Environment Division South
New Orleans Environmental Branch; CEMVN-PDN-UDP
7400 Leake Avenue
New Orleans, LA 70118

RE: EA #406 – Morganza to the Gulf Hurricane Protection
Levee J-1 Off-site Borrow Area and Temporary Access Road

Dear Mr. Meden:

I have reviewed the above referenced project for potential requirements of the Farmland Protection Policy Act (FPPA) and potential impact to Natural Resource Conservation Service projects in the immediate vicinity.

Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements can be forest land, pastureland, cropland, or other land, but not water or urban built-up land.

The off-site borrow area has been accounted for in a 2005 Environmental Assessment and the road used to access the borrow pits is deemed temporary. Due to these circumstances no additional prime farmland will be impacted and therefore is exempt from the rules and regulations of the Farmland Protection Policy Act (FPPA)—Subtitle I of Title XV, Section 1539-1549. Furthermore, we do not predict impacts to NRCS work in the vicinity. For specific information about the soils found in the project area, please visit our Web Soil Survey at the following location: <http://websoilsurvey.nrcs.usda.gov/>

Please direct all future correspondence to me at the address shown below.

Respectfully,



Dr. Michael Lindsey
State Soil Scientist

Attachment



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Voice: (318) 473-7751 Fax: (844) 325-6947

Helping People Help the Land

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request		4. Sheet 1 of _____	
1. Name of Project		5. Federal Agency Involved			
2. Type of Project		6. County and State			
PART II (To be completed by NRCS)		1. Date Request Received by NRCS		2. Person Completing Form	
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form).		YES <input type="checkbox"/> NO <input type="checkbox"/>		4. Acres Irrigated Average Farm Size	
5. Major Crop(s)	6. Farmable Land in Government Jurisdiction Acres: _____ %		7. Amount of Farmland As Defined in FPPA Acres: _____ %		
8. Name Of Land Evaluation System Used	9. Name of Local Site Assessment System		10. Date Land Evaluation Returned by NRCS		
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly					
B. Total Acres To Be Converted Indirectly, Or To Receive Services					
C. Total Acres In Corridor					
PART IV (To be completed by NRCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland					
B. Total Acres Statewide And Local Important Farmland					
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted					
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value					
PART V (To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)					
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area in Nonurban Use		15			
2. Perimeter in Nonurban Use		10			
3. Percent Of Corridor Being Farmed		20			
4. Protection Provided By State And Local Government		20			
5. Size of Present Farm Unit Compared To Average		10			
6. Creation Of Nonfarmable Farmland		25			
7. Availability Of Farm Support Services		5			
8. On-Farm Investments		20			
9. Effects Of Conversion On Farm Support Services		25			
10. Compatibility With Existing Agricultural Use		10			
TOTAL CORRIDOR ASSESSMENT POINTS		160			
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100			
Total Corridor Assessment (From Part VI above or a local site assessment)		160			
TOTAL POINTS (Total of above 2 lines)		260			
1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>		
5. Reason For Selection:					

Signature of Person Completing this Part:

DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

From: [DEQ Water Quality Certifications](#)
To: [Meden, Daniel C CIV USARMY CEMVN \(USA\)](#); [DEQ Water Quality Certifications](#)
Subject: [Non-DoD Source] RE: Pre-filing meeting request for Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee
Date: Monday, April 12, 2021 1:33:34 PM

Thank you for submitting the Clean Water Act (CWA), Section 401 Water Quality Certification (WQC) pre-filing meeting request for the Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee project. The pre-filing request was received April 12, 2021.

LDEQ serves as the certifying authority for the state of Louisiana for CWA Section 401 WQC. At this time we do not require a scheduled pre-filing meeting.

No sooner than 30 days after submittal of the pre-filing meeting request, application may be made to LDEQ for water quality certification. Please submit the ENG 4345 (application or equivalent) and attachments submitted for Section 404 permitting no sooner than May 12, 2021 to:

DEQ-WaterQualityCertifications@la.gov

From: Meden, Daniel C CIV USARMY CEMVN (USA) [mailto:Daniel.C.Meden@usace.army.mil]
Sent: Friday, April 9, 2021 8:26 AM
To: DEQ Water Quality Certifications <DEQ-WaterQualityCertifications@la.gov>
Subject: Pre-filing meeting request for Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee

EXTERNAL EMAIL: Please do not click on links or attachments unless you know the content is safe.

Regarding the Pre- Filing Meeting Request requirement, we, the US Army Corps of Engineers, New Orleans District, respectfully make this request:

The proposed project, Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee, is located in Terrebonne Parish, off Highway 55 (Montegut Road) by way of Exxon Company Road, and involves construction of an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The proposed preload levee would tie-in to the existing Morganza to the Gulf of Mexico flood protection levees. Borrow material for the proposed preload levee would be obtained from government-furnished off-site borrow source adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. Additional features include a road extension from the Hilcorp Energy facility to Pointe Barre Road and clearing roadside right-of-way and a +4.0 ft NAVD88 elevated section of Point Barre Road. To support hydrologic connectivity for adjacent wetlands, culverts will be considered in the design of the proposed road extension.

The Applicant is the US Army Corps of Engineers, New Orleans District

Planning, Programs and Programs and Project Management Division
CEMVN-PDN-CEP
7400 Leake Avenue
New Orleans, LA 70118
ATTN: Daniel Meden
Daniel.c.meden@usace.army.mil

504-862-1014

The Agent or Point of Contact is the same as the Applicant.

Regards,

Daniel Meden

Biologist, Coastal Environmental Planning

RPEDS, New Orleans District

Office: 504-862-1014

JOHN BEL EDWARDS
GOVERNOR



CHUCK CARR BROWN, Ph.D.
SECRETARY

State of Louisiana

AUG 03 2021

DEPARTMENT OF ENVIRONMENTAL QUALITY ENVIRONMENTAL SERVICES

Mr. Daniel Meden
US Army Corps of Engineers, New Orleans District
Planning, Programs and Project Management Division
CEMVN-PDP-CEP
7400 Leake Avenue
New Orleans, Louisiana 70118

AI No.: 229067
Activity No.: CER20210001

RE: Morganza to the Gulf of Mexico – Humble Canal Floodgate Preload Levee
Water Quality Certification WQC 210601-03
St. Tammany Parish

Dear Mr. Meden:

The Louisiana Department of Environmental Quality, Water Permits Division (LDEQ), has reviewed the application to construct an initial preload levee to prepare Canal Floodgate site for future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal for the purpose of flood risk reduction near Montegut, LA, Terrebonne Parish.

The information provided in the application has been reviewed in terms of compliance with State Water Quality Standards, the approved Water Quality Management Plan and applicable state water laws, rules and regulations. LDEQ determined that the requirements for a Water Quality Certification have been met. LDEQ concludes that the discharge of fill will not violate water quality standards as provided for in LAC 33:IX.Chapter 11. Therefore, LDEQ hereby issues US Army Corps of Engineers, New Orleans District – Humble Canal Floodgate Preload Levee Water Quality Certification, WQC 210601-03.

Should you have any questions concerning any part of this certification, please contact Elizabeth Hill at (225) 219-3225 or by email at elizabeth.hill@la.gov. Please reference Agency Interest (AI) number 229067 and Water Quality Certification 210601-03 on all future correspondence to this Department to ensure all correspondence regarding this project is properly filed into the Department's Electronic Document Management System.

Sincerely,

A blue ink signature of Elliott B. Vega, written in a cursive style.

Elliott B. Vega
Assistant Secretary

c: IO-W

ec: Daniel Meden
daniel.c.meden@usace.army.mil

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application or a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
(ITEMS BELOW TO BE FILLED BY APPLICANT)			
5. APPLICANT'S NAME US Army Corps of Engineers, New Orleans District		8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required) Same as Applicant	
6. APPLICANT'S ADDRESS Planning, Programs and Project Management Division CEMVN-PDN-CEP 7400 Leake Avenue New Orleans, LA 70118 ATTN: Daniel Meden		9. AGENT'S ADDRESS	
7. APPLICANT'S PHONE NOS. W/AREA CODE		10. AGENT'S PHONE NOS. W/AREA CODE	
a. Residence b. Business (504) 862-1014		a. Residence b. Business	
11. STATEMENT OF AUTHORIZATION			
HARPER.MARSHALL.KEVIN.1536114358 VIN.1536114358 Digitally signed by HARPER.MARSHALL.KEVIN.1536114358 Date: 2021.06.03 16:03:46 -05'00'			
APPLICANT'S SIGNATURE		DATE	
NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY			
12. PROJECT NAME OR TITLE (see instructions) St. Tammany Parish, Louisiana Feasibility Study			
13. NAME OF WATERBODY, IF KNOWN (if applicable) Bayou Patassat, Mile Branch		14. PROJECT STREET ADDRESS (if applicable) Not applicable. See #16 and #17 below for project coordinates and location.	
15. LOCATION OF PROJECT St. Tammany COUNTY Louisiana STATE			

17. DIRECTIONS TO SITES:

The proposed levee and floodwall alignments are contiguous with the existing Slidell levee alignment that crosses LA Hwy 10, west of Eden Isle. See Figure 2 (attached). Land access to the Bayou Patassat channel improvement site is through Bayou Lane or the existing pump station. The Mile Branch channel improvements start at the intersection of Mile Branch and Highway 190, crossing Highway 190 Business, and end at the intersection of Mile Branch and the Tchefuncte River.

18. Nature of Activity (Description of project, include all features.)

The proposed action consists of constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site ("the site," see Figure 2) for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee would provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee would tie-in to existing flood protection levees.

The main project site is approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is located on Humble Canal approximately 1/3 miles east of the Bayou Terrebonne/Humble Canal intersection (Lat 29 26 08.5, Lon -90 33 44.0). A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately 500 linear feet and tie-in to existing Reach "I-3" Levee. It will have a maximum elevation of +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach "J-2" Levee. It will have a maximum elevation of +24 ft NAVD88.

The preload levee will be constructed mostly of clay. Some sand and rock and will also be used. Approximately 150,000 cubic yards of fill will be required. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation. The borrow material shall be of naturally occurring earth materials. The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District's off-site borrow source ("J-1 borrow site," see Figure 3) adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the main project site.

For an estimated construction duration of 430 Days (5 day/week; 10 hr/days), the equipment that may be used in the various stages of construction of the preload levee includes, but is not limited to the following:

- Excavators, bulldozers, marsh excavators and buggies, barges, and pontoons will be used in clearing and grubbing, excavation, placement of levee and roadway fill, rock, and gravel.
- Dump trucks will be used to haul fill between the borrow pit and construction site and to haul other construction materials.
- Water or spray trucks will be used to process borrow material.
- Rollers will be used to compact levee and roadway fill.
- Excavator with mounted hollow mandrel will be used to install the vertical wick drains.
- A work boat will be used to install navigation aids in Humble Canal and oversee construction operations from the water when necessary.
- 1/2-ton and 1-ton work trucks will also be used on-site for hauling equipment.

19. Project Purpose (Describe the reason or purpose of the project, (see instruction.)

The purpose of the proposed action is to provide hurricane and storm damage risk reduction for the communities located within the levee system. The overarching goal is to reduce the risk to people and property in the vicinity of Houma, Louisiana. All project benefits are related to hurricane and storm damage risk reduction. No flood damage reduction, navigation, or ecosystem restoration benefits are quantified for this project. The project is needed because of the increasing susceptibility of coastal communities to storm surge due to wetland loss, sea level rise, and subsidence.

The proposed action is associated with the Morganza to the Gulf levee alignment (2013) and subsequent need for additional NEPA for constructible features requiring additional design and impact analysis.

See Figure 1 (attached) for the study area.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

The discharge is needed for the construction of the Humble Canal preload levee.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards.

Approximately 150,000 cyd of earthen fill material for construction of the preload levee. This borrow material shall be of naturally occurring earth materials. Materials that are classified in accordance with American Society for Testing and Materials, Unified Soil Classification System (ASTM D 2487) as CL (silty clay or sandy clay) or CH (fat clay) with less than 35% naturally occurring sand content are suitable for use as levee construction material. Materials classified as ML are suitable if blended to produce a material that classifies as CL or CH according to ASTM D 2487. Allowable borrow material cannot have organic content greater than 12 percent by weight, as determined by ASTM D 2974, Method C. The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District's off-site borrow source ("J-1 borrow site") adjacent to Bayou la Cache, off Aragon Road near Montegut, LA.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

The proposed action would result in impacts to open water, fresh-intermediate and brackish marsh, and bottomland hardwood within the footprint.

23. Is Any Portion of the Work Already Complete? Yes ____ No X IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list.

1. Brasseaux, Hollie White, 207 Brashear Ave., Morgan City, LA 70380 (Physical: 1609 Hwy 55)
2. Elissalde, Marcel H., Jr., PO Box 1982, Crystal Beach, TX 77650-1982 (Physical: 1555 Hwy 55)
3. Ellender, Henry J. Heirs LLC, 1537 Richland Ave., Baton Rouge, LA 70808 (Physical: 1559 Hwy 55)
4. Louisiana Department of Wildlife and Fisheries, Comission, Baton Rouge, LA 70363 (Physical: 1113 Cross St.)
5. Nettleton, Cody James
6. Nettleton, Greg Edmund Trust, 1616 Hwy 55, Montegut, LA 70377
7. Nettleton, Jerry J., Jr., 1145 Hwy 55, Montegut, LA 70377 (Physical: 1615 Hwy 55)
8. Nettleton, Kary Paul, 1613 Hwy 55, Montegut, LA 70377

25. List of Other Certifications or Approvals/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL	IDENTIFICATION NO.	DATE APPLIED	DATE APPROVED	DATE DENIED
--------	---------------	--------------------	--------------	---------------	-------------

To the best of my knowledge the proposed activity described in my permit application complies with and will be conducted in a manner that is consistent with the LA Coastal management Program.

*Would include but is not restricted to zoning, building and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

HARPER.MARSHALL
KEVIN.1536114358
Digitally signed by
HARPER.MARSHALL.KEVIN.153611
4358
Date: 2021.06.03 16:04:21 -05'00'

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency The United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than five years, or both.

*U.S. :1994-520-478/82018

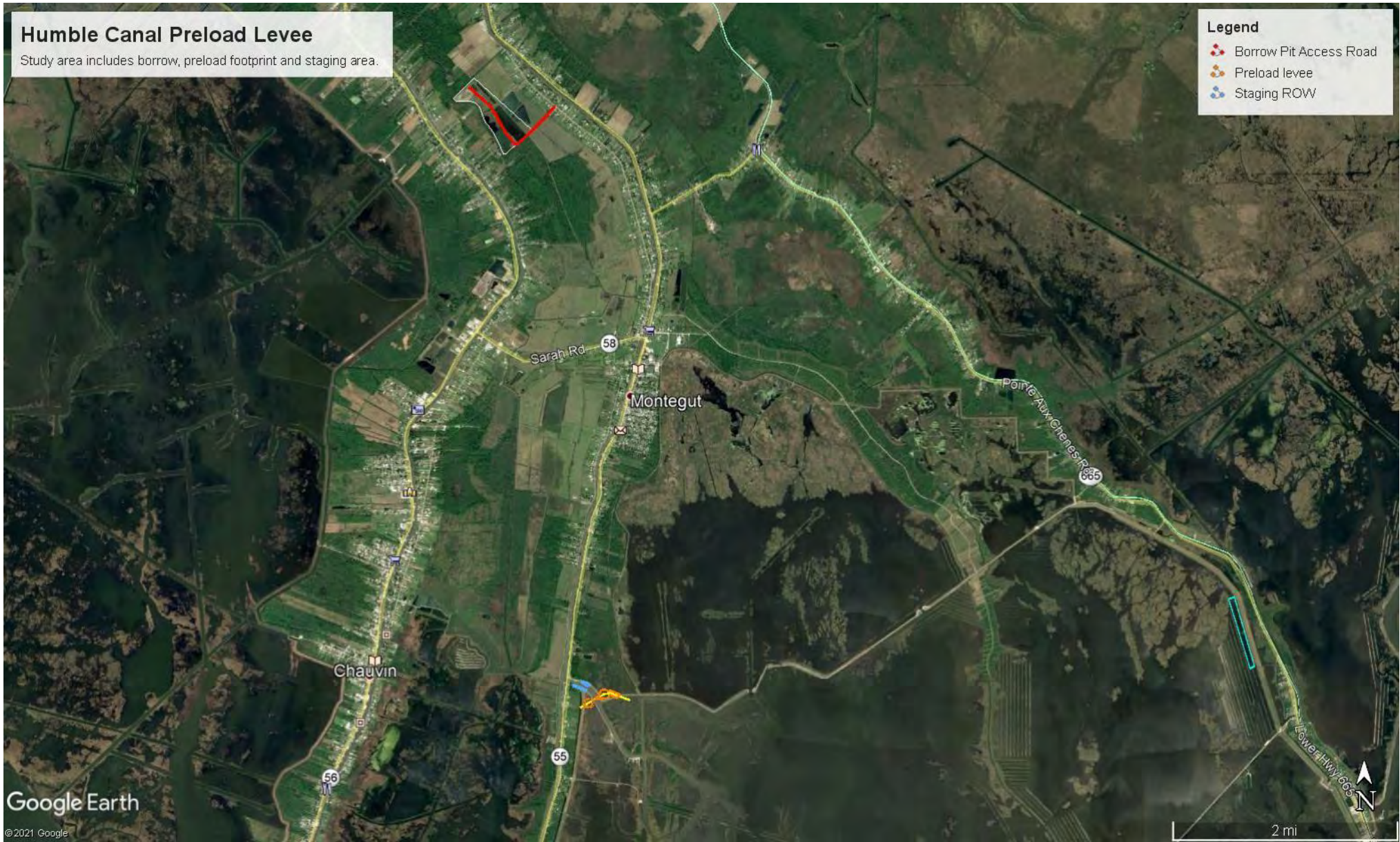


Figure 1. Humble Canal Preload Study Area



. Figure 2. Humble Canal Preload footprint and staging area right-of-way (ROW)

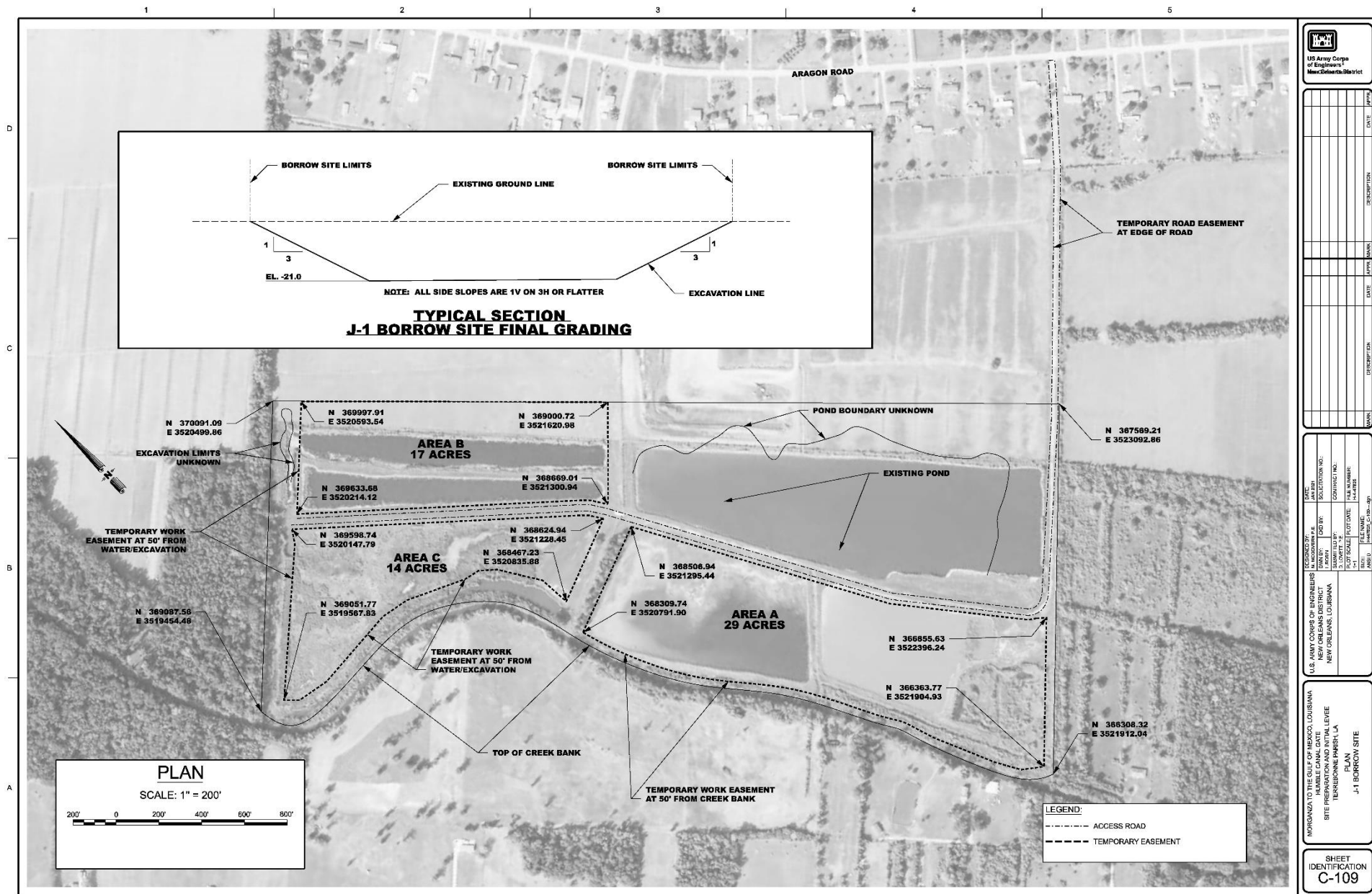


Figure 3. J-1 Borrow site for earthen fill material



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

June 10, 2021

Regional Planning and
Environment Division, South
Environmental Planning Branch
Attn: CEMVN-PDS-N

Kristin Sanders, SHPO
LA State Historic Preservation Officer
P.O. Box 44247
Baton Rouge, LA 70804-4241

RE: Section 106 Review Consultation

Undertaking: Humble Canal Preload Construction: Morganza to the Gulf Project, Lafourche Parish, Louisiana (Lat. 29.436 Long. - 90.563)

Determination: **No Historic Properties Affected**

Dear Ms. Sanders:

The U.S. Army Corps of Engineers (USACE), New Orleans District, proposes to ready a location for the weight required by construction and performance of a Sector Gate across the Humble Canal, by first constructing a pre-load levee to aid soil compaction. This construction is located near Bayou Terrebonne in Lafourche Parish (Lat. 29.436 Long. -90.563). This effort will also require a previously used borrow source, also near Bayou Terrebonne in Lafourche Parish (Lat. 29.512 Long. -90.577).

Description of the Undertaking

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees.

The main project site is approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is accessed via Highway 55 (Montegut Road) and Exxon Company Road. It is located on Humble Canal approximately 1/3 miles east of the Bayou Terrebonne/Humble Canal intersection). A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately

500 linear feet and tie-in to existing Reach "I-3" Levee. It will have a maximum elevation of +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach "J-2" Levee. It will have a maximum elevation of +24 ft NAVD88.

The preload levee will be constructed mostly of clay. Some sand and rock and will also be used. Approximately 150,000 cubic yards of fill will be required. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation.

The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District's off-site borrow source ("J-1 borrow site") adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the main project site.

Area of Potential Effects (APE)

The preload levee requires a right-of-way, staging area, and borrow material. The totality of these is considered to be the APE, while noting that the borrow source has been previously coordinated for no historic properties affected, and the staging area is on land previously disturbed by construction of the existing levees. Known resources and past investigations within each of the identified APE's are described below in the "Identification and Evaluation" portion of this letter.

Identification and Evaluation

Background and literature review has been conducted by USACE staff. Historic properties in the project vicinity were identified based on a review of the NRHP database, the Louisiana Cultural Resources Map, historic map research, and a review of cultural resources survey reports.

A site visit was made to the preload and staging areas Right-of-Way by USACE archaeologists Dr. Paul Hughbanks and Mr. Jason Emery. Observation of soil strata was made by walking bankline, observing overturned trees, and other remnants of animal or natural activity. These observations suggested prior soil mixing, and no strata suggesting past cultural remains was visible.

The borrow source has been previously utilized and was coordinated for cultural resources as a part of the Environmental Assessments (EA) #406 and #450. As depicted on Figure #4, the borrow would come primarily from the 29 acres defined as Area A. In addition, borrow would be removed from Area B and the space between existing ponds. Lastly, the access road for excavation and removal will be located between Areas B and C.

EA#406 described a 2.6 mile levee to fill in a gap between previously constructed levees on either side, with the current borrow source being utilized for construction material. The letters of coordination for Section 106 of the National Historic Preservation Act (February 14, 2005 and April 15, 2005), discussed measures to protect prehistoric site 16TR33 located near the levee construction, and that no historic properties existed within the proposed borrow area. Letters of concurrence to the protective measures and the no historic properties for borrow area, were received from

the Chitimacha Tribe of Louisiana (May 16, 2005) and the Louisiana SHPO (March 30, 2005 and May 18, 2005).

The definition and use of the borrow area was revisited again with EA#450. A Louisiana SHPO concurrence for no historic properties affected, was received on October 20, 2008.

Assessment of Effects

The Staging Areas and Preload Area have been previously disturbed by both manmade manipulation of the land, and by natural forces of subsidence and flooding. The borrow source has been previously used, and previously coordinated for no historic properties affected, in letters of coordination for past documents. As such, the USACE has made a determination of no historic properties affected as a result of this undertaking. This project will be subject to the standard change in scope of work, unexpected discovery, and unmarked human burial sites act provisions. USACE requests your comments within 30 days.

We look forward to your concurrence with this determination. Should you have any questions or need additional information with this undertaking, please contact Dr. Paul Hughbanks, Archaeologist; U.S. Army Corps of Engineers, New Orleans District at paul.j.hughbanks@usace.army.mil; or Jason Emery, Archaeologist and Tribal Liaison at (504) 862-2364 jason.e.emery@usace.army.mil.

Sincerely,

HARPER.MARSHAL
L.KEVIN.153611435
8

Digitally signed by
HARPER.MARSHALL.KEVIN.15361
14358
Date: 2021.06.09 13:38:33 -05'00'

MARSHALL K. HARPER
Chief, Environmental Planning Branch

CC:File

LA SHPO

An electronic copy of this letter with enclosures will be provided to the Section 106 Inbox, section106@crt.la.gov.

Figure 1. Humble Canal Preload Area and J-1 Borrow Source, Lafourche Parish.

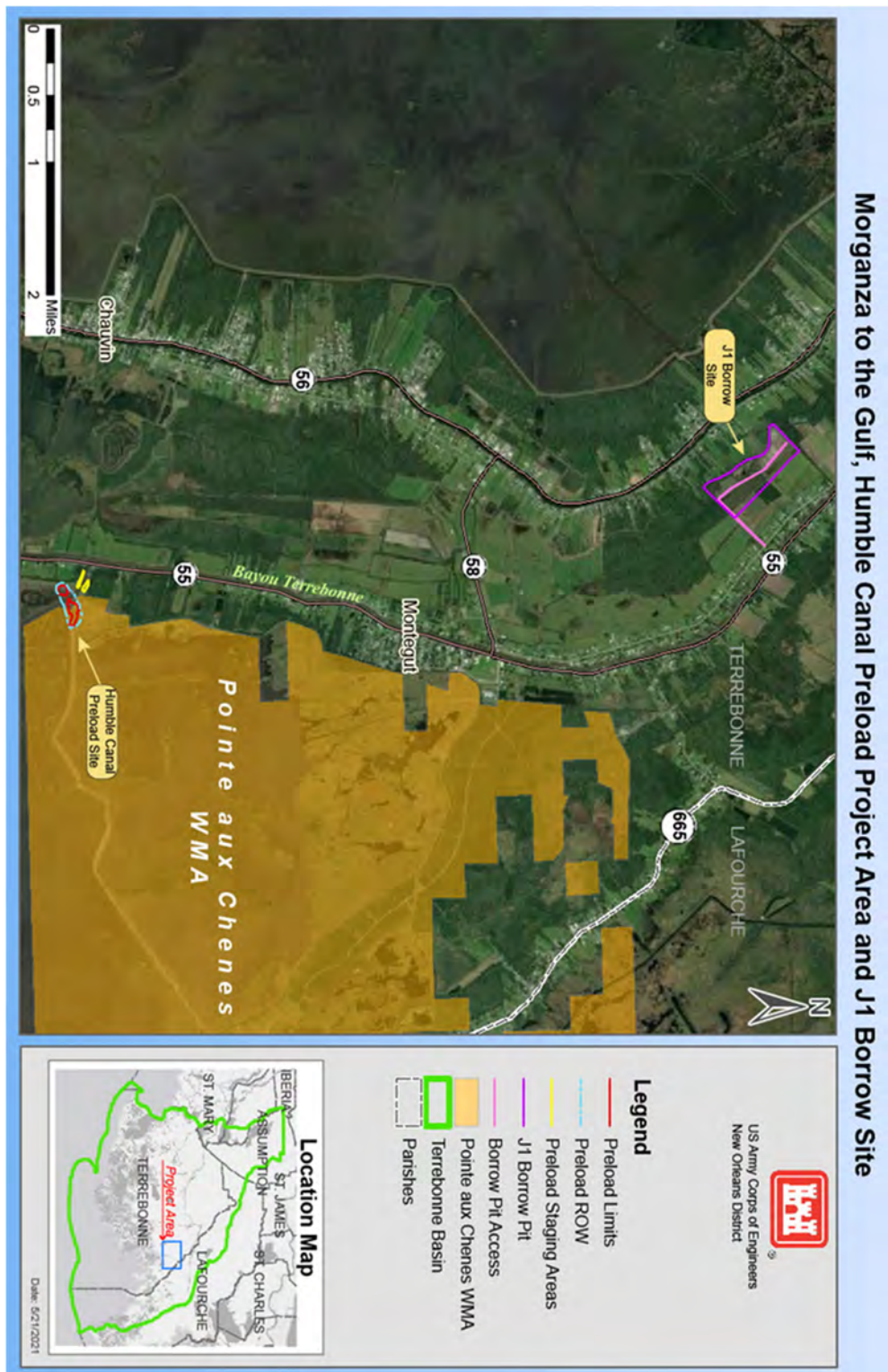


Figure 2. Humble Canal Preload Project Area



Figure 3. J-1 Borrow Area





State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

June 21, 2021

Daniel Meden
Corps of Engineers- New Orleans District
7400 Leake Avenue
New Orleans, LA 70118
Via email: Daniel.C.Meden@usace.army.mil

RE: **C20130001 Mod 02**, Coastal Zone Consistency
New Orleans District, Corps of Engineers
Direct Federal Action
Morganza to the Gulf Project Mod 02 - Humble Canal Preload Project
Terrebonne Parish

Dear Mr. Meden:

The above referenced project modification has been reviewed for consistency with the Louisiana Coastal Resources Program in accordance with Section 307 (c) of the Coastal Zone Management Act of 1972, as amended. The project modification, as proposed in this application, is consistent with the LCRP.

If you have any questions concerning this determination please contact Jim Bondy of the Consistency Section at (225) 342-3870 or james.bondy@la.gov.

Sincerely,

/S/ Charles Reulet

Administrator
Interagency Affairs/Field Services Division

CR/MH/jab

cc: Dave Butler, LDWF

From: [James Bondy](#)
To: [Meden, Daniel C CIV USARMY CEMVN \(USA\)](#)
Subject: [Non-DoD Source] C20130001 Mod 02 COE-NOD - Humble Canal Preload Project, Terrebonne Parish
Date: Thursday, May 27, 2021 9:38:29 AM

Daniel,

I wouldn't look for this one to happen real fast. After looking at comments from other agencies on the original authorization and on Mod 01, I am expecting comments on Mod 02... which will slow process down. The 60-Day deadline is July 9th, so we will definitely have it by then.

Thanks,
Jim

From: Meden, Daniel C CIV USARMY CEMVN (USA) [mailto:Daniel.C.Meden@usace.army.mil]
Sent: Thursday, May 27, 2021 8:45 AM
To: James Bondy <James.Bondy@LA.GOV>
Subject: Follow-up on Humble Canal CZC Mod

EXTERNAL EMAIL: Please do not click on links or attachments unless you know the content is safe.

Good morning, Jim!

How are you today? I wanted to check in with you on the status of the coastal zone consistency modification for Humble Canal since we had previously had a determination done for the 2013 MTG alignment.

Thanks!

Daniel Meden
Biologist, Coastal Environmental Planning
RPEDS, New Orleans District
Office: 504-862-1014

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From: [Meden, Daniel C CIV USARMY CEMVN \(USA\)](#)
To: [James Bondy](#)
Cc: [Wilkinson Wolfson, Laura L CIV USARMY CEMVN \(USA\)](#)
Subject: Coastal Zone Consistency Determination for Humble Canal Preload
Date: Friday, May 7, 2021 3:54:00 PM
Attachments: [C20130001 MTG: Pages from Appendices A-M for RPEIS for MtoG 5-16-13.pdf](#)
[J1 Borrow Pit Access Road.kmz](#)
[PRELOAD NORTH 20210505.kmz](#)

Good evening, Jim!

I hope everything is going well in your neck of the woods. Things are really starting to heat up as we head into the heat of early summer.

Please see the below project information for the Humble Canal Preload project, which falls within the levee alignment of the Morganza to the Gulf project (Revised Programmatic EIS in 2013). I'm wanting to see if we could clear this under the prior Coastal Zone Consistency determination (C20130001) before sending a new cover letter and list of guidelines. Otherwise I can cover each guideline and respond to each accordingly. I have also included kmz's of the preload footprint ("Preload North 20210505") and the access road owned by our Non-Federal Sponsor, Terrebonne Levee Conservation District ("J1 Borrow Access Road")

Thanks!

"The proposed action consists of constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site ("the site,") for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee would provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee would tie-in to existing flood protection levees.

The main project site is approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is located on Humble Canal approximately 1/3 miles east of the Bayou Terrebonne/Humble Canal intersection (Lat 29 26 08.5, Lon -90 33 44.0). A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately 500 linear feet and tie-in to existing Reach "I-3" Levee. It will have a maximum elevation of +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach "J-2" Levee. It will have a maximum elevation of +24 ft NAVD88.

The preload levee will be constructed mostly of clay. Some sand and rock and will also be used. Approximately 150,000 cubic yards of fill will be required. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation. The borrow material shall be of naturally occurring earth materials. Materials that are classified in accordance with American Society for Testing and Materials,

Unified Soil Classification System (ASTM D 2487) as CL (silty clay or sandy clay) or CH (fat clay) with less than 35% naturally occurring sand content are suitable for use as levee construction material. Materials classified as ML are suitable if blended to produce a material that classifies as CL or CH according to ASTM D 2487. Allowable borrow material cannot have organic content greater than 12 percent by weight, as determined by ASTM D 2974, Method C. The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District's off-site borrow source ("J-1 borrow site") adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the main project site.

For an estimated construction duration of 430 Days (5 day/week; 10 hr/days), the equipment that may be used in the various stages of construction of the preload levee includes, but is not limited to the following:

- Excavators, bulldozers, marsh excavators and buggies, barges, and pontoons will be used in clearing and grubbing, excavation, placement of levee and roadway fill, rock, and gravel.
- Dump trucks will be used to haul fill between the borrow pit and construction site and to haul other construction materials.
- Water or spray trucks will be used to process borrow material.
- Rollers will be used to compact levee and roadway fill.
- Excavator with mounted hollow mandrel will be used to install the vertical wick drains.
- A work boat will be used to install navigation aids in Humble Canal and oversee construction operations from the water when necessary.

1/2-ton and 1-ton work trucks will also be used on-site for hauling equipment."

Daniel Meden
Biologist, Coastal Environmental Planning
RPEDS, New Orleans District
Office: 504-862-1014



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

June 10, 2021

Regional Planning and
Environment Division, South
Environmental Planning Branch
Attn: CEMVN-PDS-N

Kristin Sanders, SHPO
LA State Historic Preservation Officer
P.O. Box 44247
Baton Rouge, LA 70804-4241

No known historic properties will be affected by this undertaking. Therefore, our office has no objection to the implementation of this project. This effect determination could change should new information come to our attention.

Kristin P. Sanders
State Historic Preservation Officer
Date 07/07/2021

RE: Section 106 Review Consultation

Undertaking: Humble Canal Preload Construction: Morganza to the Gulf Project, Lafourche Parish, Louisiana (Lat. 29.436 Long. - 90.563)

Determination: **No Historic Properties Affected**

Dear Ms. Sanders:

The U.S. Army Corps of Engineers (USACE), New Orleans District, proposes to ready a location for the weight required by construction and performance of a Sector Gate across the Humble Canal, by first constructing a pre-load levee to aid soil compaction. This construction is located near Bayou Terrebonne in Lafourche Parish (Lat. 29.436 Long. -90.563). This effort will also require a previously used borrow source, also near Bayou Terrebonne in Lafourche Parish (Lat. 29.512 Long. -90.577).

Description of the Undertaking

The objective of this project is to construct an initial, or preload levee, to prepare the site for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee will provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee will tie-in to existing flood protection levees.

The main project site is approximately 3 miles south of the town of Montegut, LA and 2 miles east of Chauvin, LA in Terrebonne Parish. It is accessed via Highway 55 (Montegut Road) and Exxon Company Road. It is located on Humble Canal approximately 1/3 miles east of the Bayou Terrebonne/Humble Canal intersection). A portion of the project site extends into the Pointe-aux-Chenes State Wildlife Management Area.

The preload levee will consist of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately

500 linear feet and tie-in to existing Reach "I-3" Levee. It will have a maximum elevation of +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach "J-2" Levee. It will have a maximum elevation of +24 ft NAVD88.

The preload levee will be constructed mostly of clay. Some sand and rock and will also be used. Approximately 150,000 cubic yards of fill will be required. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation.

The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District's off-site borrow source ("J-1 borrow site") adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the main project site.

Area of Potential Effects (APE)

The preload levee requires a right-of-way, staging area, and borrow material. The totality of these is considered to be the APE, while noting that the borrow source has been previously coordinated for no historic properties affected, and the staging area is on land previously disturbed by construction of the existing levees. Known resources and past investigations within each of the identified APE's are described below in the "Identification and Evaluation" portion of this letter.

Identification and Evaluation

Background and literature review has been conducted by USACE staff. Historic properties in the project vicinity were identified based on a review of the NRHP database, the Louisiana Cultural Resources Map, historic map research, and a review of cultural resources survey reports.

A site visit was made to the preload and staging areas Right-of-Way by USACE archaeologists Dr. Paul Hughbanks and Mr. Jason Emery. Observation of soil strata was made by walking bankline, observing overturned trees, and other remnants of animal or natural activity. These observations suggested prior soil mixing, and no strata suggesting past cultural remains was visible.

The borrow source has been previously utilized and was coordinated for cultural resources as a part of the Environmental Assessments (EA) #406 and #450. As depicted on Figure #4, the borrow would come primarily from the 29 acres defined as Area A. In addition, borrow would be removed from Area B and the space between existing ponds. Lastly, the access road for excavation and removal will be located between Areas B and C.

EA#406 described a 2.6 mile levee to fill in a gap between previously constructed levees on either side, with the current borrow source being utilized for construction material. The letters of coordination for Section 106 of the National Historic Preservation Act (February 14, 2005 and April 15, 2005), discussed measures to protect prehistoric site 16TR33 located near the levee construction, and that no historic properties existed within the proposed borrow area. Letters of concurrence to the protective measures and the no historic properties for borrow area, were received from

the Chitimacha Tribe of Louisiana (May 16, 2005) and the Louisiana SHPO (March 30, 2005 and May 18, 2005).

The definition and use of the borrow area was revisited again with EA#450. A Louisiana SHPO concurrence for no historic properties affected, was received on October 20, 2008.

Assessment of Effects

The Staging Areas and Preload Area have been previously disturbed by both manmade manipulation of the land, and by natural forces of subsidence and flooding. The borrow source has been previously used, and previously coordinated for no historic properties affected, in letters of coordination for past documents. As such, the USACE has made a determination of no historic properties affected as a result of this undertaking. This project will be subject to the standard change in scope of work, unexpected discovery, and unmarked human burial sites act provisions. USACE requests your comments within 30 days.

We look forward to your concurrence with this determination. Should you have any questions or need additional information with this undertaking, please contact Dr. Paul Hughbanks, Archaeologist; U.S. Army Corps of Engineers, New Orleans District at paul.j.hughbanks@usace.army.mil; or Jason Emery, Archaeologist and Tribal Liaison at (504) 862-2364 jason.e.emery@usace.army.mil.

Sincerely,

HARPER.MARSHAL
L.KEVIN.153611435
8

Digitally signed by
HARPER.MARSHALL.KEVIN.15361
14358
Date: 2021.06.09 13:38:33 -05'00'

MARSHALL K. HARPER
Chief, Environmental Planning Branch

CC:File

LA SHPO

An electronic copy of this letter with enclosures will be provided to the Section 106 Inbox, section106@crt.la.gov.

From: [David Franks](#)
To: [Hughbanks, Paul J CIV USARMY CEMVN \(USA\)](#)
Subject: [Non-DoD Source] RE: USACE Section 106: Finding of No Historic Properties Affected for Humble Canal Preload Levee and Borrow Source, Lafourche Parish
Date: Tuesday, June 15, 2021 8:40:12 AM

The Seminole Nation has no objections.

From: Hughbanks, Paul J CIV USARMY CEMVN (USA) [mailto:Paul.J.Hughbanks@usace.army.mil]
Sent: Wednesday, June 9, 2021 3:44 PM
To: David Franks <Franks.D@sno-nsn.gov>
Cc: Emery, Jason A CIV USARMY CEMVN (USA) <Jason.A.Emery@usace.army.mil>
Subject: USACE Section 106: Finding of No Historic Properties Affected for Humble Canal Preload Levee and Borrow Source, Lafourche Parish

Hello:

Attached, please find a signed Finding of No Historic Properties Affected for construction of a preload area related to the Humble Canal Floodgate, Louisiana.

Please notify the Archaeologist or District Tribal Liaison with questions or comments. Their contact information follows: Dr. Paul Hughbanks, (504) 862-1100 or Paul.J.Hughbanks@usace.army.mil; Jason A. Emery, MVN Archaeologist and District Tribal Liaison at (504) 862-2364 or jason.a.emery@usace.army.mil.

Sincerely,
Paul Hughbanks
Archaeologist, Natural/Cultural Resources Analysis RPEDS, New Orleans District
Office: 504-862-1100

From: [Lindsey Bilyeu](#)
To: [Hughbanks, Paul J CIV USARMY CEMVN \(USA\)](#)
Subject: [Non-DoD Source] RE: USACE Section 106: Finding of No Historic Properties Affected for Humble Canal Preload Levee and Borrow Source, Lafourche Parish
Date: Thursday, July 8, 2021 2:41:48 PM

Paul,

The Choctaw Nation of Oklahoma thanks the USACE, New Orleans District, for the correspondence regarding the above referenced project. Lafourche Parish lies outside of our area of historic interest. The Choctaw Nation Historic Preservation Department respectfully defers to the other Tribes that have been contacted.

If you have any questions, please contact me.

Thank you,

Lindsey D. Bilyeu, MS
Senior Section 106 Reviewer
Choctaw Nation of Oklahoma
Historic Preservation Department
Office: (580) 924-8280
Cell: (580) 740-9624

From: Hughbanks, Paul J CIV USARMY CEMVN (USA) <Paul.J.Hughbanks@usace.army.mil>
Sent: Wednesday, June 9, 2021 3:47 PM
To: Lindsey Bilyeu <lbilyeu@choctawnation.com>; Ian Thompson <ithompson@choctawnation.com>
Cc: Emery, Jason A CIV USARMY CEMVN (USA) <Jason.A.Emery@usace.army.mil>
Subject: USACE Section 106: Finding of No Historic Properties Affected for Humble Canal Preload Levee and Borrow Source, Lafourche Parish

Halito: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello:

Attached, please find a signed Finding of No Historic Properties Affected for construction of a preload area related to the Humble Canal Floodgate, Louisiana.

Please notify the Archaeologist or District Tribal Liaison with questions or comments. Their contact information follows: Dr. Paul Hughbanks, (504) 862-1100 or Paul.J.Hughbanks@usace.army.mil; Jason A. Emery, MVN Archaeologist and District Tribal Liaison at (504) 862-2364 or jason.a.emery@usace.army.mil.

Sincerely,
Paul Hughbanks
Archaeologist, Natural/Cultural Resources Analysis RPEDS, New Orleans District
Office: 504-862-1100

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure. If you have received this message in error, you are hereby notified that we do not consent to any reading, dissemination, distribution or copying of this message. If you have received this communication in error, please notify the sender immediately and destroy the transmitted information. Please note that any view or opinions presented in this email are solely those of the author and do not necessarily represent those of the Choctaw Nation.

APPENDIX E: 404(B)(1) ANALYSIS (SHORT FORM)

SECTION 404(b)(1) EVALUATION

PROJECT TITLE. Morganza to the Gulf, Humble Canal Gate Site Preparation and Initial Levee

PROJECT DESCRIPTION. The proposed action consists of constructing an initial, or preload levee, to prepare the Humble Canal Floodgate site, location depicted in Figure 1, for the future construction of a floodgate, associated floodwalls, and earthen levees across Humble Canal. The preload levee would provide a good base and working surface for future construction by promoting settlement and strengthening the foundations of the future levee and floodwalls. The preload levee would tie-in to existing Morganza to the Gulf flood protection levees.

The preload levee consists of north and south alignments on each side of the Humble Canal channel. The south alignment will extend from the channel approximately 500 linear feet and tie-in to existing Reach “I-3” Levee. It will have a maximum elevation of +22 ft NAVD88. The north alignment will extend from the channel approximately 1150 linear feet and tie-in to existing Reach “J-2” Levee. It will have a maximum elevation of +24 ft NAVD88.

Approximately 150,000 cubic yards of fill and borrow material, comprised of mostly of clay and some sand and rock, will be used to construct the preload levee. The preload will be constructed over a wick drain foundation that will extend within and drain the upper 45 feet of clay foundation. The borrow material used to construct the preload levee will be hauled in from Terrebonne Levee and Conservation District’s off-site borrow source “J-1 borrow site,” adjacent to Bayou la Cache, off Aragon Road near Montegut, LA. It is about 5 miles north of the main project site. The 100-acre J-1 borrow site has been subdivided into three categories for use. Figure 2 depicts the site location and the three subdivided areas of the J-1 borrow site. Acreage and specific planned use for each subdivided site is listed below:

1. Area A (29 acres) – primary borrow source
2. Area B space between the ponds (17 acres) – additional borrow
3. Access Road between Area B and C (extra as needed)

It should be noted that the Sponsor has stated Area C is currently being used for another contract, and will not be available for use in the Humble Canal preload levee project.

The estimated construction duration is 430 Days (5 days/week; 10 hrs/day). The equipment that may be used for the construction includes, but is not limited to the following:

- Excavators, bulldozers, marsh excavators and buggies, barges, and pontoons will be used in clearing and grubbing, excavation, placement of levee and roadway fill, rock, and gravel.
- Dump trucks will be used to haul fill between the borrow pit and construction site and to haul other construction materials.
- Water or spray trucks will be used to process borrow material.
- Rollers will be used to compact levee and roadway fill.
- Excavator with mounted hollow mandrel will be used to install the vertical wick drains.
- A work boat will be used to install navigation aids in Humble Canal and oversee construction operations from the water when necessary.

- 1/2-ton and 1-ton work trucks will also be used on-site for hauling equipment.

The purpose of the proposed action is to provide hurricane and storm damage risk reduction for the communities located within the levee system. The overarching goal is to reduce the risk to people and property in the vicinity of Houma, Louisiana. All project benefits are related to hurricane and storm damage risk reduction. No flood damage reduction, navigation, or ecosystem restoration benefits are quantified for this project. The project is needed because of the increasing susceptibility of coastal communities to storm surge due to subsidence, climate change, and sea-level rise.



Figure 1. Humble Canal Preload footprint and staging area right-of-way (ROW)

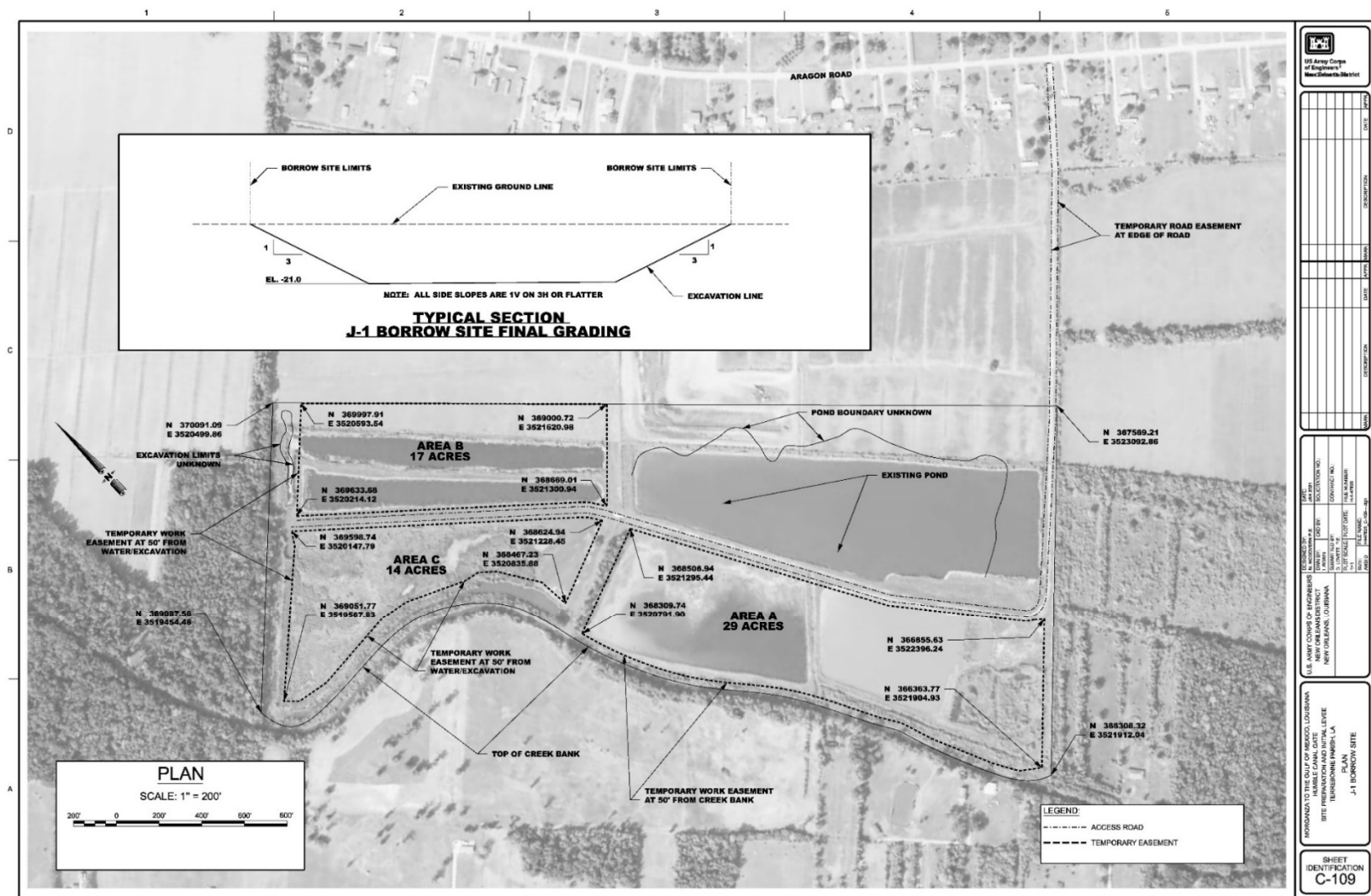


Figure 2. Borrow site plan sheet for Humble Canal earthen fill material

1. Review of Compliance (§230.10 (a)-(d))

A review of this project indicates that:

	Preliminary ¹		Final ²	
	Yes	No	Yes	No
a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for environmental assessment alternative)	x			
b. The activity does not appear to: i. violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act; ii. jeopardize the existence of Federally listed endangered or threatened species or their habitat; and iii. violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies)	x ⁴			
c. The activity will not cause or contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values (if no, see section 2)	x			
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5)	x			

2. Technical Evaluation Factors (Subparts C-F)

a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)

- i. Substrate impacts
- ii. Suspended particulates/turbidity impacts.
- iii. Water column impacts
- iv. Alteration of current patterns and water circulation
- v. Alteration of normal water fluctuations/hydroperiod
- vi. Alteration of salinity gradients

N/A	Not Significant	Significant ^{3,5}
	x	
	x	
	x	
	x	
	x	
	x	

b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)

- i. Effect on threatened/endangered species and their habitat
- ii. Effect on the aquatic food web
- iii. Effect on other wildlife (mammals, birds, reptiles, and amphibians)

	x	
	x	
	x	

c. Special Aquatic Sites (Subpart E)

- i. Sanctuaries and refuges
- ii. Wetlands
- iii. Mud flats
- iv. Vegetated shallows
- v. Coral reefs
- vi. Riffle and pool complexes

	x	
	x	
x		
x		
x		
x		

d. Human Use Characteristics (Subpart F)

- i. Effects on municipal and private water supplies
- ii. Recreational and commercial fisheries impacts
- iii. Effects on water-related recreation.
- iv. Esthetic impacts
- v. Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves

x		
	x	
	x	
x		
	x	

3. Evaluation of Dredged or Fill Material (Subpart G)

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

- | | |
|---|---------------|
| i. Physical characteristics | <u> x </u> |
| ii. Hydrography in relation to known or anticipated sources of contaminants | <u> x </u> |
| iii. Known, significant sources of persistent pesticides from land runoff or percolation | <u> </u> |
| iv. Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances | <u> x </u> |
| v. Other public records of significant introduction of contaminants from industries, municipalities, or other sources | <u> x </u> |
| vi. Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities | <u> </u> |
| vii. Other sources (specify) | <u> </u> |

Appropriate references: See Encl 2

b. An evaluation of the appropriate information in 3.a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria.⁶

Yes	No ³
x	

4. Disposal Site Delineation (§230.11(f))

- a. The following factors, as appropriate, have been considered in evaluating the disposal site.

i. Depth of water at disposal site	<u>x</u>
ii. Current velocity, direction, and variability at disposal site	<u>x</u>
iii. Degree of turbulence	<u>x</u>
iv. Water column stratification	<u>x</u>
v. Discharge vessel speed and direction	<u>x</u>
vi. Rate of discharge	<u>x</u>
vii. Dredged or fill material characteristics (constituents, amount, and type of material, settling velocities)	<u>x</u>
viii. Number of discharges per unit of time	<u> </u>
ix. Other factors affecting rates and patterns of mixing (specify)	<u> </u>

Appropriate references: See Encl 2

- b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable

Yes	No ³
x	

5. Actions to Minimize Adverse Effects (Subpart H)

All appropriate and practicable steps have been taken, through application of the recommendations of §230.70-230.77, to ensure minimal adverse effects of the proposed discharge

Yes	No ³
x	

Actions taken: Compensatory mitigation bank credits will be used to fully mitigate for fresh and brackish marsh and bottomland hardwoods impacted from the proposed action. Staging areas are located on non-wetlands above the preload footprint. In consideration of biological characteristics, construction contracts will have best management practices for colonial nesting birds as well as manatees as coordinated with US Fish and Wildlife, National Marine Fisheries Service, and Louisiana Department of Wildlife and Fisheries.

6. Factual Determination (§230.11)

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:

- a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5 above)
- b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5)
- c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5)
- d. Contaminant availability (review sections 2a, 3, and 4)
- e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5)
- f. Disposal site (review sections 2, 4, and 5)
- g. Cumulative impact on the aquatic ecosystem
- h. Secondary impacts on the aquatic ecosystem

Yes	No ³
x	
x	
x	
x	
x	
x	
x	
x	

¹ Negative responses to three or more of the compliance criteria at this stage indicates that the proposed projects may not be evaluated using this "short form procedure". Care should be used in assessing pertinent portions of the technical information of items 2a-d, before completing the final review of compliance.

² Negative responses to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

³ A negative, significant, or unknown response indicates that the project may not be in compliance with the Section 404(b)(1) Guidelines.

⁴ For 1.b., review is for i. only (i.e., The activity does not appear to violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act)

⁵ Where a check is placed under the significant category, the preparer has attached explanation.

⁶ If the dredged or fill material cannot be excluded from individual testing, the "short form" evaluation process is inappropriate.

7. Evaluation Responsibility

a. Prepared by:

Shannon Kelly
Hydraulic Engineer
U.S. Army Corps of Engineers, New Orleans District
May 25, 2021

Daniel Meden
Biologist
U.S. Army Corps of Engineers, New Orleans District
July 15, 2021

b. Reviewed by:

Eric Glisch
Environmental Engineer
U.S. Army Corps of Engineers, New Orleans District
June 8, 2021

8. Findings

- | | | |
|----|--|-------|
| a. | The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines | x |
| b. | The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions ... | _____ |
| c. | The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reason(s): | _____ |
| | i. There is a less damaging practicable alternative | _____ |
| | ii. The proposed discharge will result in significant degradation of the aquatic ecosystem | _____ |
| | iii. The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem | _____ |

Date: 7/15/2021

Chief, Environmental Planning and
Compliance Branch

APPENDIX F: ABBREVIATIONS AND ACRONYMS

LIST OF ABBREVIATIONS, ACRONYMS, AND GLOSSARY OF COMMON TERMS

AAHUs	Average Annual Habitat Units
ACE	American Community Survey
APE (Cultural)	Area of Potential Effect
ASTM	American Society for Testing and Materials
BGEPA	Bald and Golden Eagle Protection Act
BLH	Bottomland Hardwoods
CAA	Clean Air Act
CDP	Census Designated Place
CEMVN	US Army Corps of Engineers, Mississippi Valley Division New Orleans District
CFR	Code of Federal Regulations
CH	fat clay (from ASTM Unified Soil Classification System)
CI	Cumulative Impacts
CL	silty or sandy clay (from ASTM Unified Soil Classification System)
CO	Carbon monoxide
CPRA	Coastal Protection and Restoration Authority
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection, and Restoration Act
cyd	cubic yards
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
ECS	Environmental Control Structure
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act of 1973
Phase I ESA	Phase I Environmental Site Assessment
FONSI	Finding of No Significant Impact
FPPA	Farmland Policy Act of 1981
ft	Feet
FWCA	Fish and Wildlife Coordination Act
FWCAR	Fish and Wildlife Coordination Act Report
FWOP	Future without Project
FWP	Fish and Wildlife Propagation
FONSI	Finding of No Significant Impact
Hwy	Highway
HNC	Houma Navigation Canal
HSI	Habitat Suitability Index
HTRW	Hazardous, toxic and radioactive waste
HU	Habitat Unit
in/sec	inches per second
LA	Louisiana

LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LF	linear feet
LGM	Larose to Golden Meadow project
MBTA	Migratory Bird Treaty Act
ML	silt soil (from ASTM Unified Soil Classification System)
MSA	Metropolitan Statistical Area
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MRT-MTG	Mississippi River and Tributaries Morganza to the Gulf of Mexico
NAAQS	National Ambient Air Quality Standards
NAVD 88	North American Vertical Datum 88
NEPA	National Environmental Policy Act of 1969
NFS	Non-Federal Sponsor
NHPA	National Historic Preservation Act
NMFS	NOAA National Marine Fisheries Service
NO ₂	Nitrogen Dioxide
NO _x	Oxides of Nitrogen
NRCS	Natural Resources Conservation Service
NWR	National Wildlife Refuge
O ₃	Ozone
OYS	Oyster Propagation
PACR	Post Authorization Change Report
Pb	Lead
PCR	Primary Contact Recreation
PED	Pre-construction, Engineering, and Design
PEIS	Programmatic Environmental Impact Statement
PL	Public Law
PM	Particulate Matter
PM _{2.5}	Particulate Matter less than or equal to 2.5 micrometers
PM ₁₀	Particulate Matter less than or equal to 10 micrometers
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
REC	Recognized Environmental Condition
ROD	Record of Decision
RPEIS	Revised Programmatic Environmental Impact Statement
SAV	Submerged aquatic vegetation
SCR	Secondary Contact Recreation
SHPO	State Historic Preservation Officer
SI	Suitability Index
SLR	Sea Level Rise
SO ₂	Sulfur dioxide
T&E	threatened and endangered
THPO	Tribal Historic Preservation Office
TLCD	Terrebonne Levee Conservation District
TMDL	Total Maximum Daily Loads
U.S.	United States
USACE	U.S. Army Corps of Engineers

USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
VRAP	Visual Resource Assessment Procedure
WMA	Wildlife Management Area
WQC	Water Quality Certification
WRDA	Water Resources Development Act
WRRDA	Water Resources Reform and Development Act
WVA	Wetland Value Assessment
µg/m ³	microgram per cubic meter

APPENDIX G: BEST MANAGEMENT PRACTICES TO AVOID ENTRAPMENTS

Protected Marine Species Entrapment Prevention Measures

Bottlenose dolphins, sea turtles and Gulf sturgeon (NOAA Trust Species) are known to inhabit coastal Louisiana waters. Bottlenose dolphins are protected under the Marine Mammal Protection Act of 1972 (MMPA) and sea turtles and Gulf sturgeons are protected under the Endangered Species Act (ESA). Because of the potential for these protected species to become entrapped within construction sites in coastal Louisiana waters, projects that utilize shallow open water areas for the construction of enclosed facilities and wetland creation will utilize the following measures to minimize and/or prevent the potential for such entrapment:

1. Prior to construction, the Corps of Engineers (COE) Technical Manager, the Contracting Officer Representative (COR) and the Contractors should conduct a site visit and meeting to develop a mutual understanding relative to compliance with the MMPA and the ESA.
2. Contractors will instruct all personnel associated with the project of the potential presence of Trust Species in the area, and the need to prevent entrapment of these animals. All construction personnel will be advised that there are civil and criminal penalties for harming, harassing, or killing these protected species. The Contractor shall be held responsible for any Trust species harassed or killed as a result of construction activities not conducted in accordance with these specifications.
3. Contractor will observe the area to be enclosed for Trust Species at least 24 hours prior to and during closure of any levee, dike or structure. This is best accomplished by small vessel or aerial surveys, with at least two experienced marine observers on board scanning for Trust species. Large areas (e.g. >300 acres) will likely require the use of more than one vessel or aerial surveys to insure full coverage of the area. These surveys will occur in a best sea state (BSS) of 3 feet or less, as Trust species are difficult to sight in choppy water.
4. Any Trust Species sighted within the area to be enclosed triggers all appropriate precautions to be implemented by the Contractor to ensure protection of the animal(s). These precautions shall include avoiding direct contact with the Trust species.
5. Any sightings of Trust Species within an enclosed project site shall be reported immediately to the COE. The point of contact within the COE will be Tammy Gilmore, (504) 862-1002 or email at tammy.h.gilmore@usace.army.mil. Coordination by the COE personnel with the National Marine Fisheries Service (NMFS) Marine Mammal Health and Stranding Response (MMHSRP) and the Louisiana State Coordinator for the Sea Turtle Stranding and Salvage Network (STSSN) will be conducted, as applicable, to determine what further actions may be required.
6. During enclosure construction, the Contractor will leave or construct at least one escape route in retention structures to allow any Trust species to exit shallow open water areas during construction activities. Escape routes in retention structures would be constructed to lead directly to open water outside the disposal site with a minimum width of 100 feet and have a depth as deep as the deepest natural entrance into the disposal site.

7. Escape routes in retention structures would remain open until visual inspections of the enclosure have determined that no Trust species are present within the structure.
8. If observers note entrapped animals are not leaving the area, but are visually disturbed, stressed, or their health is compromised then COE may require any pumping activity to cease until the animals either leave on their own or are moved under the direction of NMFS.
 - a. In coordination with the local stranding networks and other experts, NMFS will conduct an initial assessment to determine the number of animals, their size, age (in the case of dolphins), body condition, behavior, habitat, environmental parameters, prey availability and overall risk.
 - b. If the animal(s) is/are not in imminent danger they will need to be monitored by the Stranding Network for any significant changes in the above variable.
 - c. The contractor may not attempt to scare, herd, disturb, or harass the Trust species to encourage them to leave the area. Coordination by the COE with the NMFS SER Stranding Coordinator may result in authorization for these actions.
 - d. NMFS may intervene (catch and release and/or rehabilitate) if the Trust Species are in a situation that is life threatening and evidence suggests the animal is unlikely to survive in its immediate surroundings.
 - e. Surveys will be conducted throughout the area at least twice or more in calm surface conditions (BSS 3 feet or less), with experienced marine observers, to determine whether Trust species are no longer present in the area.
9. Any Trust Species observed dead must immediately be reported to the COE (Tammy Gilmore 504-862-1002) .who will then report to NMFS and/or STSSN coordinator.

Special Operating Conditions If Manatees Are Present in the Project Area:

- (1) If a manatee(s) is sighted within 100 yards (91 m) of the project area, all appropriate precautions shall be implemented by the Contractor to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 ft (15.2 m) of a manatee. If a manatee is closer than 50 ft (15.2 m) to moving equipment or the project area, the equipment will be shut down and all construction activities will cease to ensure protection of the manatee. Construction activities will not resume until the manatee has departed and the 50-foot (15.2 m) buffer has been re-established.
- (2) If a manatee(s) is sighted in the project area, all vessels associated with the project shall operate at "no wake/idle" speeds at all times while in waters where the draft of the vessel provides less than a four-foot (1.2 m) clearance from the bottom, and vessels will follow routes of deep water whenever possible. Boats used to transport personnel shall be shallow-draft vessels, preferably of the light displacement category, where navigational safety permits.
- (3) If siltation barriers are used, they will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment.
- (4) Manatee Signs. Prior to commencement of construction, each vessel involved in construction activities shall display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8-1/2" x 11" (21.6 x 27.9 cm) reading, "CAUTION: MANATEE HABITAT/IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA." In the absence of a vessel, a temporary 3' x 4' (0.9 x 1.2 m) sign reading "CAUTION: MANATEE AREA" will be posted adjacent to the issued construction permit. A second temporary sign measuring 8-1/2" x 11" (21.6 x 27.9 cm) reading "CAUTION: MANATEE HABITAT. EQUIPMENT MUST BE SHUT DOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION" will be posted at the dredge operator control station and at a location prominently adjacent to the issued construction permit. The Contractor shall remove the signs upon completion of construction.