CWPPRA RPT Region 3

Terrebonne Basin

PPL35 PROJECT NOMINEE FACT SHEET
February 5th, 2025

Project Name
West Lake De Cade Marsh Creation Project

Project Location
Region 3, Terrebonne Basin, Terrebonne Parish, West of Lake De Cade

Problem
The Terrebonne Basin is an abandoned delta complex, characterized by a thick section of unconsolidated sediments that are undergoing dewatering compaction, contributing to high subsidence. Historically, subsidence, saltwater intrusion, hurricanes, and numerous oil and gas pipelines in the area have contributed significantly to wetland losses. Since 1932, the Terrebonne Basin has lost approximately 20% of its wetlands. Current loss rates range from approximately 4,500 to 6,500 acres/year. This loss amounts to approximately 130,000 acres over the next 20 years. One-third of the Terrebonne Basin's remaining wetlands would be lost to open water by the year 2040. The wetland loss rate in the area is 0.08%/year estimated by USGS with a subsidence of at least 6.7mm/y (ArcMap).

Proposed Solution
Sediments from Lake De Cade will be hydraulically dredged and pumped via pipeline to create/nourish 405 acres of marsh. Dewatering and compaction of dredged sediments should produce elevations conducive to the establishment of emergent marsh and within the intertidal range. Containment dikes will be constructed around each marsh creation cell. Where practicable, material will be borrowed from perimeter lakes and bayous. Containment dikes will be gapped at the end of construction or by TY3.

Goals
The project goals are to create and/or nourish 405 acres of intermediate marsh and armor 8,116 LF of shoreline.

Project Features
Marsh Creation – 288 acres
Marsh Nourishment – 117 acres

Preliminary Ranking Criteria
1) *What is the project's estimated total net acres after 20 years?*
   The total net acres protected/created over the project life is approximately 259 acres.

2) *What is the estimated construction cost plus 25% contingency and the estimated fully funded cost?*
   The estimated construction cost plus 25% contingency range is $37,527,663
   The estimated fully funded range is $50M-$55M

3) *What is the project cost effectiveness using fully funded cost/net acres?*
   Cost effectiveness - $186,041/acre

Total fully funded cost ($52.5 M) / Total Net Acres (259 ac) = Cost effectiveness – ($202,703/acre)

4) *To what extent does the project provide a synergistic effect with other approved and/or constructed restoration projects? (Provide details including proximity, funding/project status, and how the projects collectively contribute to restorations benefits larger than their individual footprints)*

The project would work synergistically with the North Lake Mechant Landbridge Restoration Project (TE-44), the Lost Lake Project Marsh Creation Hydrologic Restoration (TE-72), the South Lake De Cade Freshwater Introduction Project (TE-39), Coastwide Vegetative Plantings (LA-39), and the Bayou De Cade Marsh Creation Project (TE-138).

5) *What is the interior loss rate and/or shoreline loss rate? And what is the source of the data?*

The wetland loss rate in the area is 0.08%/year estimated by USGS with a subsidence of at least 3.6mm/y.

6) *Do any project features maintain or restore structural components of the coastal ecosystem such as barrier islands, natural or artificial levee ridges, beach and lake rims, cheniers, etc or is part of a land bridge feature?*

The project would help to maintain portions of the Lake De Cade shoreline.

7) *Does the project result in net positive and direct benefits on critical infrastructure?*

The project would help protect oil and gas infrastructure in the area.

Other Considerations

Considerations for this project include pipelines/utilities. Only one cooperative landowner.

Preparer(s) of Fact Sheet and Contact Information

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PPL34 West Lake De Cade Marsh Creation Project

2024 Aerial Imagery Federal Sponsor: NOAA Fisheries

288 Acres Marsh Creation

117 Acres Marsh Nourishment

Map Date 01-09-2024

Legend

- Marsh Creation
- Borrow
- Shoreline Armor

West Lake De Cade Marsh Creation Project

NOAA FISHERIES

REGION 3 – Terrebonne Basin

Presenter: Jennifer Smith, Project Manager, NOAA

Special Thanks:
Apache Louisiana Minerals, LLC
Terrebonne Parish

PPL 35 CWPPRA Regional Planning Team Meeting

Morgan City

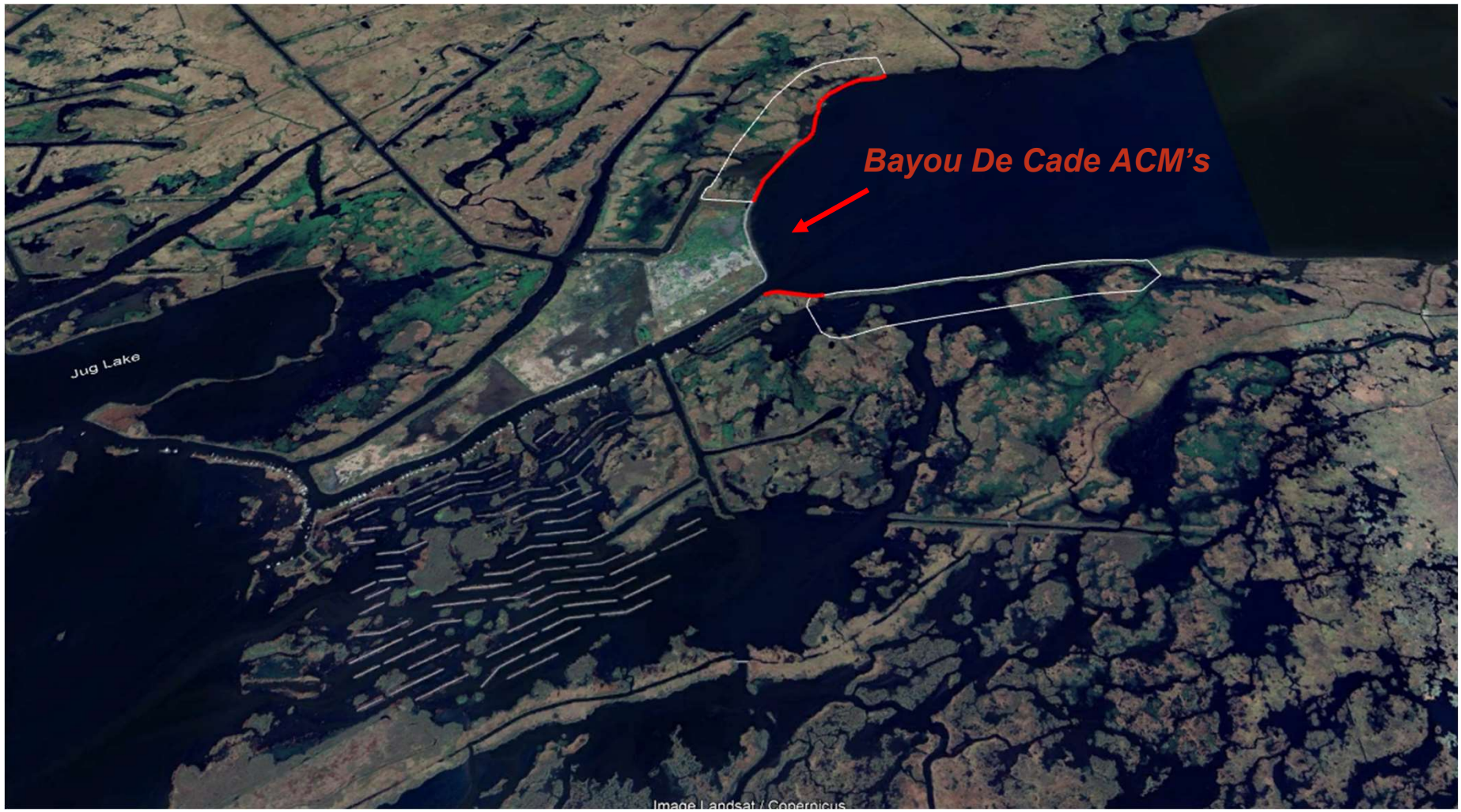
February 5th, 2025

Priority Project Planning

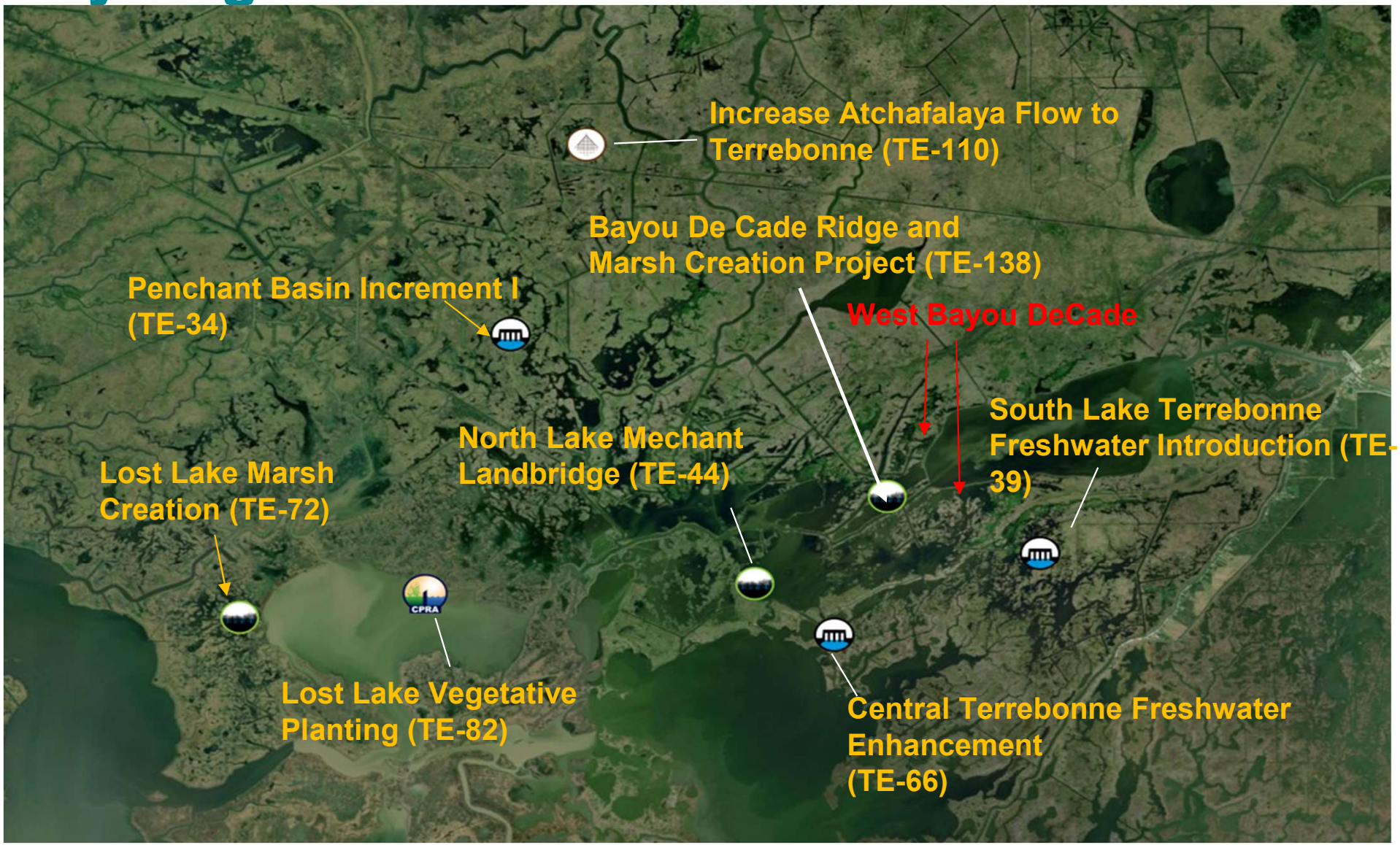
- Areas of Need Within Basin
- Synergy With Other Restoration Efforts
- Applicability Within the CWPPRA Program
- Develop Solutions with Preferred Project Features

Area of Need

- Northwest rim is breached.
- Southwest rim has rock but needs marsh behind.

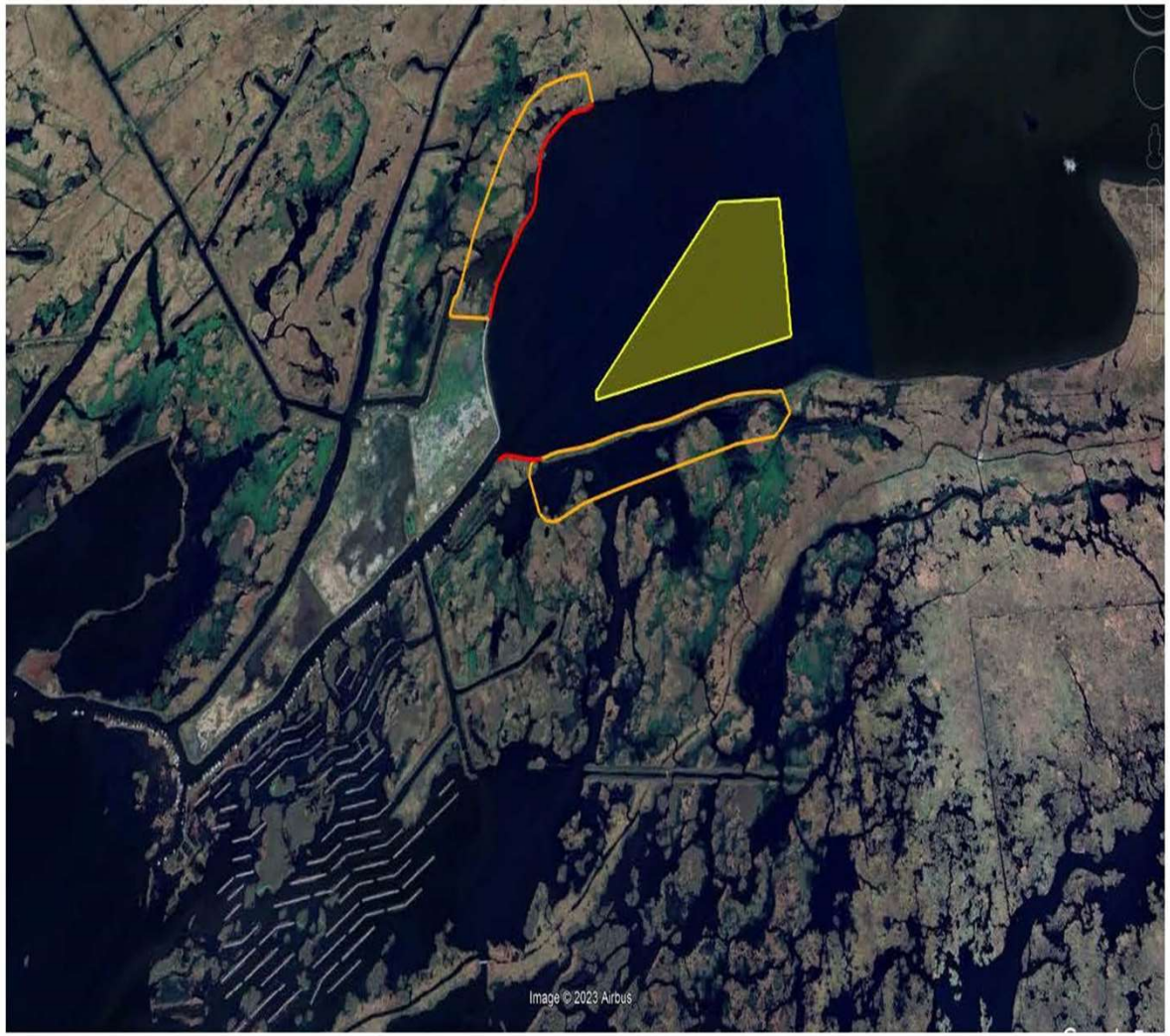


Synergies


Increase Atchafalaya Flow to Terrebonne (TE-110)
Bayou De Cade Ridge and Marsh Creation Project (TE-138)
Penchant Basin Increment I (TE-34)
West Bayou DeCade
South Lake Terrebonne Freshwater Introduction (TE-39)
North Lake Mechant Landbridge (TE-44)
Lost Lake Marsh Creation (TE-72)
CPRA
Lost Lake Vegetative Planting (TE-82)
Central Terrebonne Freshwater Enhancement (TE-66)

Preferred Project Features

Solution



- 2017 State Master Plan Polygon 03a.MC.101
- Lake De Cade Borrow
- 405 Acres of Marsh (288 Created/117 Nourished)
- Approximately 8,116 LF of Shoreline Armor
- $50M - $55M Construction + Contingency
- 250 – 300 Net Acres

PPL34 West Lake De Cade Marsh Creation Project

2024 Aerial Imagery Federal Sponsor: NOAA Fisheries

288 Acres Marsh Creation

117 Acres Marsh Nourishment

Map Date 01-09-2024

Legend

Marsh Creation

Borrow

Shoreline Armor

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PPL35 CONCEPT FACT SHEET
February 5, 2025

Project Name
Point au Fer Marsh Creation and Nourishment

Master Plan Strategy
Central Coast Marsh Creation – Point au Fer (ID:344B) – Creation of marsh within a footprint of approximately 8,200 acres on Point au Fer Island to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Project Location
Region 3, Terrebonne Basin, Terrebonne Parish

Problem
Brackish marshes on Point au Fer Island continue to be lost over time due to a combination of hurricane activity, insufficient accretion and various effects from oil and gas canals. During periods of low river flow in which the input of freshwater declines, the elevated salinity levels cause the breakup of the island's marshes. In addition, storm-induced breaches along sections of the gulf shoreline immediately adjacent to oilfield canals also allow salt water to penetrate the island's interior. Specifically, excessive tidal water exchange has increased erosion, creating a 30% loss of the island's interior marsh over the past 60-70 years. The land loss rate for the Point au Fer subunit is – 0.20%/year.

Proposed Solution
This project would create/nourish 403 acres of degraded marshes by using dredged material from the Atchafalaya River Bar Channel. Dredged material would be discharged across the marsh surface with minimal containment. We predict that the material would spread over a very large area and nourish the marsh similar to other documented effects of placing dredged material on the marsh surface, but perhaps with somewhat less environmental benefit due to the large amounts of water involved. This project will have synergistic effects with Dedicated Dredging at Point au Fer (LA-0001), Lake Chapeau Sediment Input and Hydrologic Restoration, Point au Fer Island (TE-0026), Point au Fer Canal Plugs (TE-0022), and Dedicated dredging – Point au Fer (CPRA).

Project Benefits
This project would create/nourish 403 acres of emergent marsh on Point au Fer Island. This project would directly act to restore and protect a critical landscape feature (Point au Fer Island). The only costs associated with this concept would be the project-specific incurred costs, such as mob/demob of pipeline, booster, and containment dikes. The Port of Morgan City has a dredge that operates 24/7/365 and we could be using that material to build land.

Project Innovation
- Proof of concept in utilizing fluid mud ("fluff") to nourish marsh habitat
- Only project-specific costs incurred
- Partnership with the Port of Morgan City
- $5 - $10M for 400 acres.

Project Costs
Construction + 25% contingency = $5 - $10M

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PPL35 Point au Fer Marsh Creation and Nourishment

Produced by: EPA Region 6, Dallas, TX

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS, Maxar

2025

Coordinate System: NAD 1983 StatePlane Louisiana South FIPS 1702 Feet

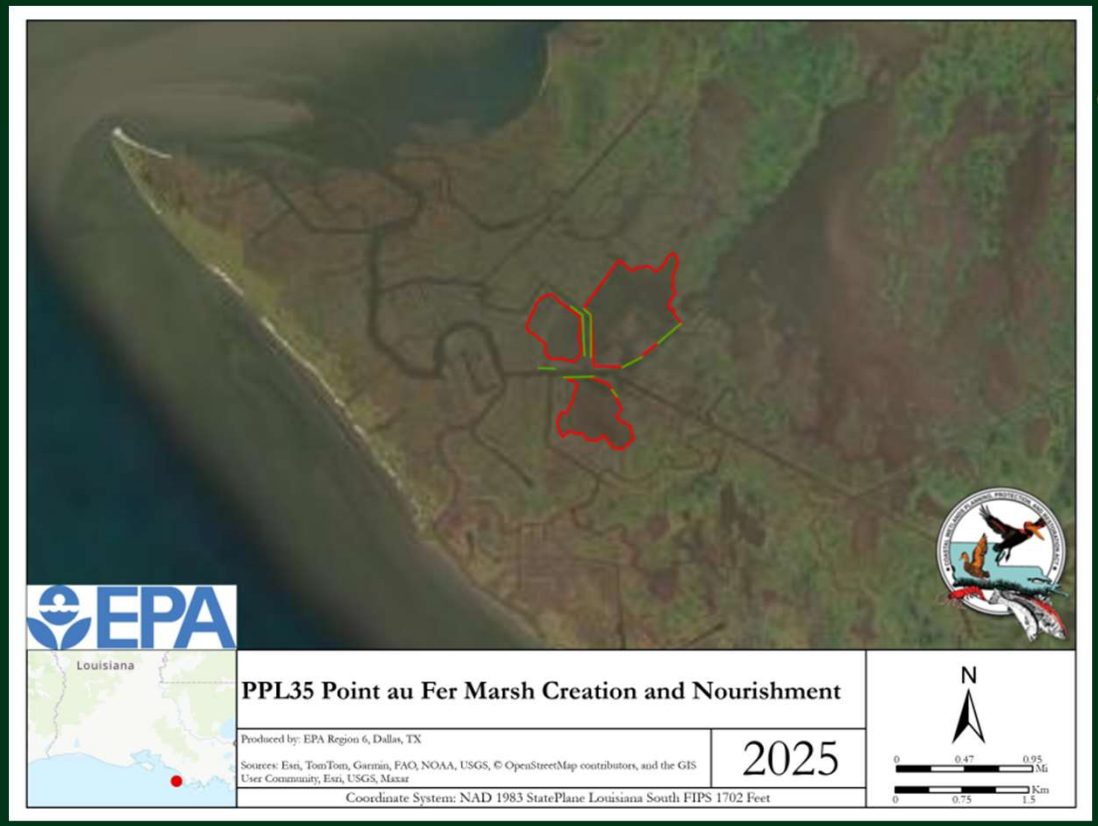
N

0 0.47 0.95 Mi

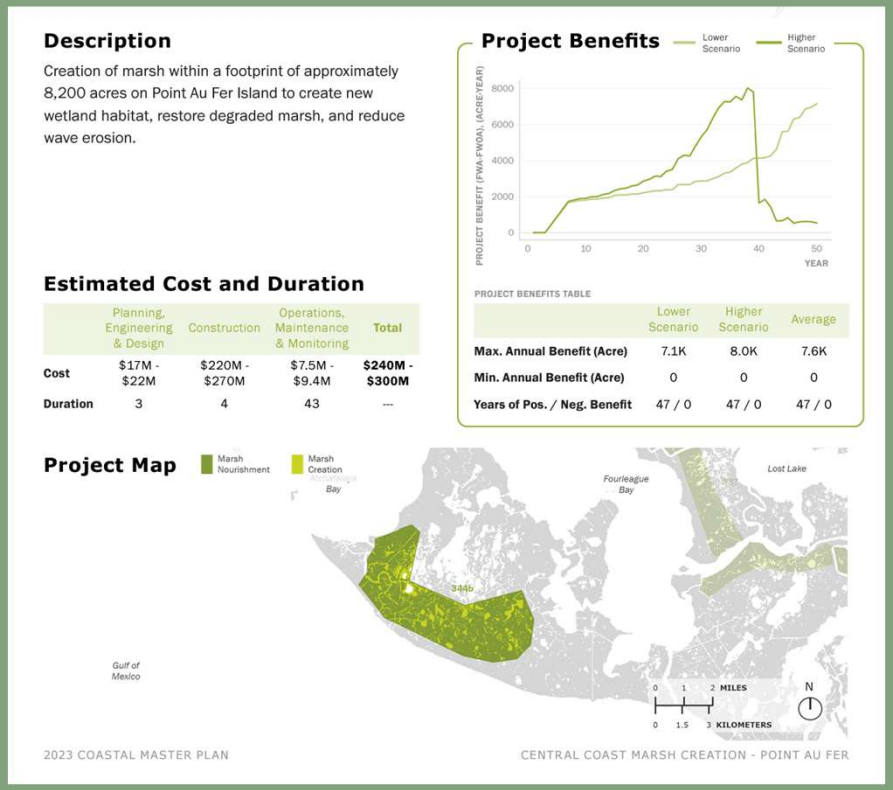
0 0.75 1.5 Km

Point au Fer Marsh Creation and Nourishment

PPL35



2023 Master Plan Strategy



Description

Creation of marsh within a footprint of approximately 8,200 acres on Point Au Fer Island to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Estimated Cost and Duration

	Planning, Engineering & Design	Construction	Operations, Maintenance & Monitoring	Total
Cost	$17M - $22M	$220M - $270M	$7.5M - $9.4M	**$240M - $300M**
Duration	3	4	43	---

Project Benefits

Lower Scenario — Higher Scenario

PROJECT BENEFIT (FWA-FWOA), (ACRE-YEAR)

YEAR

PROJECT BENEFITS TABLE

	Lower Scenario	Higher Scenario	Average
Max. Annual Benefit (Acre)	7.1K	8.0K	7.6K
Min. Annual Benefit (Acre)	0	0	0
Years of Pos. / Neg. Benefit	47 / 0	47 / 0	47 / 0

Project Map

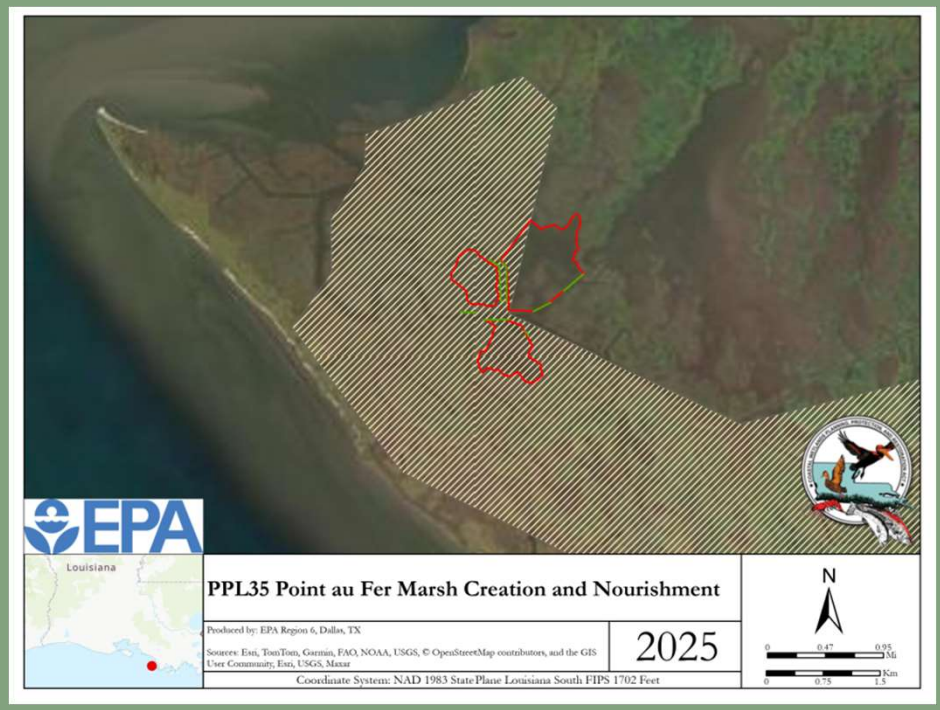
Marsh Nourishment — Marsh Creation

Fourleague Bay — Lost Lake — 344b — Gulf of Mexico

MILES — KILOMETERS — N

2023 COASTAL MASTER PLAN

CENTRAL COAST MARSH CREATION - POINT AU FER



Central Coast Marsh Creation – Point au Fer. Project ID: 344B / Implementation Period 1

Summary of Information and Features

Problem	Ship channels, harbors, and ports experience deposition of fine-grained sediments (silts, clays, organic matter) that can result in a fluid mud layer above the actual channel bottom. Commercial ships experience problems in navigating through the channel, so maintenance dredging of the fluid mud (aka "fluff") is necessary. Brackish marshes on Point au Fer Island continue to be lost over time, with 30% of the islands interior marshes eroding over the past 60-70 years. The land loss rate for the Point au Fer subunit is -0.20%.
Benefits	Utilize BUDMAT from the Atchafalaya River to create/nourish 400 acres of marsh on Point au Fer island.
Cost	Construction + 25% contingency $5 - $10M
Innovation	* Proof of concept in utilizing fluid mud to nourish marsh habitat * Only project-specific costs incurred (mob/demob pipeline, ECDs, etc) * Partnership with the Port of Morgan City * $5-$10M for 400 ac

Partnership with Port of Morgan City

Thank you, Mac and Cindy, for your continued support.

EPA Region 6 CWPPRA Team Goals

- Protect human health and the environment, including water quality, by restoring coastal wetlands
- Improve local community resilience
- Restore wetland habitats and protect critical infrastructure
- Support local stakeholder priorities in synergy with EPA's mission

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PPL35 RPT PROJECT FACT SHEET
February 05, 2025

Project Name
Carencro Bayou Diversion

Project Location
Region 3, Terrebonne Basin, Terrebonne Parish, Carencro Bayou

Problem
Bayou Penchant is the largest bayou flowing across upper Terrebonne; however, where it connects to Carencro Bayou, most of the water flow is diverted southwest to the Superior Canal and flows down Palmetto Bayou and back to Atchafalaya Bay. This short-circuits water movement to the east where marshes are deprived of the freshwater, nutrients and sediments of the Atchafalaya River. The State Master Plan calls for diverting Atchafalaya River water to the east through the Gulf Intercoastal Waterway and various other distributaries throughout the Central Terrebonne marsh complex. The reactivation of Carencro Bayou would bring water directly to areas where there have been heavy losses of wetlands caused by saltwater intrusion and sediment deprivation.

Goals
The objective of this project is to introduce freshwater, nutrients, and sediments from Bayou Penchant into the southern Terrebonne marshes to a general area east of Lost Lake to reduce saltwater intrusion and marsh loss in this area.

Proposed Solution
The project would: (1) Reduce flow into the Superior Canal near the junction with Carencro Bayou by necking down this canal from 200 feet wide and 20 feet deep to 80 feet wide and 10 feet deep. This would be accomplished by the construction of a rock weir (barge bay); (2) opening historic Carencro Bayou, by dredging, from the point where it is narrower than 100 feet wide and 8 feet deep following the old bayou channel for approximately 21,400 feet southeast to where it intersects a north/south location canal; and (3) enlarging the north/south location canal and existing DU/ConocoPhillips water control structure to accommodate this increased flow.

Preliminary Project Benefits
These components would re-direct much of the water flowing down Bayou Penchant to the re-opened Carencro Bayou instead of to Superior Canal and Palmetto Bayou then lost back to Atchafalaya Bay. This re-directed sediment-laden water would flow south into southern Terrebonne, connecting with Bayou Decade east of Lost Lake. It is estimated that 250-300 net acres of marsh would be benefited from this project.

Preliminary Construction Costs
The estimated construction cost plus 25% contingency is $5M - $10M.

Preparer(s) of Fact Sheet:
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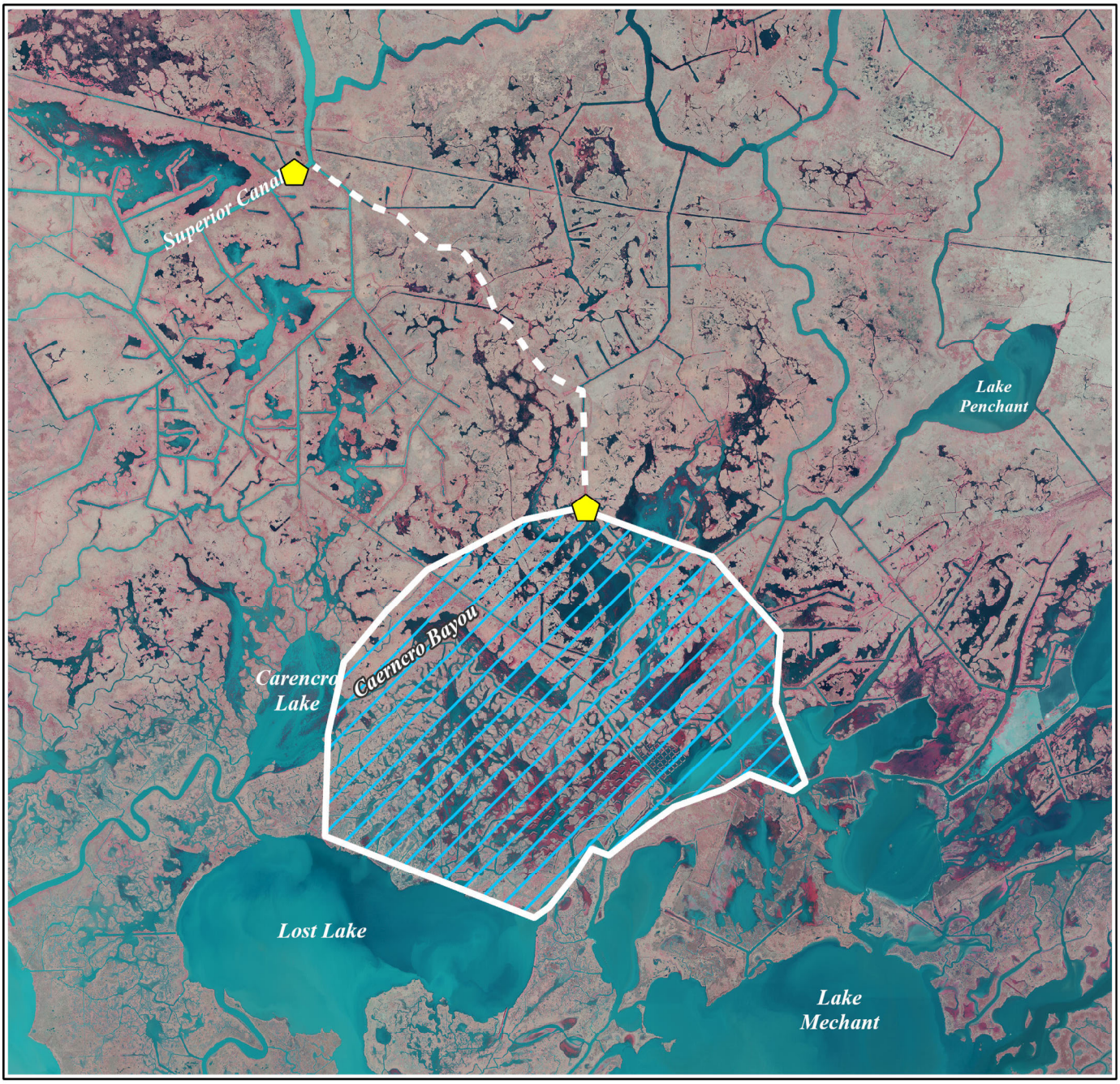

Carencro Bayou Diversion (PPL33 Candidate)

N

Weir

Channel Cleanout

Freshwater Influence

Project Boundary

Note: All features are proposed.

1.5 0 1.5 3 Kilometers

1.5 0 1.5 3 Miles

Scale: 1:125,000

USGS science for a changing world

Map Produced By:
U.S. Department of the Interior
U.S. Geological Survey
Wetland and Aquatic Research Center
Baton Rouge, LA

Image Source:
2021 NAIP CIR

Map ID: 2023-11-0025
Map Date: July 31, 2023

PPL35
Carencro Bayou Diversion Project

Region 3, Terrebonne Basin, Terrebonne Parish

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Contacts:
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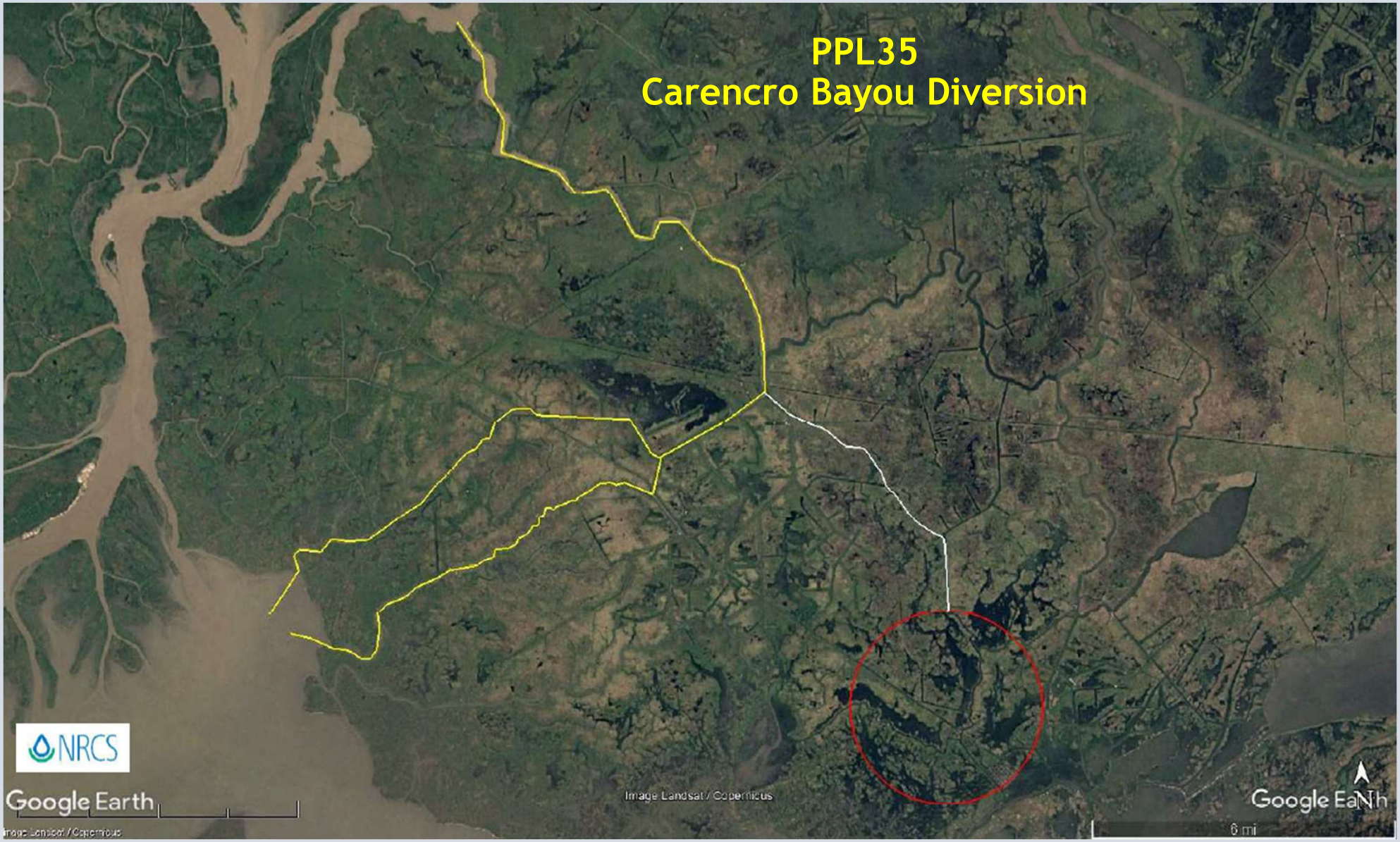
PPL35
Carencro Bayou Diversion
NRCS
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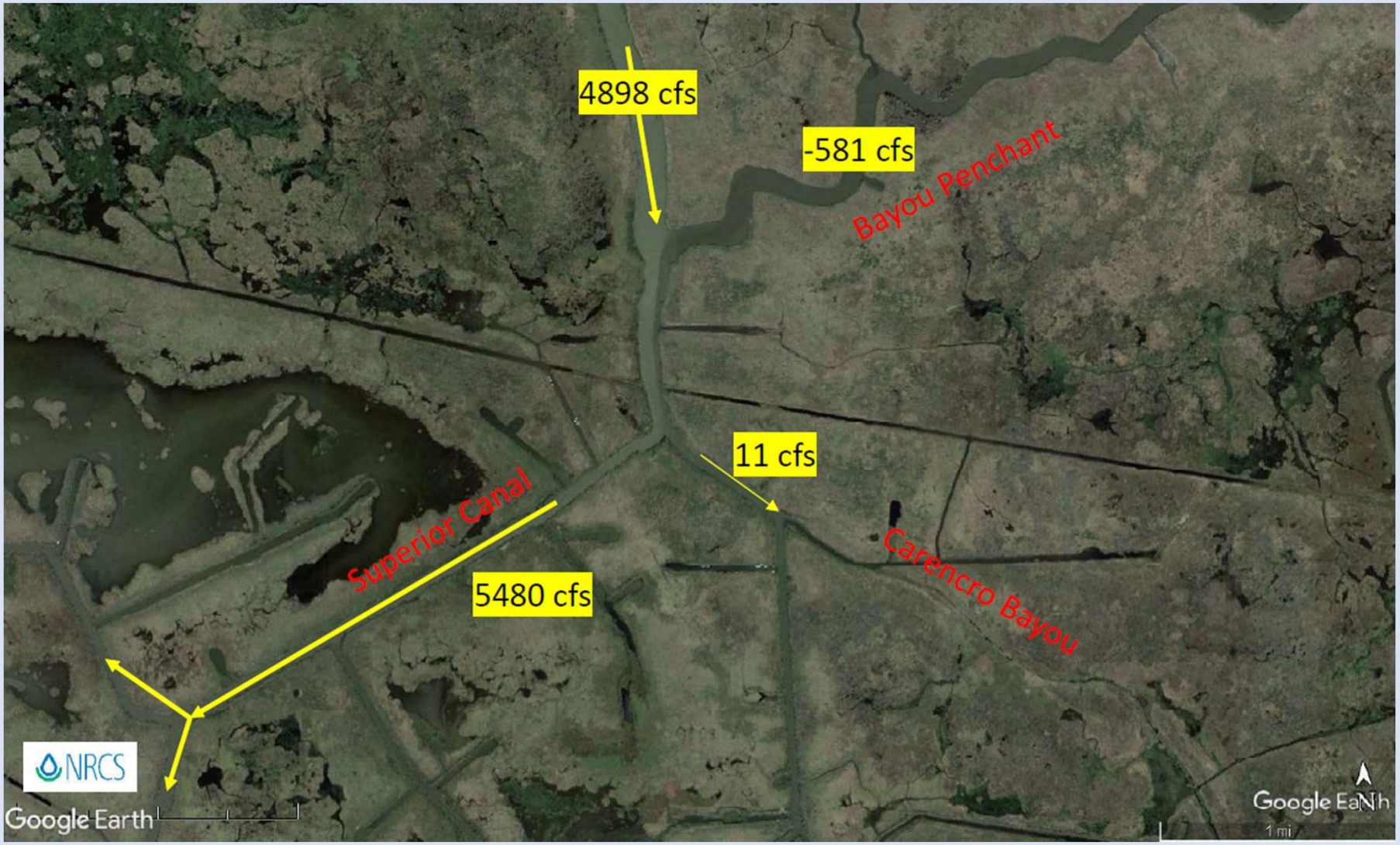
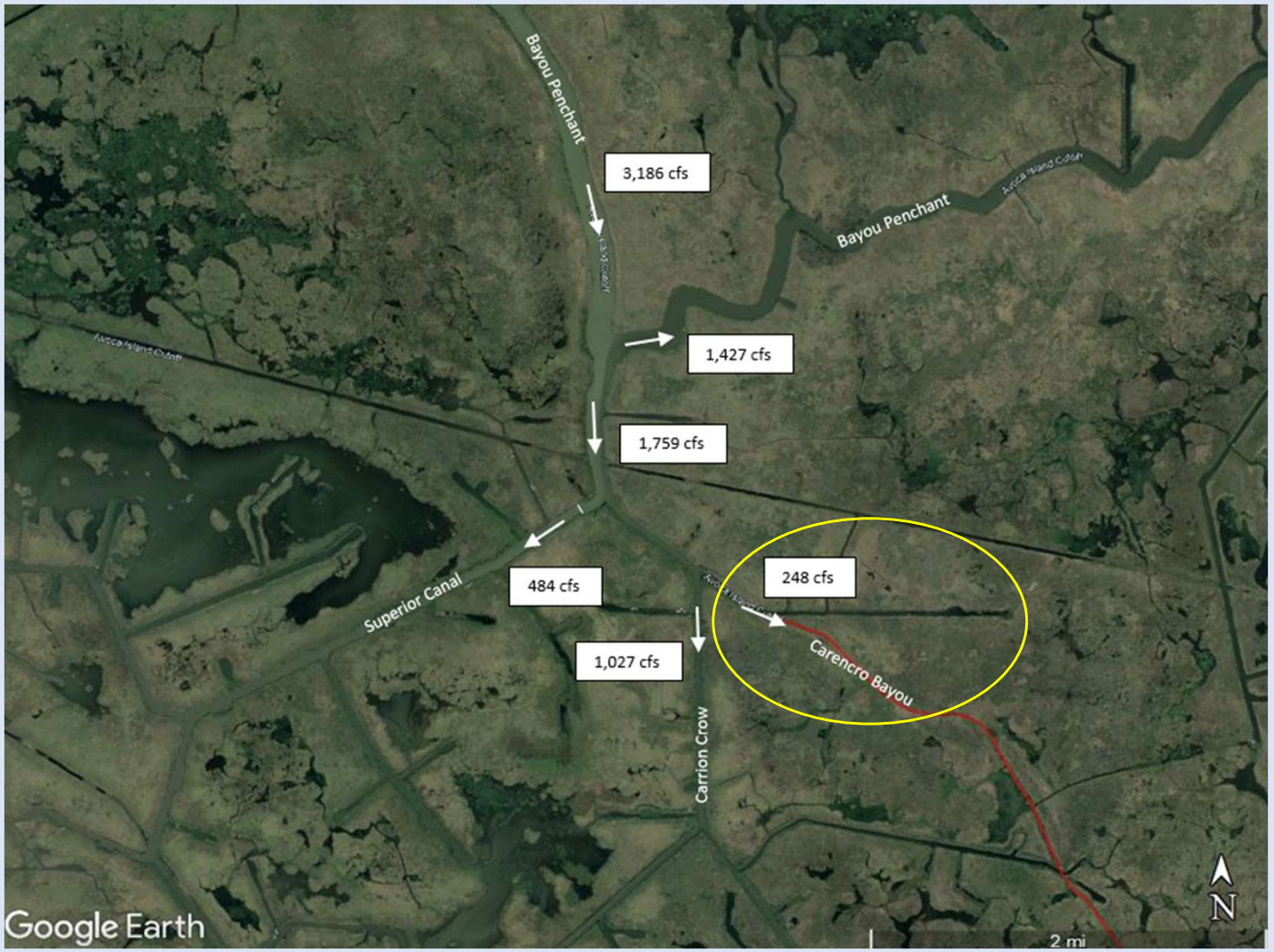
FWOP (Current) Flow Conditions

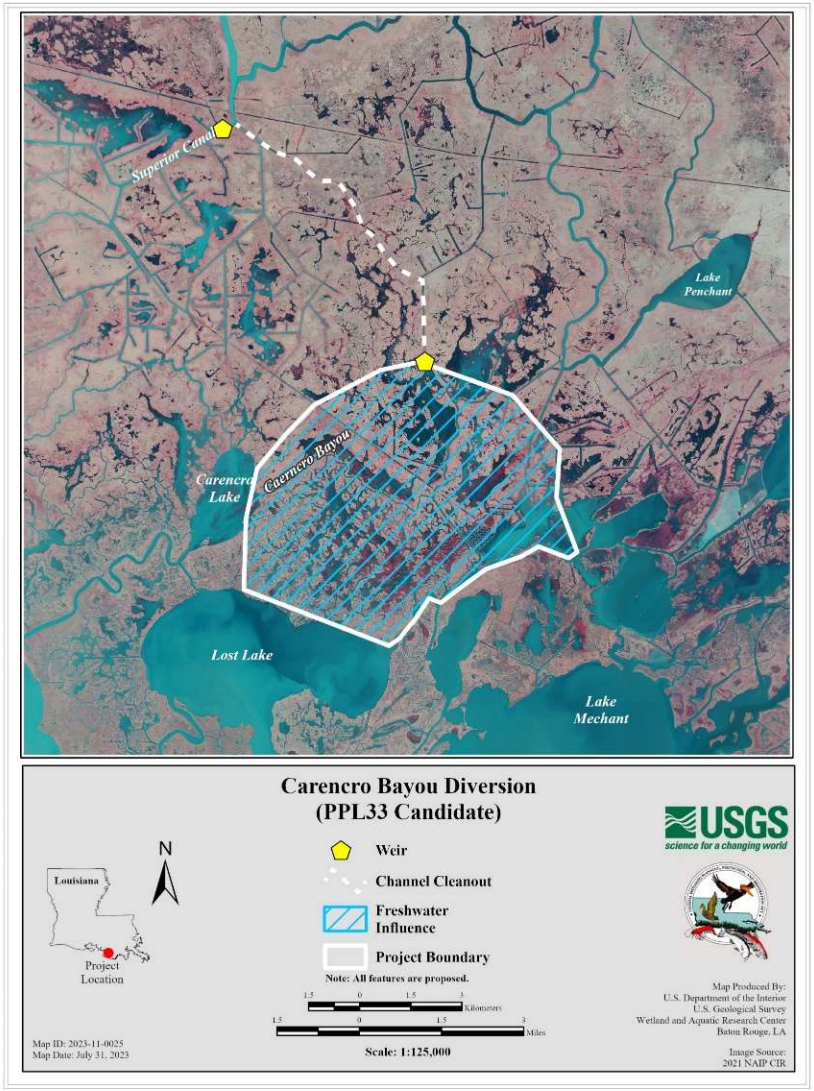


FWP Flow Conditions



*Flows were estimated with aid from a model produced by CPRA, which modeled FWP average flows (cfs) under average conditions during a median river year, based on a plug within Superior Canal. Flows from the CPRA model were modified by NRCS to reflect a rock weir in Superior Canal instead of a plug.

PPL 35
Carencro Bayou Diversion



Project Objectives

- Reduce flow into Superior Canal from Bayou Penchant by necking down the canal to allow for some flow to divert down the Carencro Bayou.
- Dredge the old Carencro Bayou along its historic bayou to reactivate flow through the bayou down into the Central Terrebonne marshes.
- Enlarge the north/south location canal and existing DU/ConocoPhillips water control structure downstream of Carencro Bayou to accommodate the increased flow.

Project Features and Benefits

- Superior Canal rock weir structure with barge bay.
- Dredging of Carencro Bayou for 21,400 linear feet to reactivate flow down the channel into the north/south canal.
- Replace the downstream water control structure with a larger structure that can accommodate increased flow through the channel into the target marshes to the south.

Estimated construction cost + 25% contingency: **$10M - $15M**

Estimated net benefits:
250 – 300 net acres

NRCS

PPL35 PROJECT NOMINEE FACT SHEET
February 6, 2025

Project Name:
West Isles de Jean Charles Marsh Creation

Project Location:
Region 3, Terrebonne Basin, Terrebonne Parish

Problem:
The project site contains organic and highly compressible soils with expansive open water areas. Subsidence, lack of sediment input, wind erosion, storms, and canals and pipelines all have contributed to widespread historic and continued rapid land loss within the project site and vicinity. With high wetland loss in the vicinity, the Morganza Hurricane Protection Levee to the north of the project area has become extremely susceptible to high wave energies with the increase in fetch. A land change analysis conducted by USGS for the PPL34 Phase 0 Wetland Value Assessment of the South Isle de Jean Charles Landbridge Increment indicates a loss rate of -1.61%/yr (1984-2024) for the extended project boundary.

Goals:
The primary goals of the project are to restore approximately 332 acres of marsh west of the community of Isle de Jean Charles. The specific project goals are: 1) create 319 acres of marsh, 2) nourish 13 acres of marsh, and 3) limit erosion through the construction of approximately 9,046 LF (1.7 mi) of large earthen berm along bay-facing containment. Borrow is proposed from Maddison Bay. The goal of the project is to provide synergy with the TE-117 Island Road Marsh Creation Project by adding protection to the community of Isle de Jean Charles. This project would be another increment of a Terrebonne Landbridge and would be the first of two to three projects that would create marsh along the Twin Pipelines to bridge the Isle de Jean Charles and Bayou Terrebonne Ridges.

Project Features:
The project features consist of restoring marsh adjacent to the Twin Pipelines and parallel to the Isle de Jean Charles.

Marsh Creation – 319 acres
Marsh Nourishment – 13 acres
Bank Stabilization – 9,046 LF (1.7 mi)

Proposed Solution
Sediments from Madison Bay will be hydraulically dredged and pumped via pipeline to create/nourish approximately 332 acres of marsh. A full containment system will be utilized with containment dikes gapped at the end of construction or no later than three years post-construction. Dewatering and compaction of dredged sediments should produce elevations conducive to the establishment of emergent marsh and within the intertidal range. Bank stabilization is also proposed. A large earthen berm will be constructed along 9,046 LF of the bay-facing containment dike.

Preliminary Ranking Criteria:

1) *What is the projects total net acres?*
Net Acres – 273 acres

2) *What is the total project construction cost plus 25% contingency?*
Construction cost plus 25% contingency - $28,776,178

3) *What is the project cost effectiveness using total net acres/project construction cost?*
Cost effectiveness - $105,407/net acre

4) *To what extent does the project provide a synergistic effect with other approved and/or constructed restoration projects?*
There is synergy with the Island Road Marsh Creation (TE-117) to the east as well as with constructed DU Island Road Terracing project. There is also the Pointe-Aux-Chenes Hydrologic Restoration (TE-06) and the NRDA funded Pointe-Aux-Chien WMA Enhancements (TE-146) to the north.

5) *What is the interior loss rate and/or shoreline loss rate?*
A land change analysis conducted by USGS for the PPL34 Phase 0 Wetland Value Assessment of the South Isle de Jean Charles Landbridge Increment indicates a loss rate of -1.61%/yr (1984-2024) for the extended project boundary.

6) *Do any project features maintain or restore structural components of the coastal ecosystem such as barrier islands, natural or artificial levee ridges, beach and lake rims, cheniers, etc or is part of a land bridge feature?*
The project would build upon an Eastern Terrebonne Landbridge concept, extending the landbridge west from Isle de Jean Charles. The project goal is to begin restoring a landbridge in Terrebonne Parish in the vicinity of the Twin Pipelines generally extending between Isle de Jean Charles and Montegut.

7) *Does any project feature directly or indirectly protect any critical and/or non-critical infrastructure?*
The project would result in direct substantial net positive impact on critical infrastructure consisting of the Terrebonne Parish Consolidated Government's (TPCG) Isle de Jean Charles levee and portions of Island Road. This includes protection to the Isle de Jean Charles community. The project would also result in indirect benefits to the Morganza to the Gulf levee.

Considerations/potential issues?
This project could have potential pipeline and oyster considerations.

Preliminary Costs
The fully funded cost range is $35M-$40M.

Preparer(s) of Fact Sheet and Contact Information:
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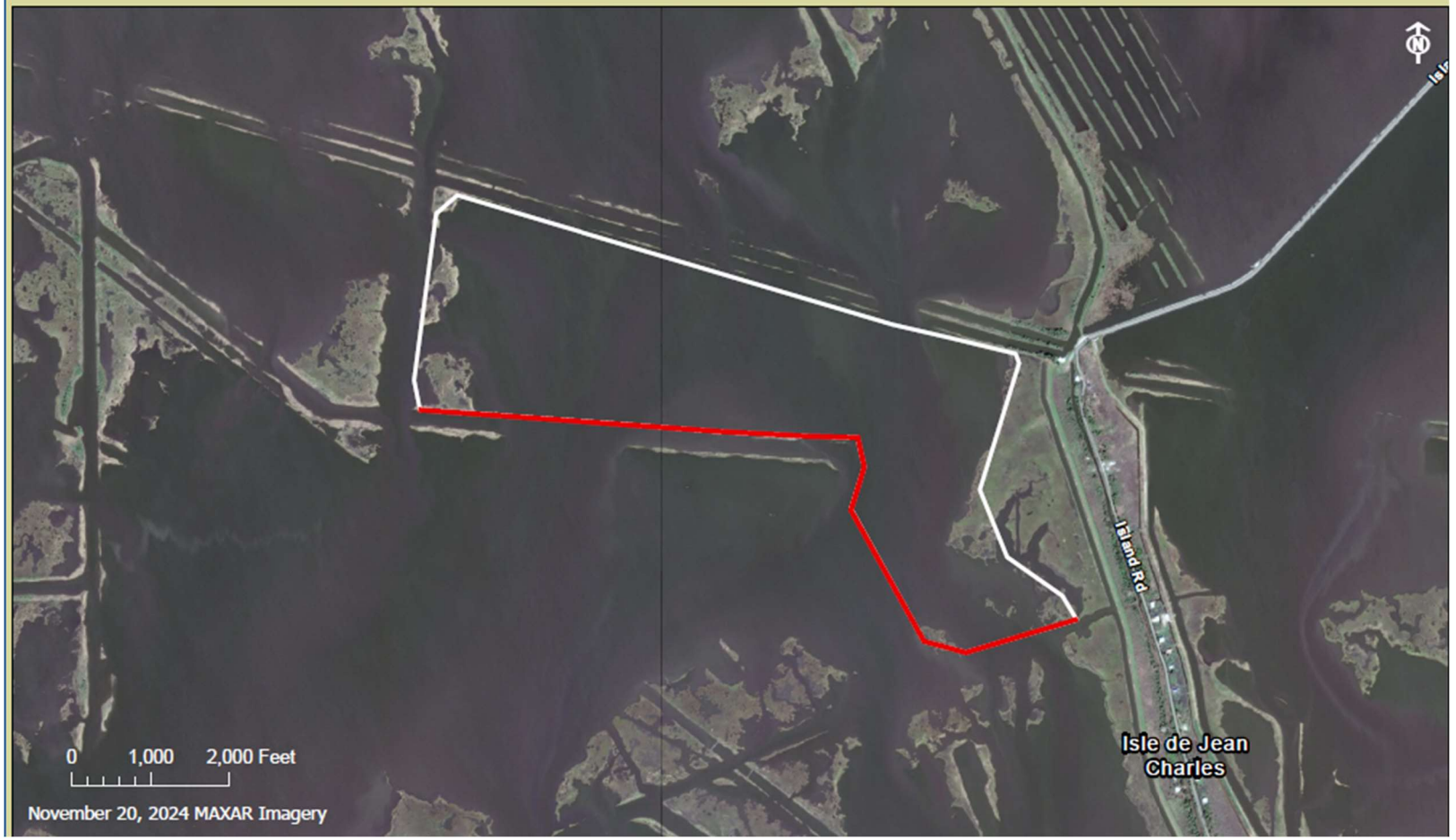
U.S. Fish & Wildlife Service

Louisiana Ecological Services

Marsh Creation
Berm

PPL35
West Isle de Jean Charles
Marsh Creation
Terrebonne Parish, Louisiana



PPL35

West Isle de Jean Charles Marsh Creation

Region 3, Terrebonne Basin

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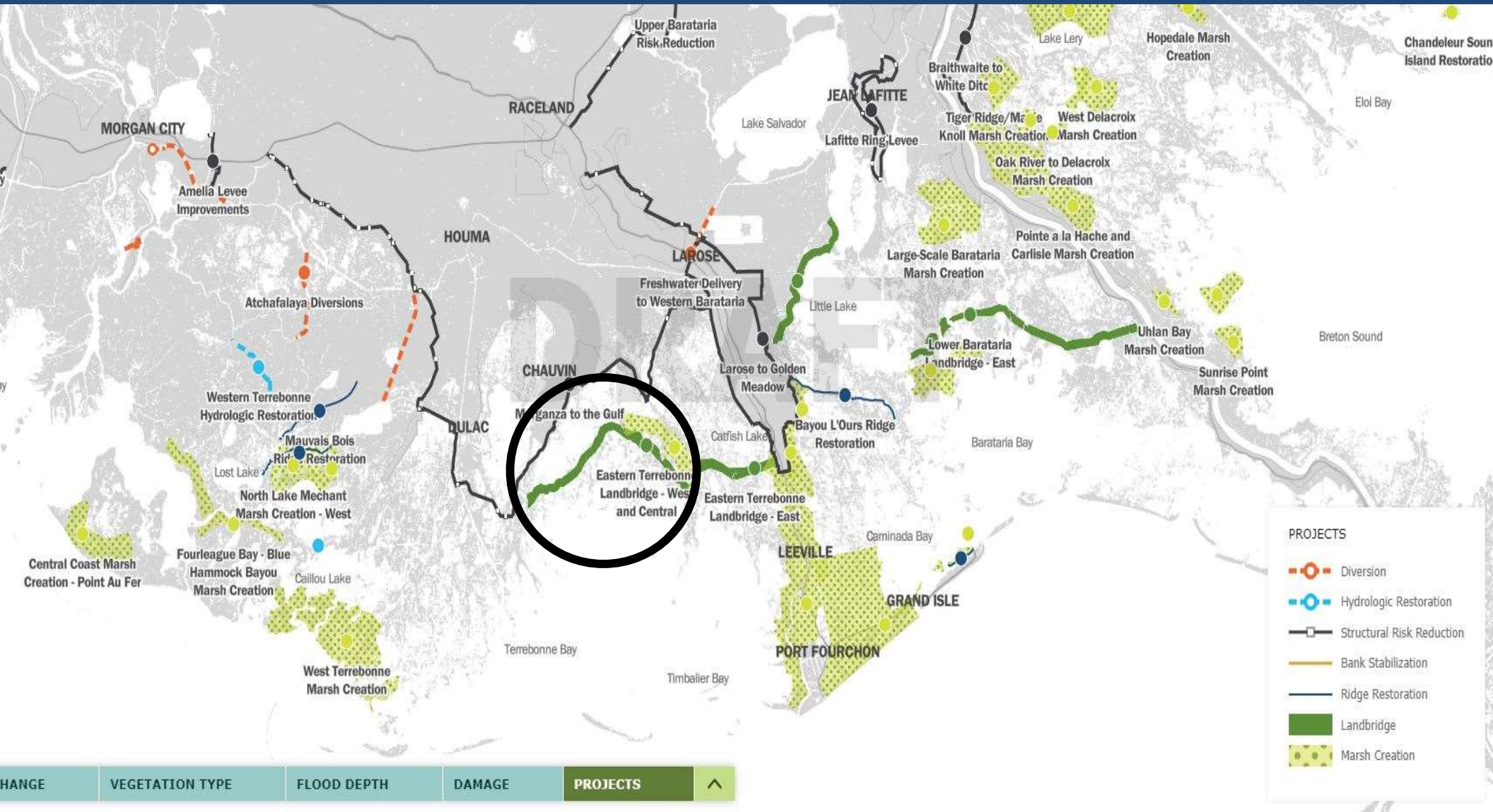
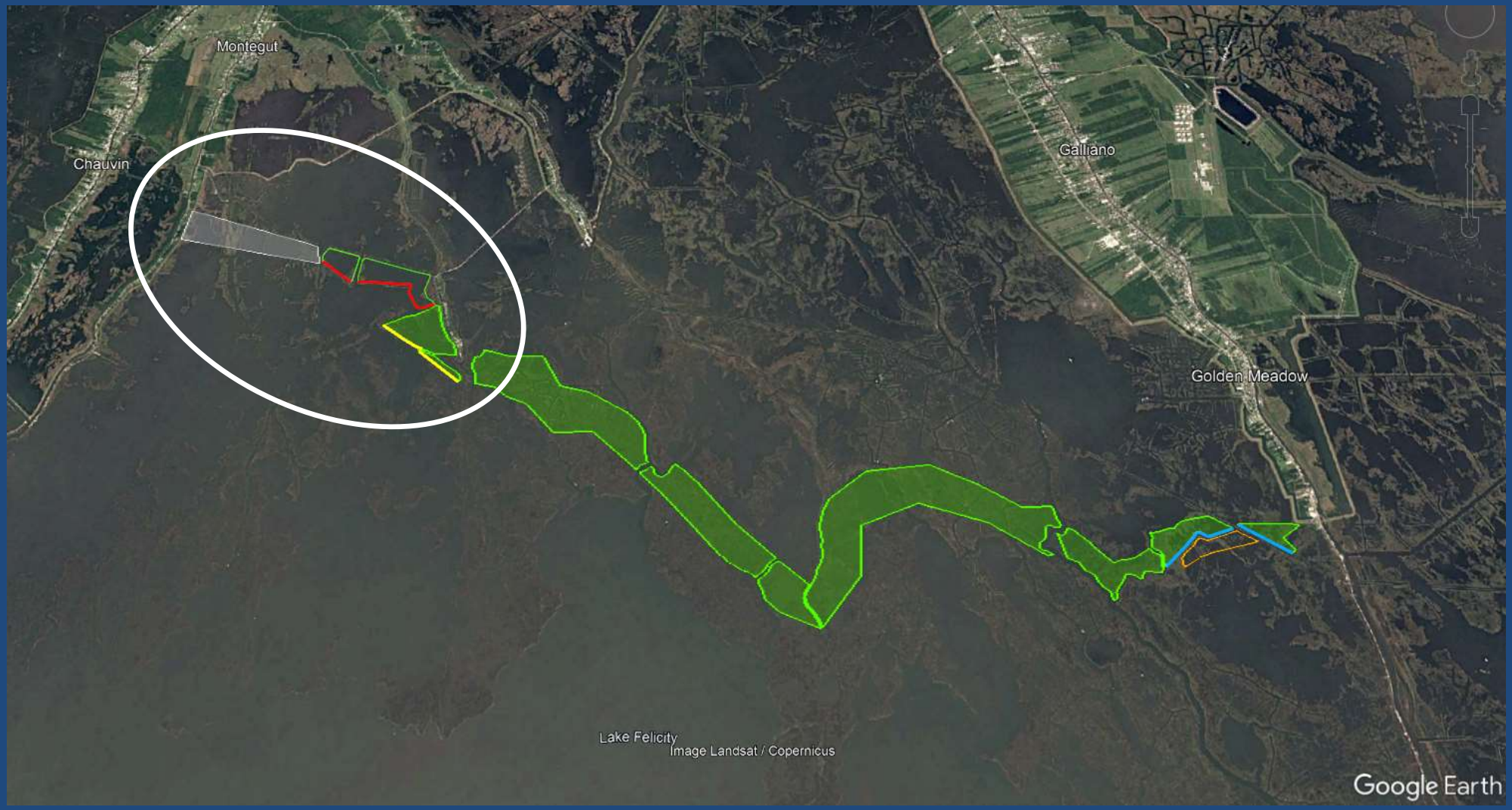
2023 State Master Plan – Eastern Terrebonne Landbridge - West and Central

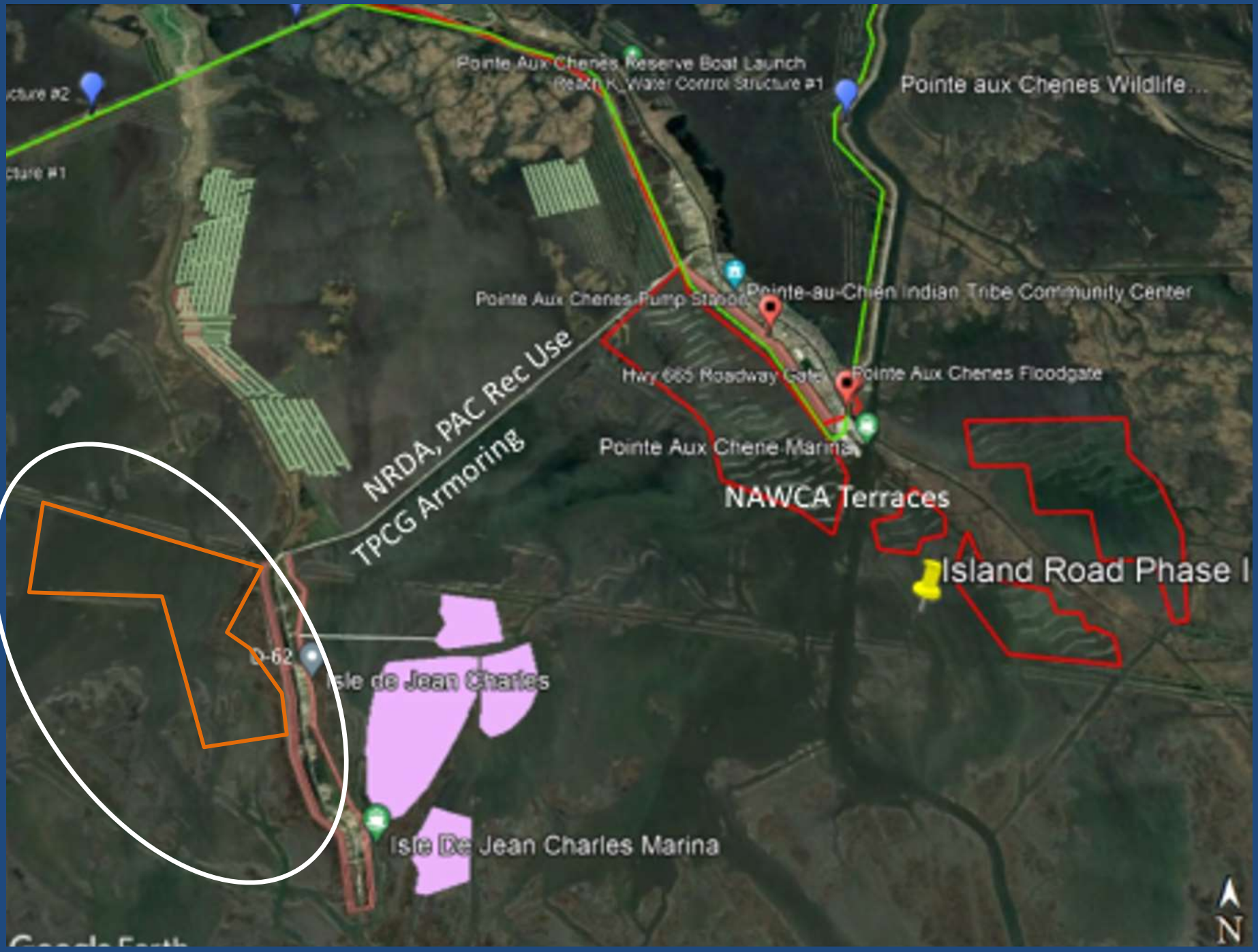


Westward Extension of the PPL34 Candidate Eastern Terrebonne Landbridge Restoration



West Isle de Jean Charles Marsh Creation

Synergy with Other Restoration Projects in the Eastern Terrebonne Basin



West Isle de Jean Charles Marsh Creation

- 319 acres of marsh creation
- 13 acres of marsh nourishment
- 9,046 LF (1.7 mi) bank stabilization
- Maddison Bay borrow
- Net acres = 250 - 300
- Construction plus contingency: $35M - $40M
- Project synergy – Island Road Marsh Creation and Nourishment (TE-117), Ducks Unlimited and TPCG Terraces, Point aux Chenes Recreational Use Enhancement Project (NRDA)

CWPPRA RPT Region 3

Teche-Vermilion Basin

PPL35 RPT PROJECT FACT SHEET
February 05, 2025

Project Name
Boston to Oaks Canals Hydrologic Restoration and Shoreline Protection

Project Location
Region 3, Teche/Vermillion Basin, Vermilion Parish; approximately 9 miles south of Delcambre, Louisiana in Vermilion Parish between the GIWW and Vermilion Bay and the Boston and Oaks Canals.

Problem
Marshes in this area are subject to losses from subsidence, a net sediment deficit, shoreline erosion, altered hydrology from levees and increased connectivity with the Gulf Intracoastal Waterway (GIWW). The area is immediately adjacent to the GIWW where it is subjected to some of the heaviest boat traffic in the contiguous US. Boat traffic in the GIWW causes erosion within the identified area which results in a net export of material. The opening to the GIWW at Hebert Bayou is currently 400 feet wide. This pulsing action will increase in frequency and intensity as the GIWW channel is enlarged (deepened and widened) for the Acadiana Gulf of Mexico Access Channel (aka AGMAC). Areas along Vermilion Bay are subjected to shoreline erosion from daily winds/waves as well as erosion during severe weather events with areas vulnerable to breach near Lake Cock and to the east along an oil-field location canal.

Goals
The project goals are to prevent export interior marsh soil from barge traffic pulsing along the GIWW, increase residence time of water moving through the marsh to allow for deposition of sediments, and prevent breaching at the most vulnerable reaches along the Vermilion Bay rim.

Proposed Solution
A series of hydrologic structures will be utilized to prevent the surge and withdrawal of water from barge traffic along the GIWW and allow for more sediments to distribute through the interior marsh. Combination fixed-crest weirs with a boat bay and flap-gated culverts will be installed at a large opening to the GIWW at Hebert Bayou to reduce the cross section of the opening by ~80%. The flap-gated culverts installed within the fixed-crest weirs will ensure a net positive flow of sediment laden water into the marsh. Two sets of outlet culverts opposite ends of the marsh will be utilized to pull this water through the area allowing for the trapping and deposition of material as it moves through the marsh. Areas within the marsh will be planted to stabilize the newly deposited sediment. In addition, 9,500 linear feet of shoreline protection will be installed in two vulnerable locations along Vermilion Bay to prevent breaching of the bay into the interior marsh.

Preliminary Project Benefits
The net acre benefits estimate for the project are 188 acres from hydrologic restoration and 28 acres from shoreline protection for a total of 216 acres (PPL29 Nominee). The hydrologic aspects of this project would be directly synergistic with Ducks Unlimited's Boston Canal Culvert that provides the southwestern outlet. The shoreline protection aspects would add to TV-0009 Boston Canal/Vermilion Bay Bank Protection and TV-0077 North Vermilion Bay Shoreline Protection efforts to stabilize the Vermilion Bay shoreline. This project would protect a critical landbridge and bay rim separating Vermilion Bay from the GIWW, a critical shipping

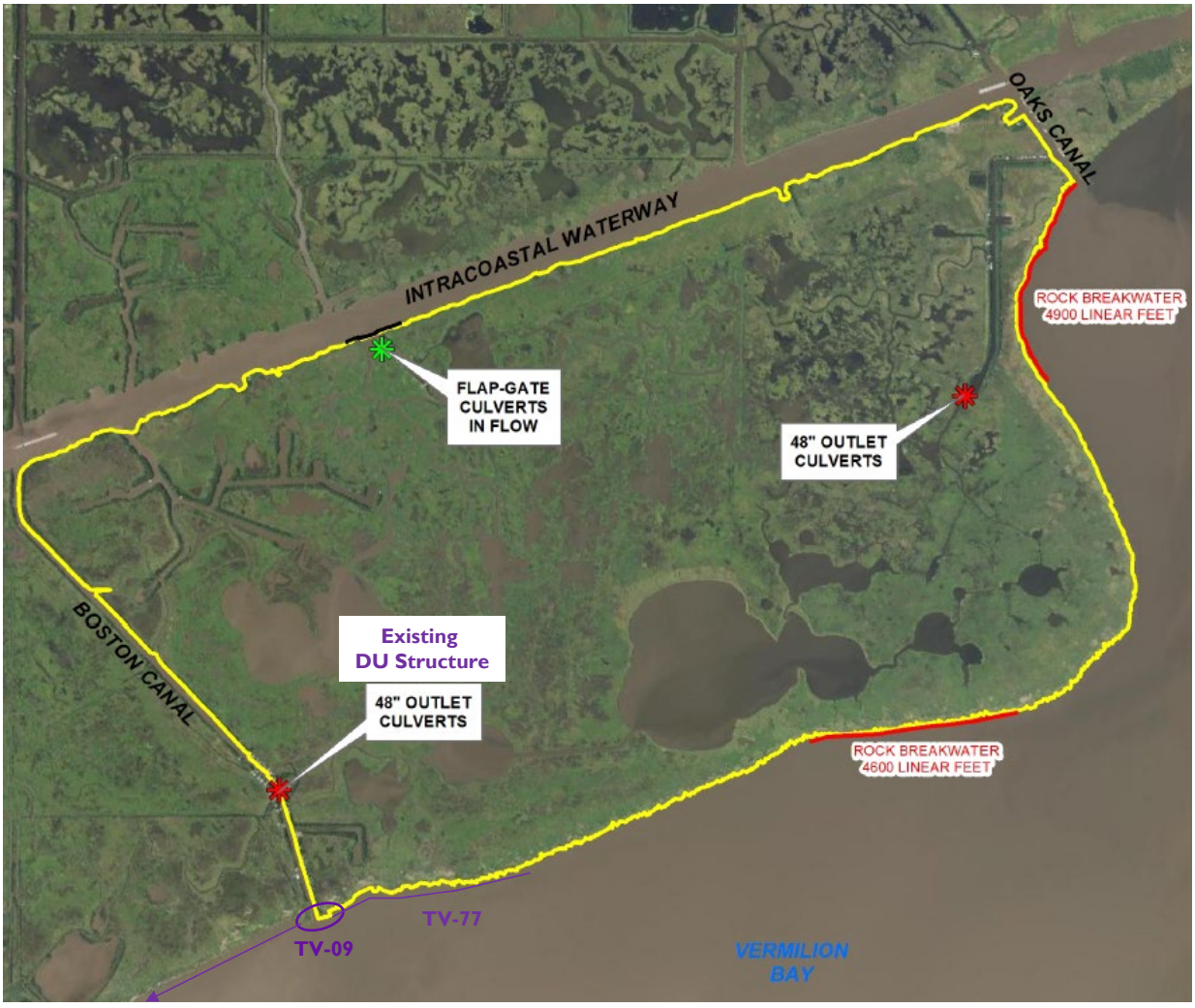
infrastructure. This project would also buffer the community of Henry and the Henry Natural Gas Hub from tropical storms.

Other Considerations
The proposed project has potential utility/pipeline issues.

Preliminary Construction Costs
The estimated construction cost plus 25% contingency is $10-15 million based on the PPL 29 estimate ($11,810,544) + 20 % inflation since 2019 equaling $14,172,665.

Preparer(s) of Fact Sheet:
Andre' Comeaux, Land Owner, Andre.Comeaux@mcgriff.com
John Trahan, Local Stakeholder, jdtrahan@att.net
Thomas McGinnis, NRCS, thomas.mcginnis2@usda.gov

Proposal Map. Boundary (yellow), Hydrologic features (stars), Shoreline Protection (red), and Synergistic Projects (purple)



CWPRRA
Regional Planning Team 3
Teche-Vermilion Basin

Boston To Oaks Canals Hydrologic Restoration and Shoreline Protection Project

Presented by:
Andre' Comeaux
John Trahan

Supported by:
John Foret, Rainey Conservation Alliance
Thomas McGinnis, USDA-NRCS

February 05, 2025

Problem Statement

- **Altered Hydrology** = Installation of the canals for shipping (**GIWW**) and quicker access to Vermilion Bay (**Boston and Oaks Canals**)

- Increased **hydrologic connectivity** b/n **GIWW** and **Vermilion Bay** increases **erosive forces** within the **fresh/intermediate marsh**

- **Heavy GIWW boat traffic = Net Loss of Soils**

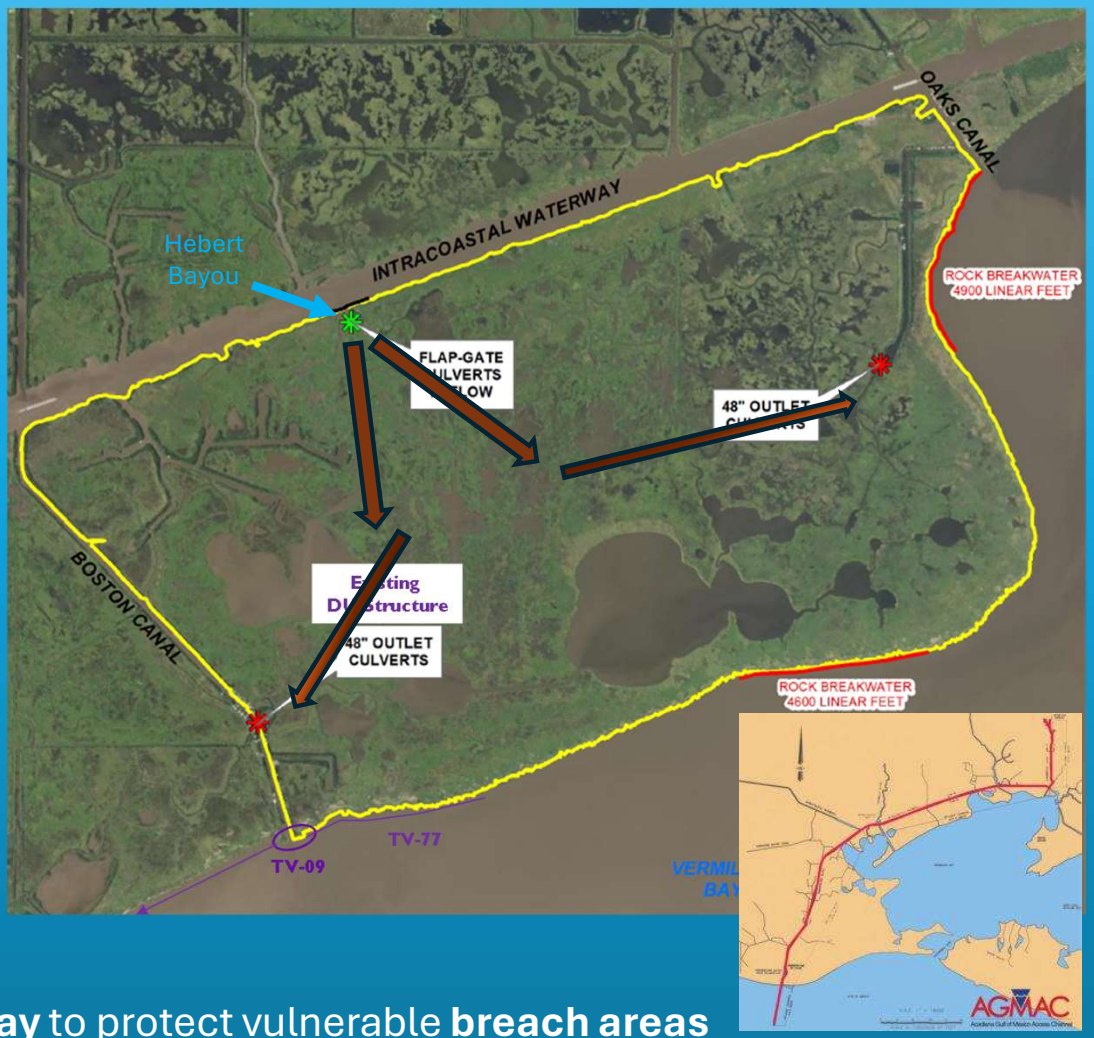
- **Increase** with enlarging GIWW **(AGMAC)**.

Proposed Solution

- **Reduce** exchange and install **one-way** culverts into the wetlands at **Hebert Bayou/GIWW**.

- **Sediments deposit** in wetlands as **water travels** to one-way culverts at **Boston and Oaks Canals**

- **Shoreline protection** (9,500 lf) along **Vermilion Bay** to protect vulnerable **breach areas**



Critical Landscape Features/Synergy

Landbridge b/n GIWW and Vermilion Bay

- Boston Canal - DU/Apache Culvert
- 5 CWPPRA Projects

Vermilion Bay Shoreline Protection

- TV-09 Boston Canal Rocks and VB Plantings
- TV-77 Extension of TV-09 Rocks

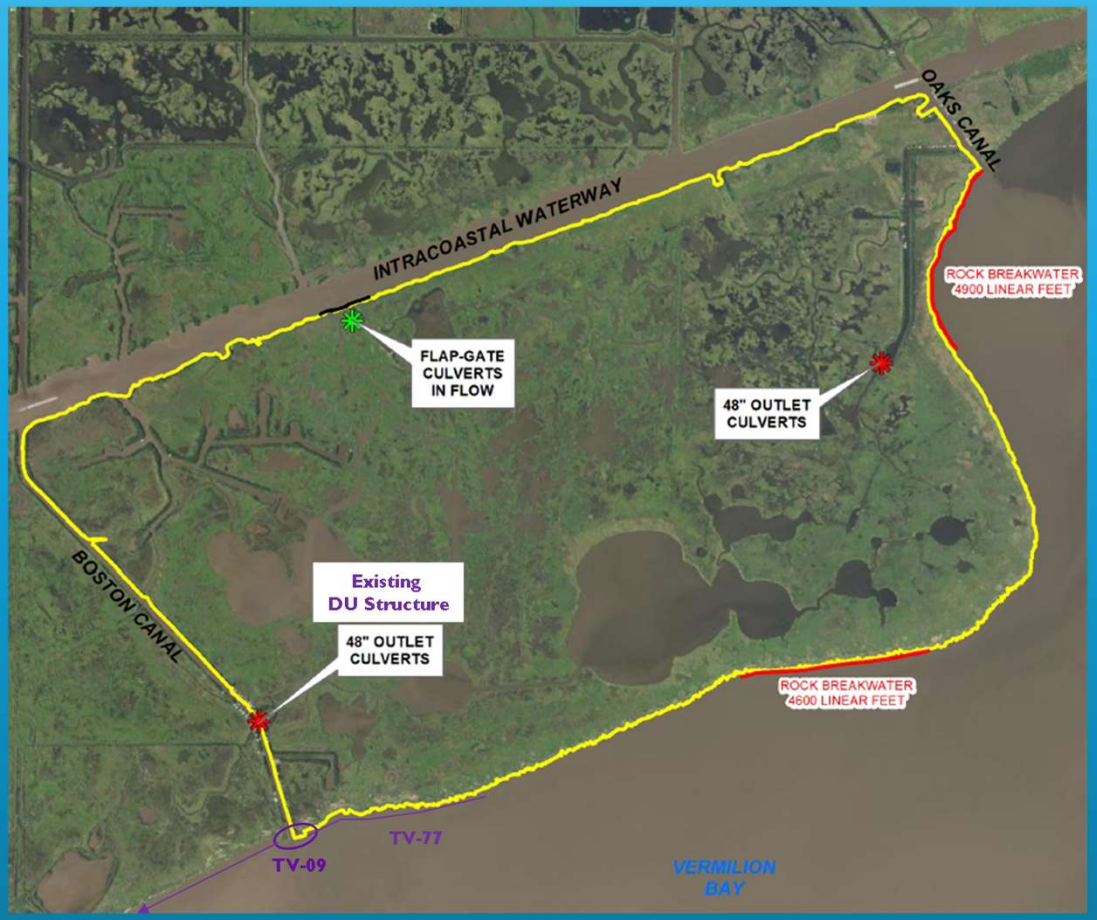
Critical Infrastructure Protected

- Shipping: GIWW
- Community: Henry
- Natural Gas Distribution: Henry Hub

PPL 35 Proposal: Boston to Oaks Canals Hydrologic Restoration and Shoreline Protection Project

Vital Stats

- Total Footprint: ~4,500 acres
- 20 Year Net Benefits: 216 acres
- Construction Cost + 25% Contingency: ~$14 M
- Synergy: High (3 direct projects and several associated projects)
- Critical Landscape Features: High (Bay Rim and Landbridge)
- High Critical Infrastructure Protection (Shipping, Community, and Energy Distribution)



PPL35 CONCEPT FACT SHEET
February 5, 2025

Project Name:
Northwest Vermilion Bay Shoreline Stabilization

Master Plan Strategy
East Rainey Marsh Creation (2023 Master Plan Project ID 157c, Implementation Period 1): Creation of marsh in the northern portion of marsh in the eastern portion of Rainey Marsh to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Project Location:
Region 3, Teche-Vermilion Basin, Vermilion Parish

Problem:
Over the past decades, the project area has experienced altered geomorphologic and hydrologic conditions, shoreline erosion and wetland loss due to storm damage, dredging of navigation and petroleum access canals, construction of spoil banks and levees, and natural wave energy. Wave energy in the Bay has gradually increased over the centuries because the Bay is naturally getting deeper due to a slight yet constant subsidence and global sea-level rise. The land loss rate for the 1985–2020 USGS Land Change Trends Rainey Marsh Subunit (096) is -0.05%. The shoreline loss rate was calculated by USGS as 5.5 ft/yr (3.2 acres/yr) in PPL25 when this project was a candidate.

Proposed Solution
The proposed solution would provide enhanced protection along the North and West Vermilion Bay shoreline to reduce the effects of wave action erosion and shoreline retreat. In particular, North Lake and Little Redfish Point Lake are at risk of coalescing with the Bay. Adding marsh and shoreline protection to these areas is essential to prevent further encroachment of the Bay into the wildlife refuge. To further stabilize the Redfish Pt area, we propose two underwater rock weirs: one at the weir blowout between Fearman and Bob Lake and another at the bayou leading from the Bay into Little Redfish Lake. The intention is to decrease the flow to prevent further channel widening. Terraces are proposed in North Lake and Lake Fearman near Bob Lake. The refuge will also benefit from the created ridge habitat to the south with woody and herbaceous plantings.

Project Goals
The goals of this project are to: 1) reduce flow through Little Redfish Point Bayou and Bob Lake; 2) Create ridge habitat along approximately 15,878 ft of the western shoreline of Vermilion Bay between Bayou Prien and Hog Bayou by constructing an enhanced earthen berm and planting the top and sides with woody and herbaceous species; 3) create 12 acres of contained marsh in North Lake and gapping the northern ECDs by year three; 4) place rock along the North Vermilion Bay shoreline adjacent to the proposed marsh creation cell near North Lake (2,170 ft) and adding ACMs on the terminus ends to prevent scouring into the marsh platform; 5) foreshore rock dike near Little Redfish Point Lake (952 ft). Assuming some natural vegetative recruitment, vegetative plantings are planned at a 50% density at project year one for the marsh creation cell.

Project Innovation
- Multiple restoration strategies
- No hydraulic dredging
- Partnership with LDWF, synergy with their project in E&D

Project Costs
The estimated construction cost plus 25% contingency is $20M-$25M.

Preparer(s) of Fact Sheet and Contact Information:
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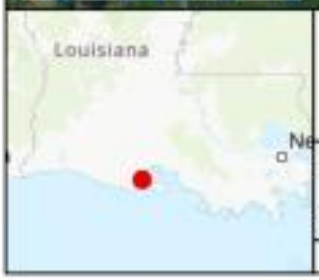
Tyson Crouch, LDWF; (337) 735-8669; tcrouch@wlf.la.gov
Lance Campbell, LDWF; (337) 735-8668; ljcampbell@wlf.la.gov



PPL35 NW Vermilion Bay Shoreline Stabilization

Produced by: EPA Region 6, Dallas, TX

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

2025

Coordinate System: NAD 1983 StatePlane Louisiana South FIPS 1702 Feet

N

0 0.45 0.9 Mi

0 0.75 1.5 Km

PPL35 NW Vermilion Bay Shoreline Stabilization N side

Produced by: EPA Region 6, Dallas, TX

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

2025

Coordinate System: NAD 1983 StatePlane Louisiana South FIPS 1702 Feet

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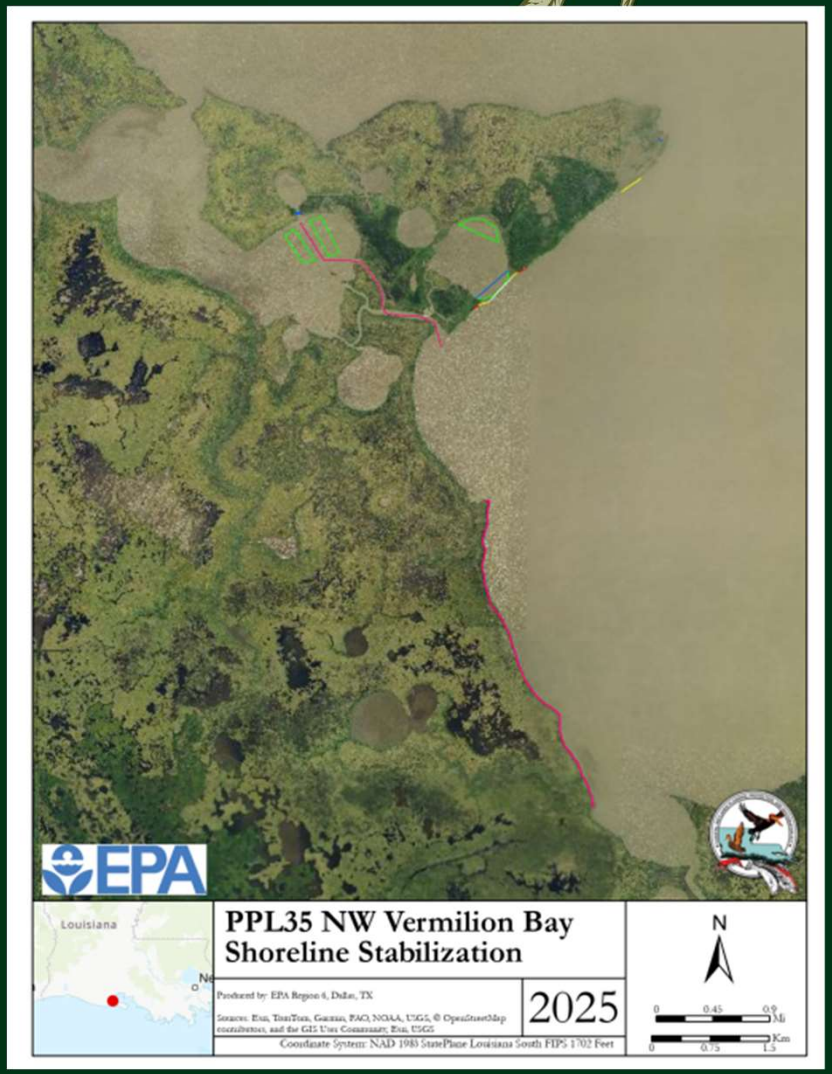
NW Vermilion Bay Shoreline Stabilization

PPL35



2023 Master Plan Strategy

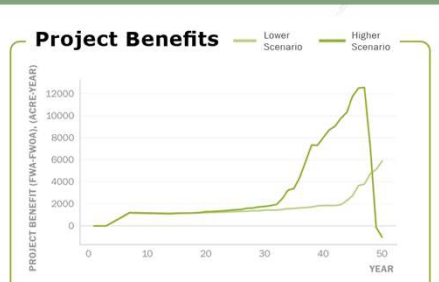
Description

Creation of marsh in the northern portion of marsh in the eastern portion of Rainey Marsh to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Estimated Cost and Duration

	Planning, Engineering & Design	Construction	Operations, Maintenance & Monitoring	Total
Cost	$23M - $30M	$280M - $370M	$9.7M - $13M	**$310M - $410M**
Duration	3	4	43	---

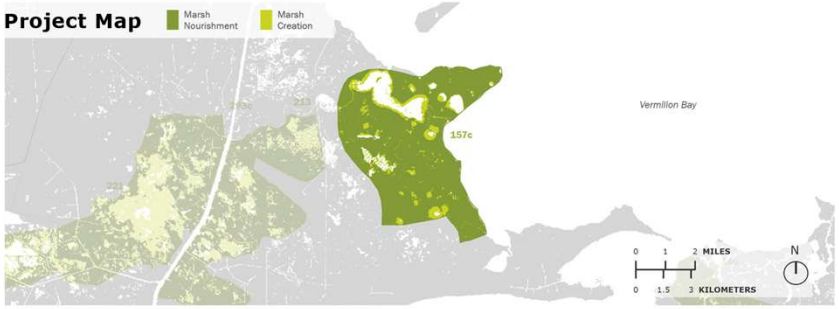
Project Benefits



PROJECT BENEFITS TABLE

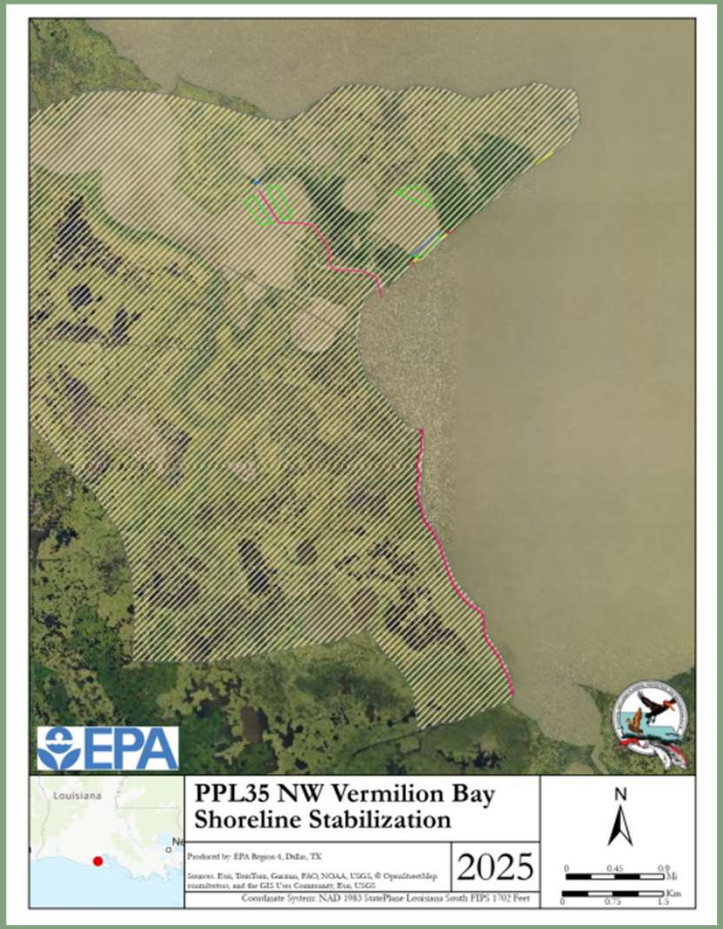
	Lower Scenario	Higher Scenario	Average
Max. Annual Benefit (Acre)	5.9K	13K	9.2K
Min. Annual Benefit (Acre)	0	-1.0K	-510
Years of Pos. / Neg. Benefit	47 / 0	45 / 2	46 / 1

Project Map



2023 COASTAL MASTER PLAN

EAST RAINEY MARSH CREATION



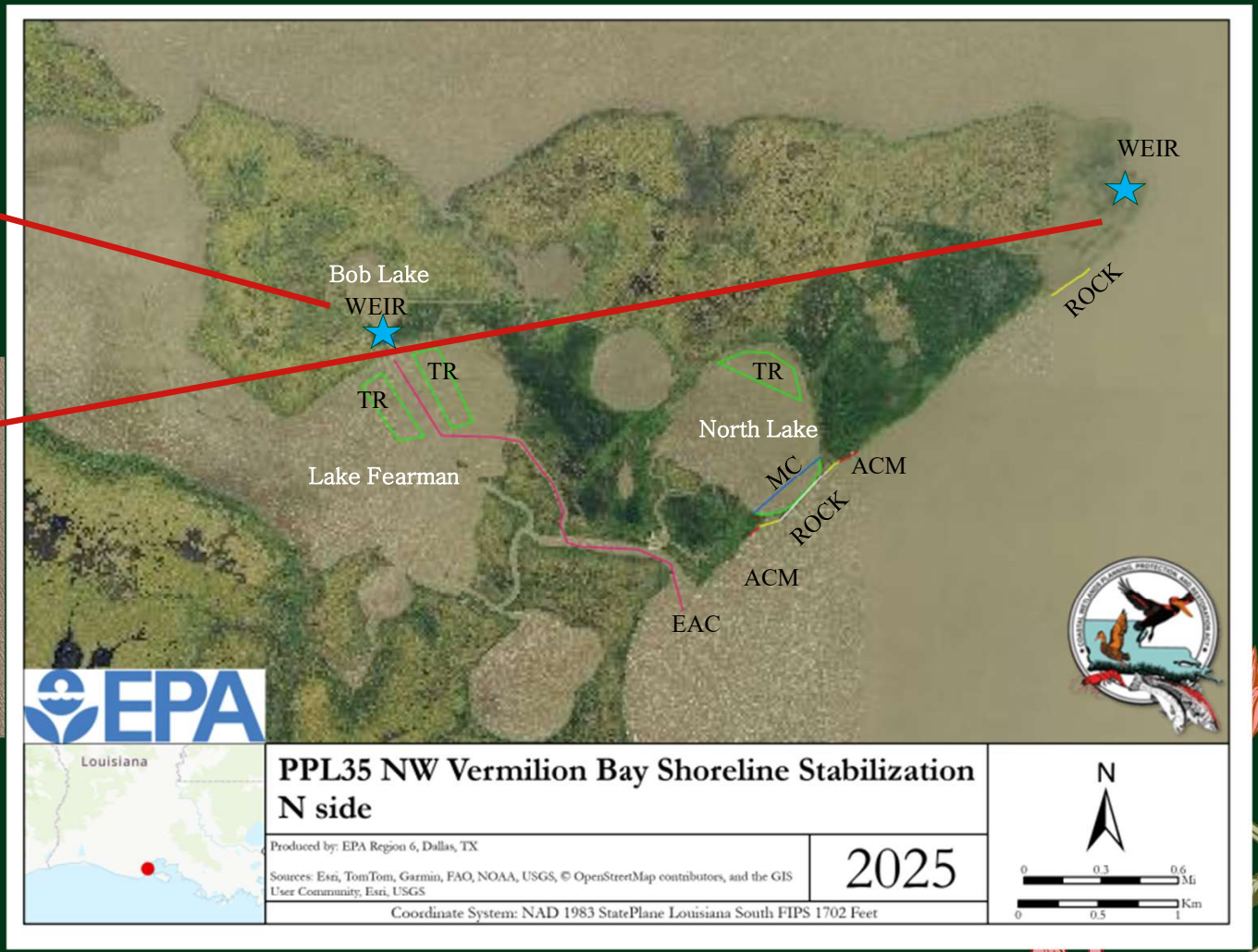
East Rainey Marsh Creation. Project ID: 157C / Implementation Period 1

Summary of Information and Features

Problem	The project area has experienced altered geomorphologic and hydrologic conditions, shoreline erosion, storm damage, dredging of petroleum and nav channels, spoil banks, and increasing wave energy. North Lake and Little Redfish Pt are at risk of coalescing with the bay.
Benefits	2 rock shoreline protection features, 2 underwater weir sills (blowout repair), terraces, marsh creation, ridge creation, plantings
Cost	$20-$25M
Innovation	* Multiple restoration strategies * No hydraulic dredging * Partnership with LDWF, synergy with their project in E&D


Lake Fearman


Little Redfish
Lake


WEIR
ROCK
Bob Lake
WEIR
TR
TR
TR
North Lake
Lake Fearman
MC
ACM
ROCK
ACM
EAC
EPA
Louisiana
PPL35 NW Vermilion Bay Shoreline Stabilization
N side
Produced by: EPA Region 6, Dallas, TX
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS
2025
Coordinate System: NAD 1983 StatePlane Louisiana South FIPS 1702 Feet
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0 0.3 0.6 Mi
0 0.5 1 Km

EPA Region 6 CWPPRA Team Goals

- Protect human health and the environment, including water quality, by restoring coastal wetlands
- Improve local community resilience
- Restore wetland habitats and protect critical infrastructure
- Support local stakeholder priorities in synergy with EPA's mission

Thank you, LDWF, for your continued support

Regions 1 & 2	Sharon Osowski, Ph.D.	osowski.sharon@epa.gov
Regions 3 & 4	Jenny Byrd, MSCE	byrd.jennifer@epa.gov
P&E Rep	Doug Jacobson	jacobson.doug@epa.gov
Project Engineer	Paul Kaspar	kaspar.paul@epa.gov

PPL35 CONCEPT FACT SHEET
February 5, 2025

Project Name
Oyster Lake, Marsh Island Restoration

Master Plan Strategy
Marsh Island Barrier Marsh Creation (ID #346): Creation of marsh within a footprint of approximately 16,000 acres on Marsh Island to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Project Location
Region 3, Teche-Vermilion Basin, Iberia Parish

Problem
Areas of emergent marsh in the interior of Marsh Island have been converted to open water, primarily due to hurricane activity, subsidence and altered hydrology. Marsh Island provides protection to tens of thousands of wetland acres and over 75 miles of shorelines on the mainland to the north, west and east of the island (Iberia, Vermilion and St. Mary parishes). It provides crucial protection to over 10,000 acres of susceptible/fragile marsh to the west and northwest of the project. Marsh Island has been projected to lose 12.9% of its marsh habitat through 2050. Areas targeted by this project are those with the greatest historic land loss and are proximal to East Cote Blanche Bay. The marsh creation cell is located near the West Branch MC Candidate (WVA) which shows a land loss rate of -0.58%/yr.

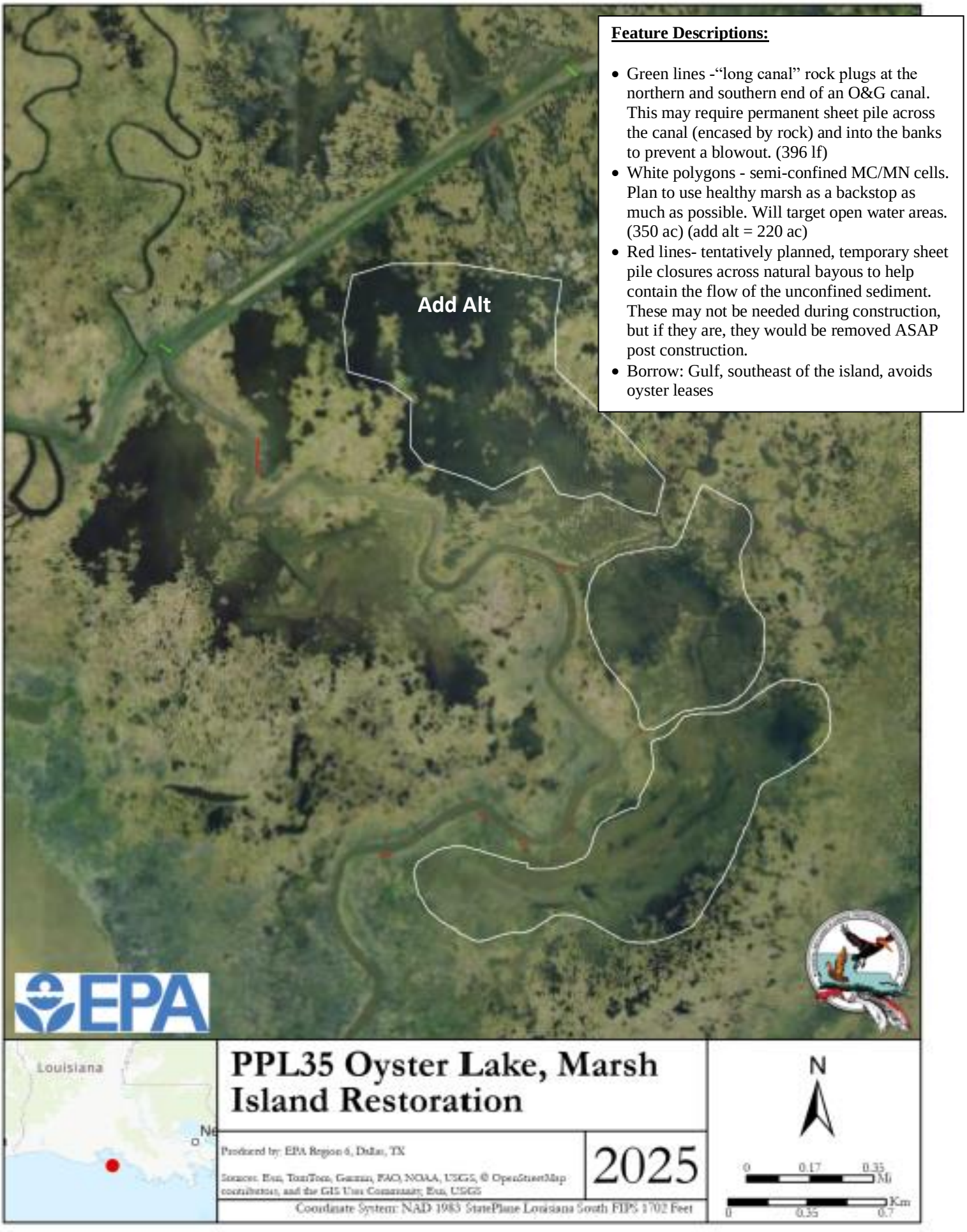
Proposed Solution
The project would use hydraulic dredging from the Gulf to create/nourish approximately 350 acres of emergent marsh by filling in open water and deteriorated areas. Unconfined or limited confinement techniques will be used allowing finer material to flow through the interior marsh areas and provide nourishment. Efforts will be made to limit water quality impacts and minimize impacts to potential oyster bed areas. Additionally, two rock plugs are proposed to close off a manmade canal that has blown out and is deteriorating interior marshes. This project has synergistic effects the constructed Marsh Island Hydrologic Restoration (TV-014), the East Marsh Island Marsh Creation (TV-021) projects on the east-end of Marsh Island, Marsh Island Repairs (TV-073, FEMA) and Marsh Island Control Structures Hydrologic Restoration (TV-006).

Project Benefits
Create/nourish approximately 350 acres of emergent marsh using dredged sediment. Closing off the manmade canal would prevent further deterioration of interior marshes and help restore natural hydrology. This project would directly contribute to the restoration of a critical landscape feature, Marsh Island.

Project Innovation
- Multiple restoration strategies addressing hydrologic restoration and marsh nourishment
- Unconfined fill to the fullest extent possible (i.e., use healthy marsh as back stop)
- Partnership with LDWF

Project Costs
The estimated construction cost including 25% contingency is $25-$30M.

Preparer(s) of Fact Sheet:
Jenny Byrd; EPA; (214) 665-7377; byrd.jennifer@epa.gov
Tyson Crouch, LDWF; (337) 735-8669; tcrouch@wlf.la.gov
Lance Campbell, LDWF; (337) 735-8668; ljcampbell@wlf.la.gov



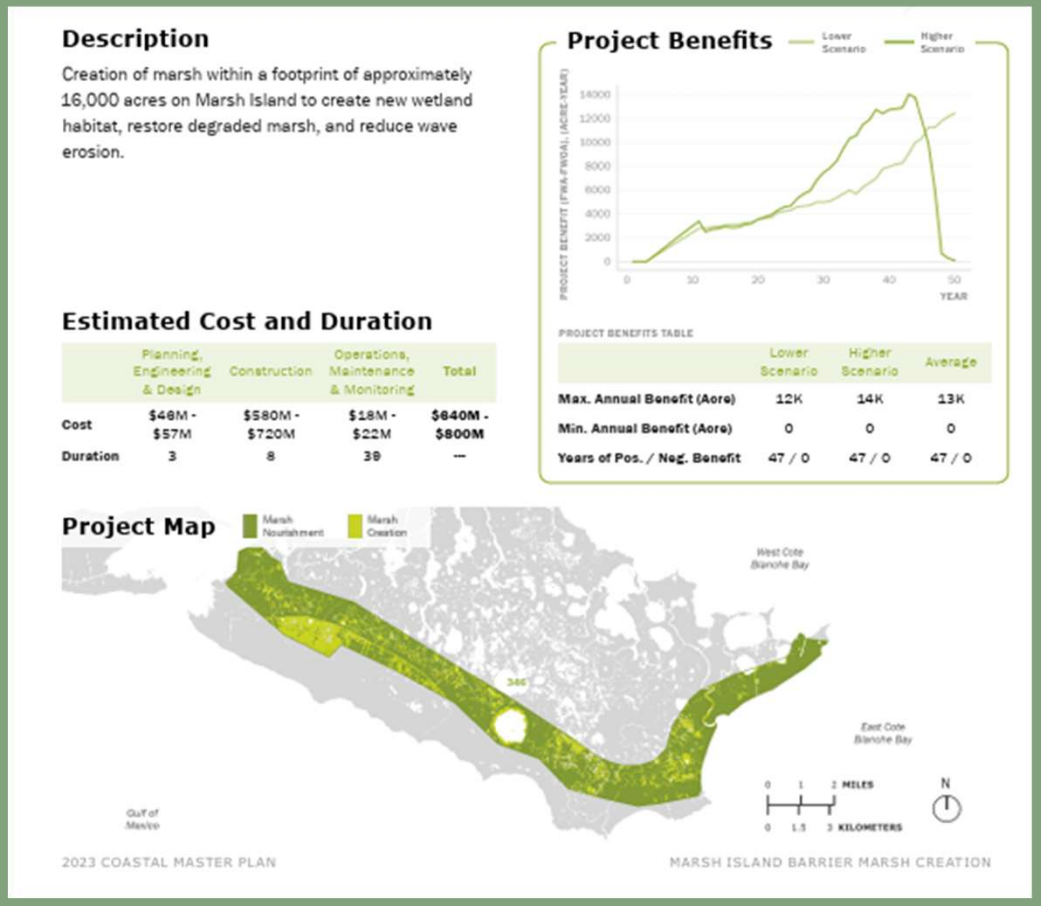
Feature Descriptions:

- Green lines -"long canal" rock plugs at the northern and southern end of an O&G canal. This may require permanent sheet pile across the canal (encased by rock) and into the banks to prevent a blowout. (396 lf)
- White polygons - semi-confined MC/MN cells. Plan to use healthy marsh as a backstop as much as possible. Will target open water areas. (350 ac) (add alt = 220 ac)
- Red lines- tentatively planned, temporary sheet pile closures across natural bayous to help contain the flow of the unconfined sediment. These may not be needed during construction, but if they are, they would be removed ASAP post construction.
- Borrow: Gulf, southeast of the island, avoids oyster leases

Oyster Lake, Marsh Island Restoration

PPL35

2023 Master Plan Strategy



Description

Creation of marsh within a footprint of approximately 16,000 acres on Marsh Island to create new wetland habitat, restore degraded marsh, and reduce wave erosion.

Project Benefits

PROJECT BENEFITS TABLE

	Lower Scenario	Higher Scenario	Average
Max. Annual Benefit (Acre)	12K	14K	13K
Min. Annual Benefit (Acre)	0	0	0
Years of Pos. / Neg. Benefit	47 / 0	47 / 0	47 / 0

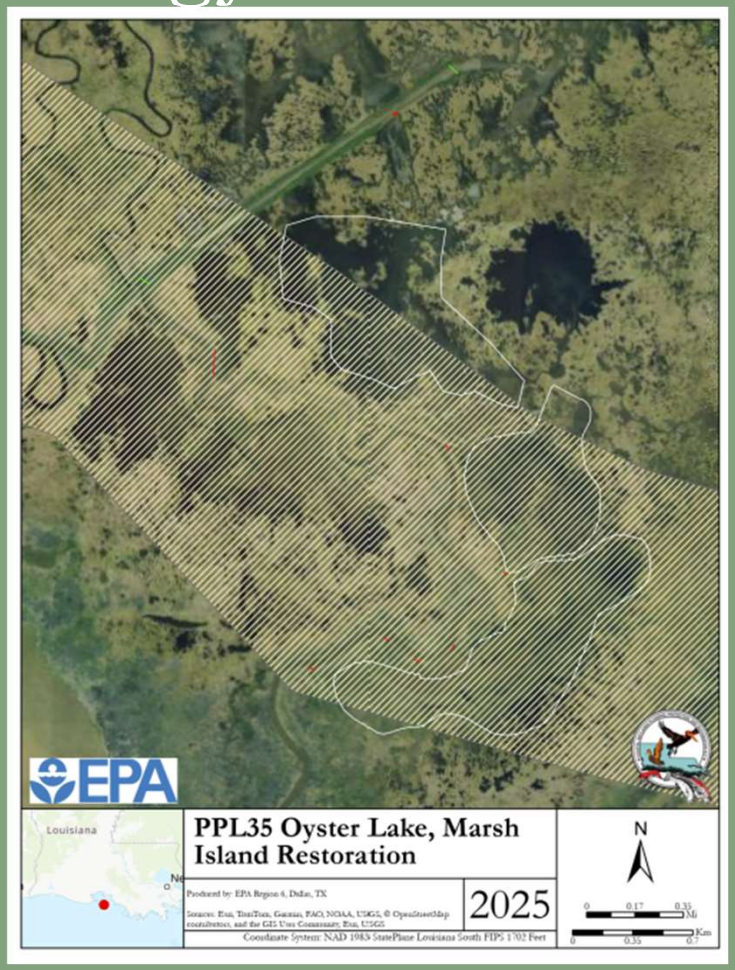
Estimated Cost and Duration

	Planning, Engineering & Design	Construction	Operations, Maintenance & Monitoring	Total
Cost	$46M - $57M	$580M - $720M	$18M - $22M	**$640M - $800M**
Duration	3	8	39	---

Project Map

2023 COASTAL MASTER PLAN

MARSH ISLAND BARRIER MARSH CREATION



Marsh Island Barrier Marsh Creation. Project ID: 346 / Implementation Period 1

Summary of Information and Features

Problem	Interior emergent marshes on the island are converting to open water due to storm damage, subsidence, and altered hydrology. Marsh Island protects tens of thousand of acres and 75 miles of shoreline on the mainland across Iberia, St. Mary and Vermilion Parishes. Marsh Island is projected to lose 12.9% of habitat through 2050.
Features	Rock plugs at the northern and southern end of manmade canal; temporary sheetpile closures across natural bayous; limited confinement to unconfined fill (350 ac)
Cost	$25-30M
Innovation	* Multiple restoration techniques * Unconfined to the fullest extent possible (i.e, use healthy marsh as backstop) * Partnership with LDWF

Feature Descriptions:

- Green lines –“long canal” rock plugs (396 lf)
- White polygons – semi-confined MC/MN cells. (350 ac) (add alt = 220 ac)
- Red lines- tentatively planned, temporary sheet pile closures
- Borrow: Gulf, southeast of the island, avoids oyster leases

EPA Region 6 CWPPRA Team Goals

- Protect human health and the environment, including water quality, by restoring coastal wetlands
- Improve local community resilience
- Restore wetland habitats and protect critical infrastructure
- Support local stakeholder priorities in synergy with EPA's mission

Thank you, LDWF, for your continued support

Regions 1 & 2	Sharon Osowski, Ph.D.	osowski.sharon@epa.gov
Regions 3 & 4	Jenny Byrd, MSCE	byrd.jennifer@epa.gov
P&E Rep	Doug Jacobson	jacobson.doug@epa.gov
Project Engineer	Paul Kaspar	kaspar.paul@epa.gov

PPL35 CONCEPT FACT SHEET

February 5, 2025

Project Name
Vermilion River Cutoff

Master Plan Strategy
Deemed programmatically consistent with the 2023 State Master Plan.

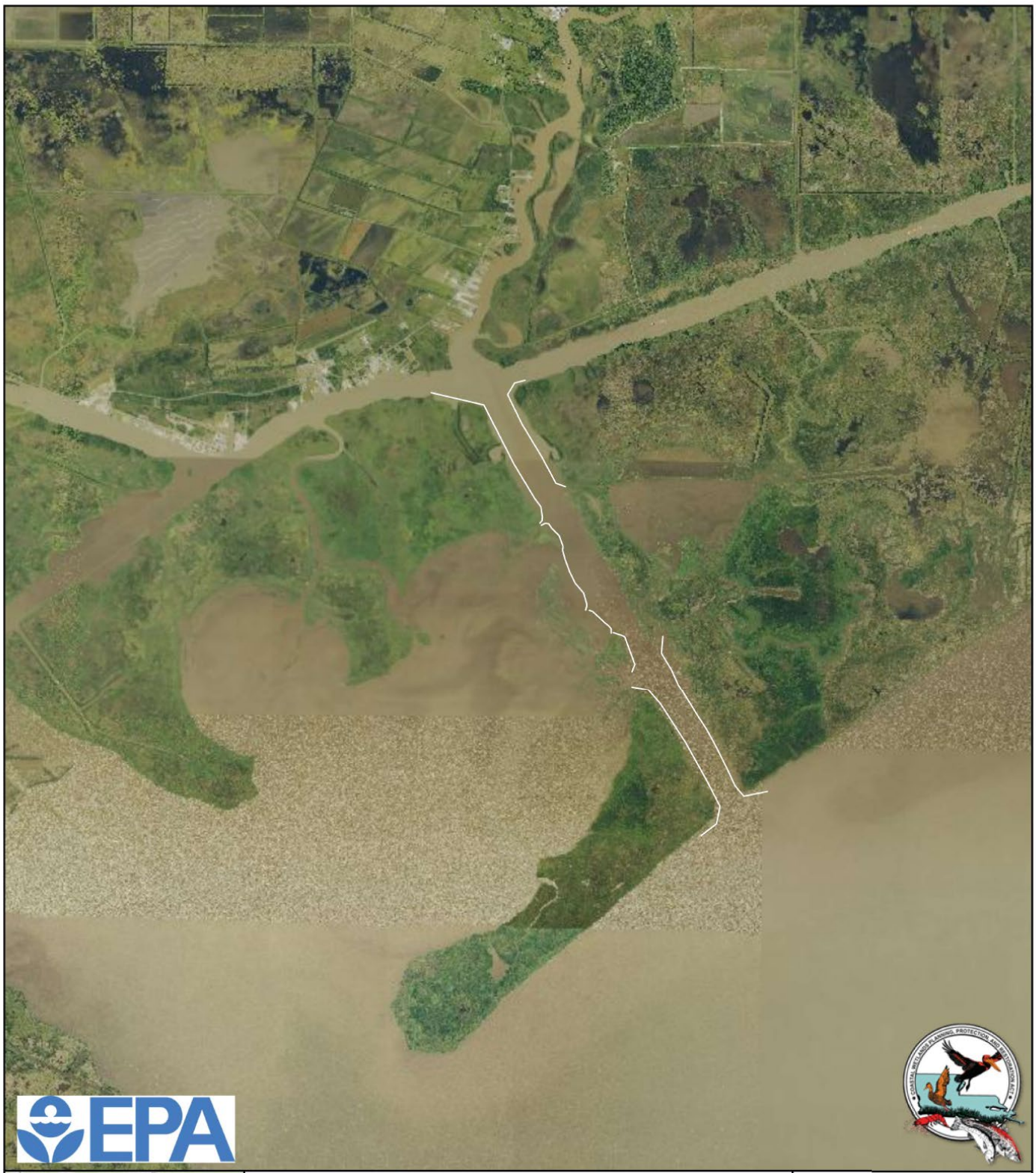
Project Location
Region 3, Teche-Vermilion Basin, Iberia Parish

Problem
4 Mile Canal, also referred to as the Vermilion River Cutoff, serves as a connection between the Vermilion River and Vermilion Bay, which ultimately discharges into the Gulf of Mexico. This channel is a vital connection to provide conveyance for the Vermilion River drainage basin. In 1947 the Corp of Engineers constructed the canal 80 feet wide and 8 feet deep. The banks of 4 Mile Canal have continued to erode as a result of boat wake-induced forces as well as wind-influenced waves and tidal scouring. The historical shoreline erosion rate has been documented (re: CWPPRA TV-03) to be on the order of 23 feet per year between 1955 and 1985. These incredible erosion rates continue to threaten the banks of the channel. One (1) section of shoreline on the east bank of 4 Mile Canal (adjacent to Onion Lake) was successfully protected with a rock dike along the existing bank line in the 1990s by CWPPRA project TV-03. The remainder of the banks of 4 Mile Canal have continued to erode with current channel widths in excess of 1,300 feet wide. As the channel has widened over the years, it permits higher seasonal tides, salt water intrusion and accelerated storm surge to travel north in the Vermilion River from Intracoastal City to Surrey Street in Lafayette. This tidal and salinity exchange challenges the work being done by the Teche Vermilion Fresh Water District by restricting the ability to provide fresh water for agricultural needs and keeping the Vermilion River cleaner than it's ever been.

Proposed Solution
This project proposes to protect both banks of Vermilion River Cutoff with rock alternatives to shoreline protection along the 3-4 ft contour. Approximately 32,420 linear feet of shoreline protection will be placed on the east and west banks of the canals, omitting where existing protection exists at TV-03. In the interest of continuing to support CWPPRA project TV-18 Four-mile Canal Terracing and Sediment Trapping, portions of the western shoreline protection could be staggered or segmented to ensure the continued nourishment of the positive impacts from that project. Extending the shoreline protection along the GIWW, Vermilion Bay and 4 Mile Canal intersections is critical to maintain the integrity and definition of the drainage channel.

Goals:
- Protect 135 net acres over the 20-year project life
- Prevent further widening of the channel
- Prevents the issues the area experiences from getting worse

Submitted for consideration by:
Chad Lege, Vermilion Parish Police Juror and Coastal Committee Vice Pres., 337-652-7692
Shannon Neveaux, Vermilion Parish Coastal Committee, 337-652-2484
Judge Edwards, Vermilion Parish Coastal Committee, 337-652-7469
Sherrill Sagrera, RCA, VSWCD, Vermilion Parish Coastal Committee, 337-652-0636



PPL35 Vermilion River Cutoff

Produced by: EPA Region 6, Dallas, TX

Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, Esri, USGS

2025

Coordinate System: NAD 1983 StatePlane Louisiana South FIPS 1702 Feet

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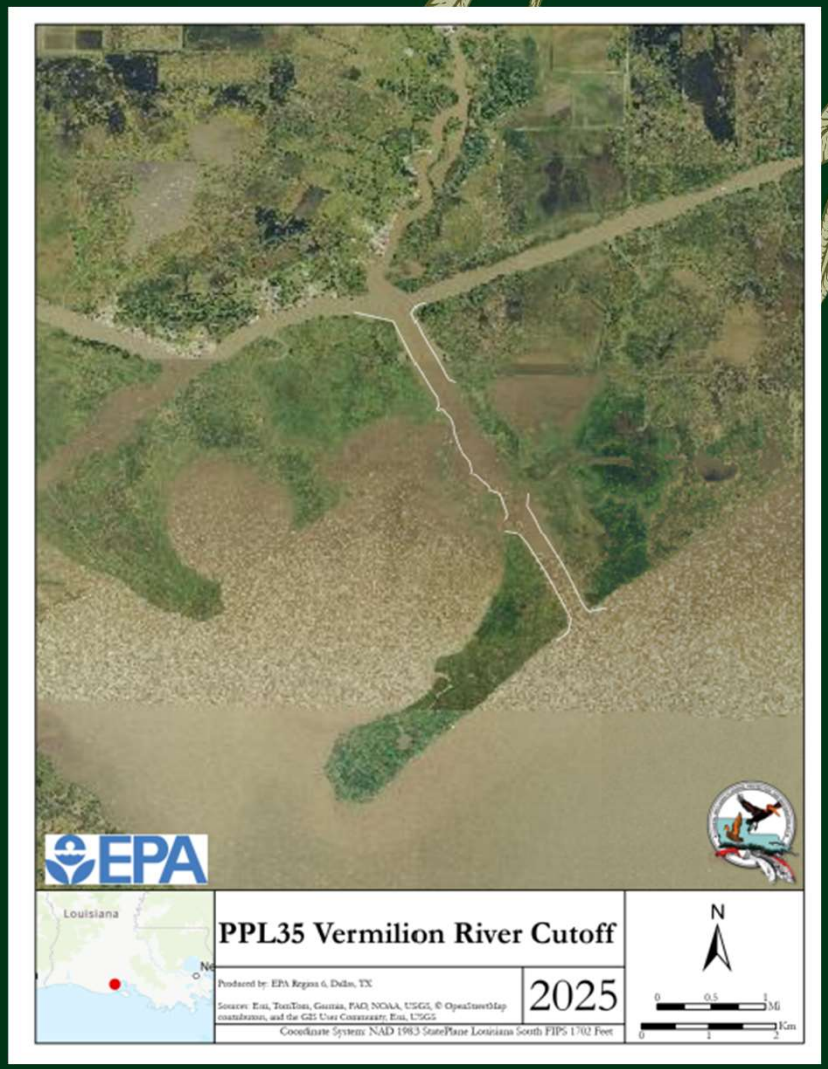
Vermilion River Cutoff

PPL35

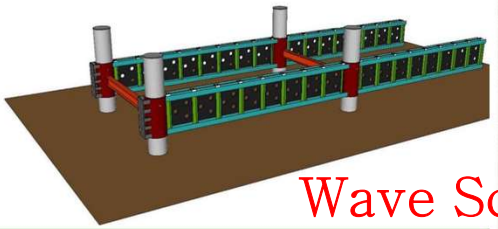


Summary of Information and Features

Problem	The Vermilion River Cutoff, also known as 4-mile canal, is a critical connection to provide conveyance for the Vermilion River Drainage Basin. In 1947, the USACE dredged the canal 80 ft wide and 8 ft deep. Current width is ~1,300 ft and depth is 16 ft in the canal. Shoreline Erosion rates approx. -23.0 ft/yr (from TV-03)
Features Cost	32,420 LF of shoreline protection on both sides of the canal, except for existing TV-03. Gapping will be implemented along TV-18 terraces. Cost dependent on SP product
State Master Plan Consistency	Shoreline Protection projects are considered programmatically consistent

Alternative Shoreline Protection Products Considered

Integrated Shoreline Solutions
Wave Screen Design
US Patent No. 9,624,636 B2
Lafayette, LA



Wave Screen System

EcoBales

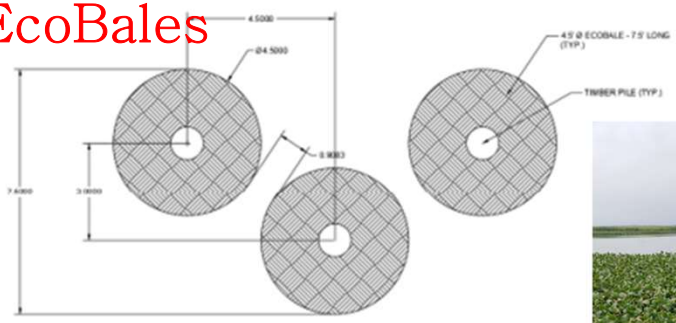
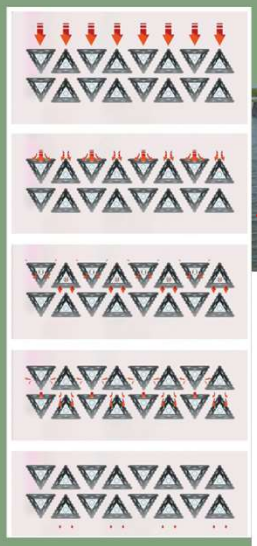
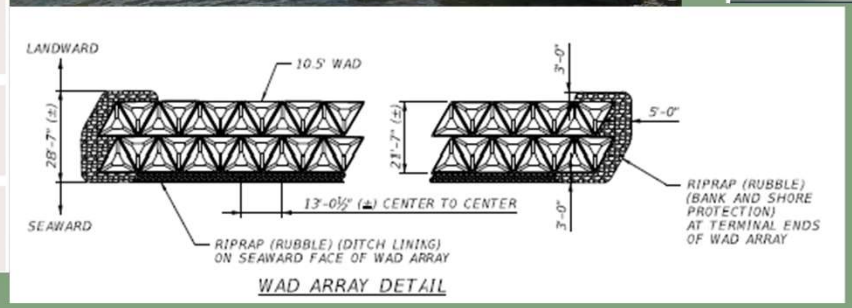


Figure 3 - Plan View of Assumed EcoBale Layout for Low Energy Envi



Wave Attenuating Devices



WAD ARRAY DETAIL

NATRX Exoforms

NATRX EXOFORMS READY FOR INSTALLATION

Original dimensions of the channel traced from Topo


TV-03
TV-18
Google Earth
Image © 2025 Airbus
N
3 mi

Submitted for consideration by:

- **Ched Lege**, Vermilion Parish Police Juror and Coastal Committee VP, 337-652-7692
- **Shannon Neveaux**, Vermilion Parish Coastal Committee, 337-652-2484
- **Judge Edwards**, Vermilion Parish Coastal Committee, 337-652-7469
- **Sherrill Sagrera**, RCA, VSWCD, Vermilion Parish Coastal Committee, 337-652-0636

- Support provided by:

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PPL35 PROJECT NOMINEE FACT SHEET
FEBRUARY 05, 2025

Project Name
Shark Island Shoreline Protection Project

Project Location
Region 3, Teche-Vermilion Basin, between Shark Island of Vermilion/Weeks Bays in Iberia Parish, LA

Problem
On-going erosion on the northeast Vermilion Bay shoreline along Shark Island are among the highest rates west of the Atchafalaya River including along the Gulf of Mexico. An erosion rate of ~40 ft/yr has been determined for this project based on BICM analyses through 2015 and more recent observations during CWPPRA's LA-0016 Non-rock Alternatives to Shoreline Protection Demo Project at Shark Island. The erosion along the northeastern Vermilion Bay rim has substantially shrunken Shark Island, especially on the northern end which has lost ~4,500 linear feet since 1990. That end of Shark Island separates Vermilion Bay from Weeks Bay which directly abuts the critical infrastructure of the GIWW and Weeks Island (Salt mine and petroleum reserves) as Weeks Bay and the GIWW have coalesced in larger sections since 1990. Shark Island also provides recreational opportunities to the Cypremort Point State Park and community of Cypremort Point.

Goals
The project goals are to stop erosion along the northeastern Vermilion Bay rim of Shark Island. This would help stabilize Shark Island and critical infrastructure to the east along Weeks Bay.

Proposed Solution
To prevent shoreline erosion, 3.85 miles (20,328 linear feet) of foreshore breakwater would be constructed along Shark Island and stabilize the northeastern and southwestern shorelines of Vermilion (2.85 miles) and Weeks (1 mile) Bays, respectively. Unfortunately, the soils along Shark Island are from old marsh platform and have very low weight-bearing capacity, so traditional application of rock breakwaters is not recommended. LA-16 demonstrated four different low density or suspended alternatives to rock breakwaters at Shark Island. The best performer, Wave Screen System developed by Integrated Shoreline Solutions, was a suspended system that held perforated sheeting about 2 feet off the bottom between steel pilings.

Preliminary Project Benefits
Over the 3.75 miles of protected shoreline, 350-400 net acres would be preserved over the 20-year life of the project based on 100% reduction of lateral erosion rate. As observed during LA-0016, progradation also occurs behind certain shoreline protection features. Indirectly, stabilization of the Shark Island shoreline could result in additional marsh loss reductions. This shoreline protection is along bay rims and a peninsula separating the bays. Protecting these critical landscape features also benefits critical shipping route (GIWW) and a U.S. Dept. of Energy Strategic Petroleum Reserve (Weeks Island Salt Dome) infrastructure along the east side of Weeks Bay by lessening wind fetch 85-90% from across Vermilion Bay. Two other projects were constructed to protect shoreline along northeastern Vermilion Bay south of Shark Island, TV-72 Quintana Canal/Cypremort Point Rock Breakwaters (State of Louisiana Wetland

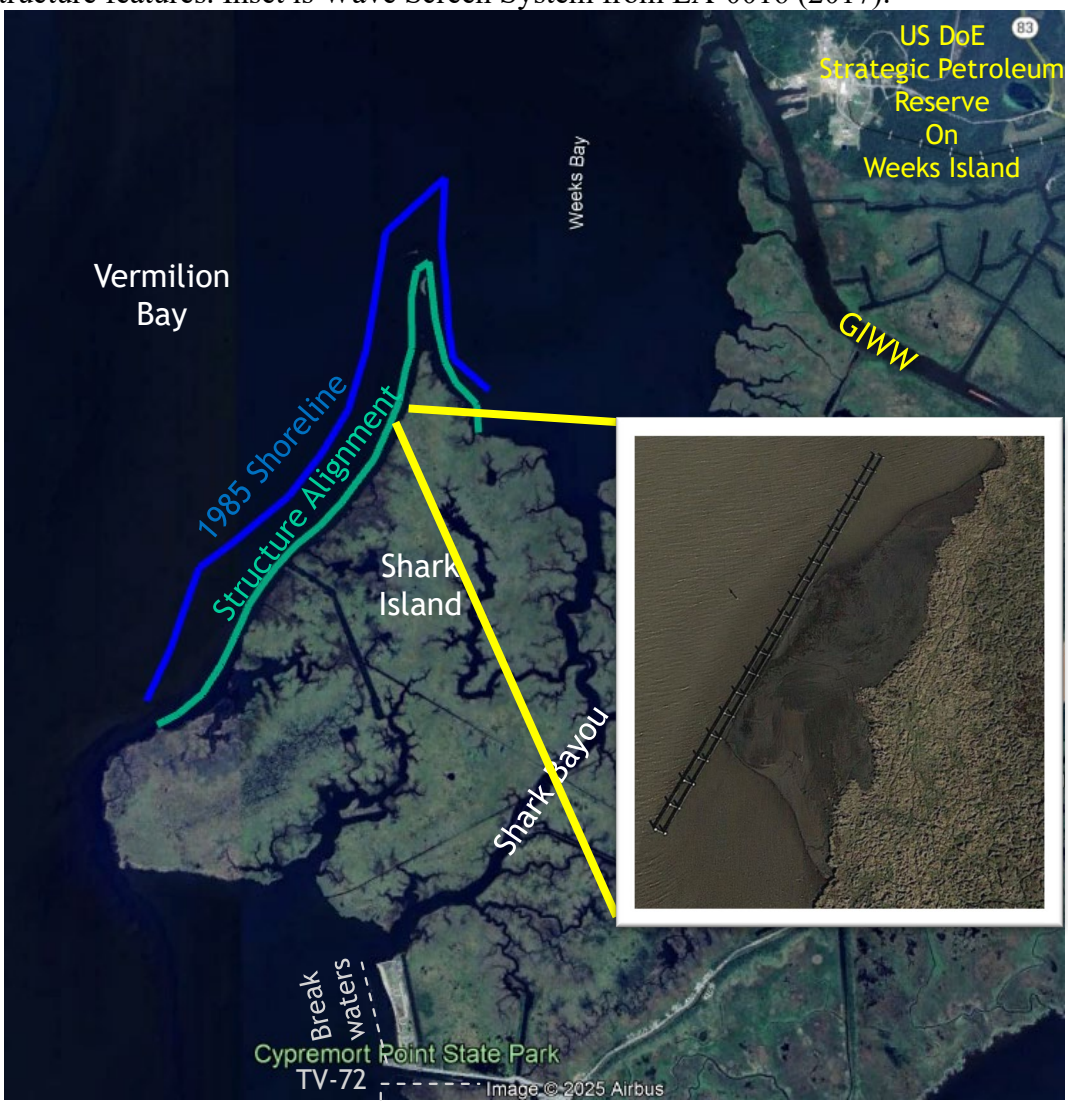
Conservation and Restoration Program, 1998) and the Cypremort Point State Park Beach Breakwater project (FEMA 2018).

Other Considerations
The project is approved by the nearest landowner, Miami Alternatives, and the Rainey Conservation Alliance. The breakwaters are proposed within designated state water bottoms and designated oyster seed ground (Tier 3). Petroleum pipelines are present in the area; however, spacing of the pilings can be adjusted to allow coverage of the area over the pipelines.

Preliminary Construction Costs
The estimated construction cost +25% contingency is $30-35M based on the construction costs from LA-0016 in 2013 adjusted for inflation.

Preparer(s) of Fact Sheet:
Thomas McGinnis, USDA-NRCS Project Manager, thomas.mcginnis2@usda.gov
John Foret, Rainey Conservation Alliance, jdforet@fenstermaker.com

Project Layout. Shark Island Shoreline Protection, Synergy, and Critical Landscape and Infrastructure features. Inset is Wave Screen System from LA-0016 (2017).



PPL35

Shark Island Shoreline Protection

Region 3, Teche-Vermilion Basin

Contacts:

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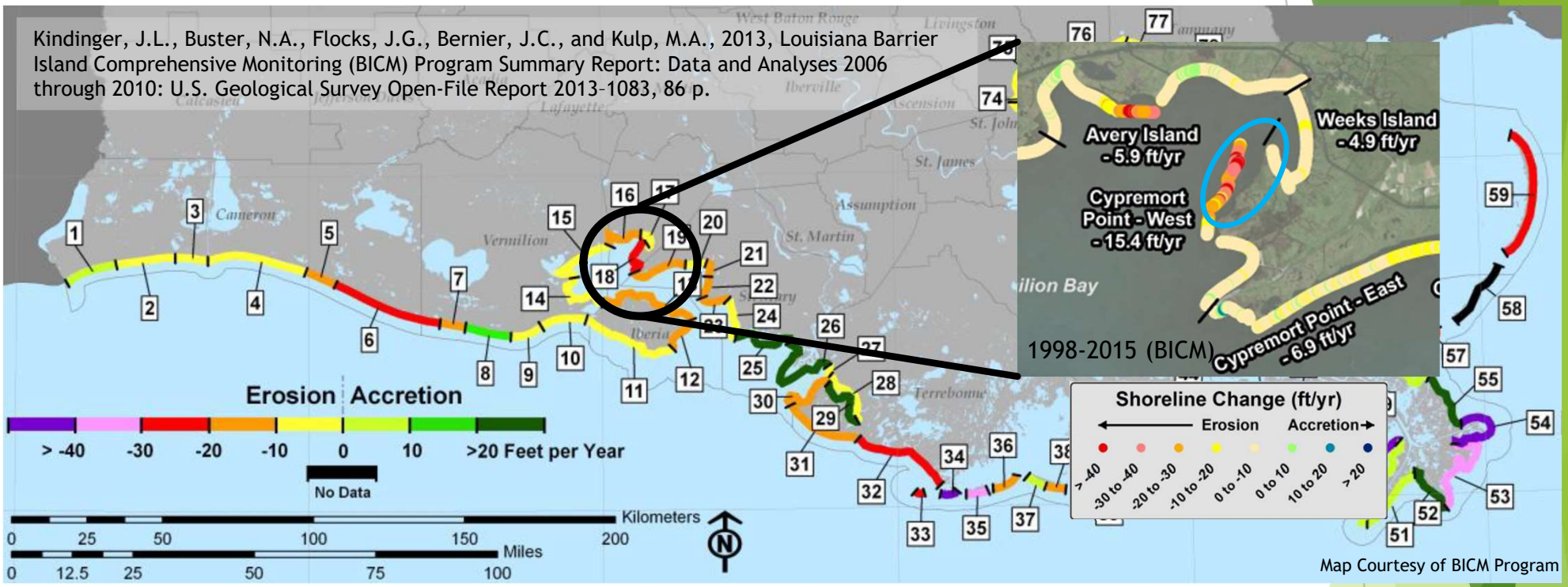
PPL32 – Shark Island Shoreline Protection



On-going shoreline retreat on the northeast Vermilion Bay shoreline along Shark Island has been among the highest rates west of the Atchafalaya River including along the Gulf of Mexico (Martinez et al. 2009) JFO

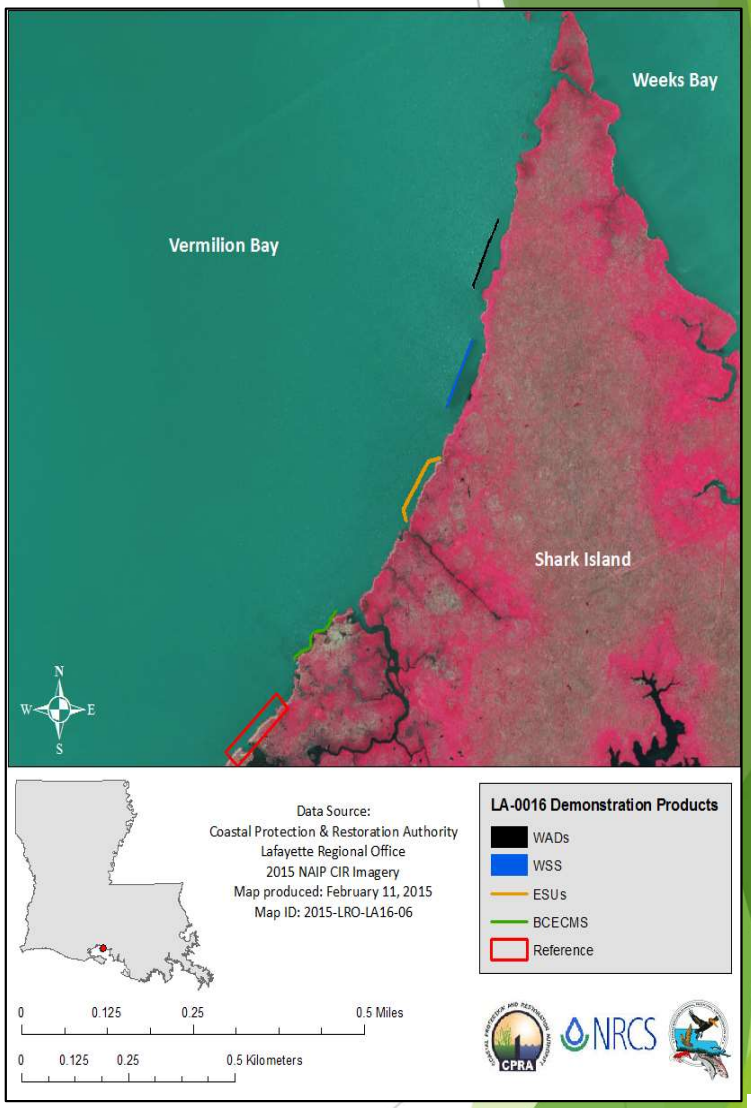
Cypermort Point – West shoreline (Segment 18) eroded 22.1 ft/yr from 1930s to 2005 (BICM Program)

Transects along Shark Island eroded 20-40+ ft/y from 1998 to 2005 (BICM 2018) and 51 ft/y from 2014-2017 (LA-0016).

LA-0016 Non-Rock Alternatives to Shoreline Protection Demo

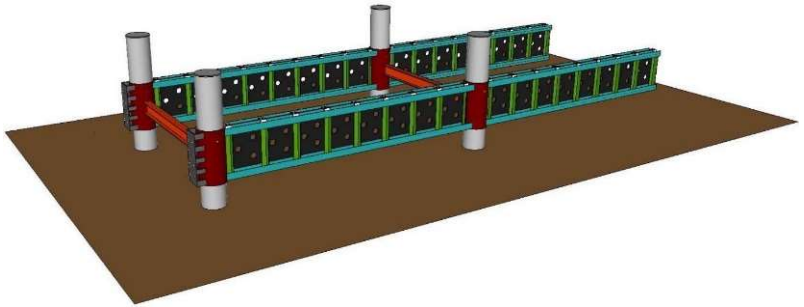
- Problem: Traditional Rock breakwaters sink in weak soils
- 4 Products were Constructed along Shark Island
  - Span up to 500 Linear Feet of Shoreline
  - Design for 20 year project life
  - Structure cannot contact the land
  - Construction must take place from the water
  - Firms responsible for Manufacture, Installation, O&M, and Removal
- 3 year Monitoring Period: 2014 to 2017

Alternative	Soil Volume Change Rate ($yd^3/ac/y$)	Shoreline Change Rate (ft/y) (%Imp)	Wave Breaking (%)	Cost per Linear Foot ($/LF)
WADs	+218	-2.6 (95%)	70	$1,402
WSS	**+576**	**-1.8 (97%)**	**83**	**$1,495**
ESUs	-38	-9.1 (85%)	65	$1,242
BCECMS	-504	-5.9 (88%)	81	$2,061
Reference	-2,190	-51.2		

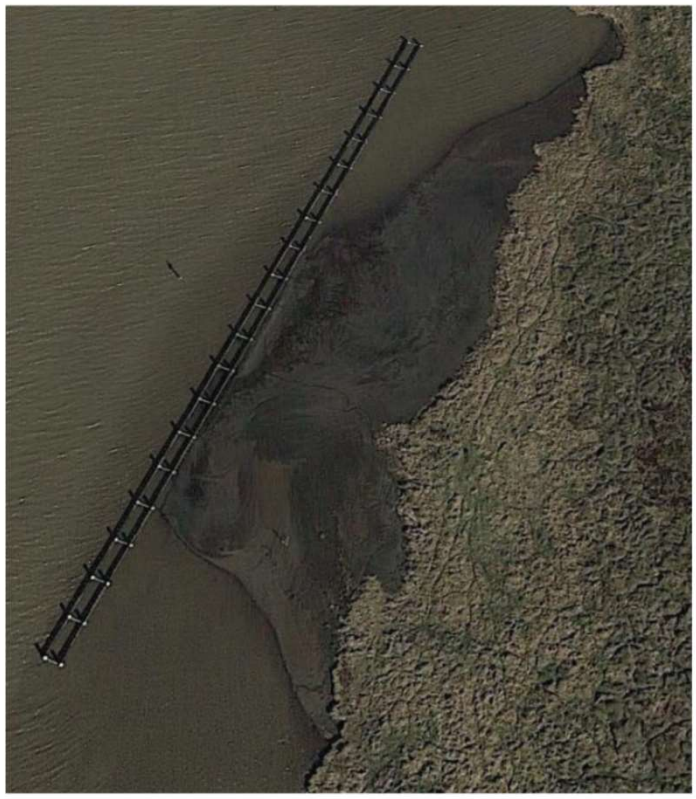


LA-16 Non-Rock Alternatives to Shoreline Protection Demonstration Project

Wave Screen System(WSS) – Integrated Shoreline Solutions, LLC (Designed by Royal Engineers & Consultations)



- Double Wall of HDPE sheets supported by steel pilings and framing, with 6-inch holes
- 125-150 ft from shoreline (~4 ft of water)
- Screens hung down about 4 feet, about 1-1.5 ft above the bay bottom

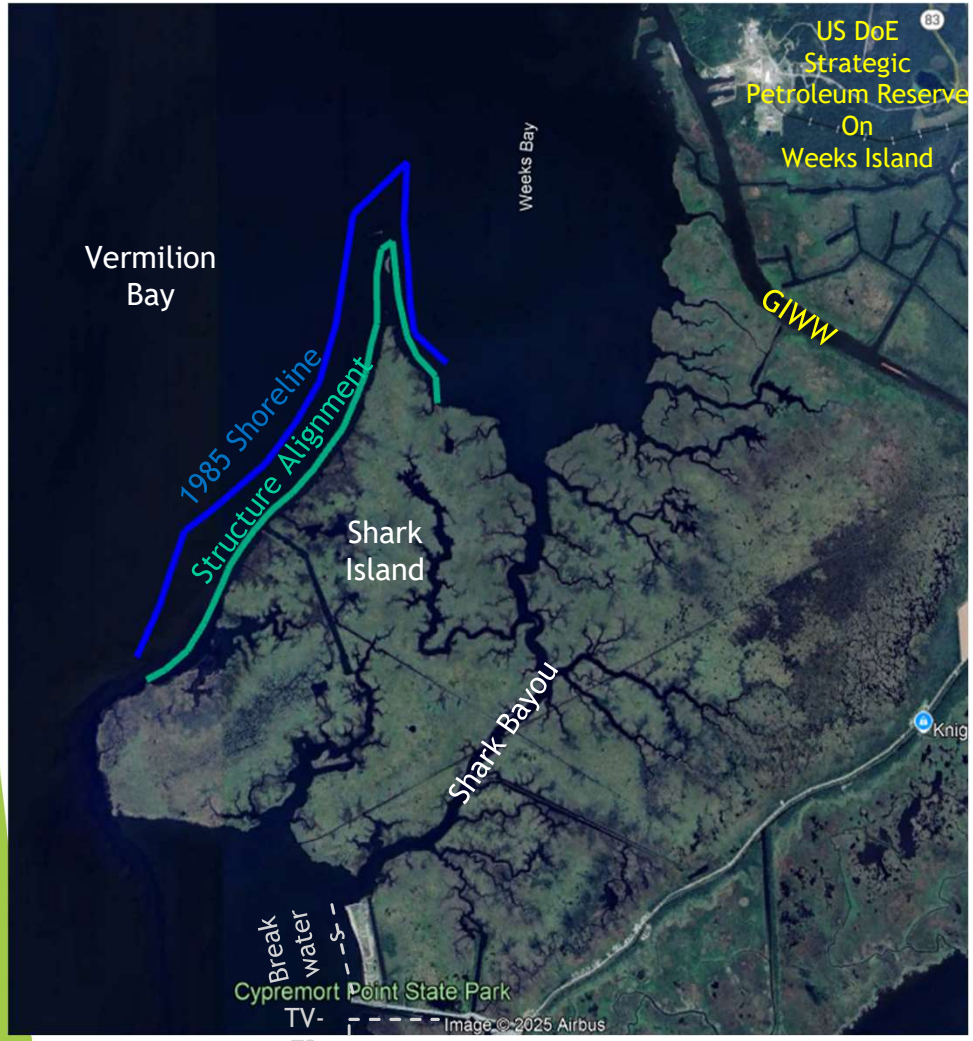


Shoreline Change = - 1.8 ft/y
~ 98% slower than the Reference Area

Positive Soil Elevation Change behind the WSS
Accretion of 0.63ft underneath

Information Provided by Final Closeout Report for LA-16 & 2018 SOC Lessons Learned Presentation (McGinnis, II T.E., 2018)

PPL35 – Shark Island Shoreline Protection



Goal:
Maintain shoreline integrity and stabilize critical areas of Vermilion and Weeks Bay rims by reducing shoreline erosion of 40+ ft/y

Solution:

- Construct 3.85 miles (20,328 lf) of shoreline protection

Direct Benefits: 300-400 Net Acres over 20 year

Est. Construction Cost + Contingency: $30-35M

Critical Landscape Features: Bay Rims and Peninsula

Critical Infrastructure: Shipping (GIWW)
Petroleum Reserve (Weeks Island Salt Dome)

Synergy: Breakwater Projects south of Shark Island near Cypremort Point State Park

PPL35 PROJECT NOMINEE FACT SHEET
February 4, 2025

Project Name
Freshwater Bayou East Marsh Restoration

Project Location
Region 3, Teche/Vermilion Basin, Vermilion Parish, East bank of Freshwater Bayou about 4-6 miles north of the Freshwater Bayou lock system; 2023 Louisiana Coastal Master Plan, West Rainey Marsh Creation, Display ID 213, Project ID 2130000

Problem
The marshes adjacent to the Freshwater Bayou Canal (FWBC) have degraded significantly by a combination of natural and man-induced conditions. Hurricanes have scoured out large areas very quickly, but anthropogenic activities and alterations have allowed the area to be much more vulnerable. Various restoration measures have been employed in this area with a high degree of success including protecting the navigation channel banklines and adjacent marsh creation and terracing. The proposed location for this project is one that has not been addressed and has continued wetland losses. Based on 1985 to 2019 data, USGS estimates that the area has a land loss rate of -0.62 %/yr. The state estimates deep subsidence at about 2.42 mm/yr. Additionally, the area adjacent to the navigation channel experiences significant bank erosion (12-15 ft/yr).

Proposed Solution
The proposed solution for bankline and interior shoreline erosion is to construct rock shoreline protection along the FWBC, create and nourish marsh along the FWBC, and construct earthen terraces in the marsh interior (Figure 1). Restoring marsh elevations would be achieved by pumping sediment from FWBC into disposal areas along the navigation channel. For constructability purposes, enhanced dike sections would be included for reaches of containment on two of the five marsh creation areas near the FWBC. Containment dikes other than the enhanced sections would be gapped or degraded within three years of construction to allow tidal exchange and organism access.

Goals
The primary goals of this project are to 1) create/restore approximately 171 acres of marsh habitat in the open water areas via marsh creation/nourishment and for that marsh to remain within the MLW to MWH for the maximum duration over 20 years, 2) create edge habitat and reduce fetch and wave energy in open water areas via the construction of terraces.

Project Features
1. 18,314 linear feet of shoreline protection along FWBC.
2. Sediment will be hydraulically dredged and pumped via pipeline from a borrow site located in the FWBC to create/nourish approximately 171 acres of marsh (147 created and 24 nourished). Enhanced dikes sections along the FWBC are included for two of the five marsh creation areas to aid in constructability until the hydraulic fill consolidates and vegetates. The enhanced dike sections total 1,751 feet, are tied into existing marsh, and include a 10 foot crown and articulated concrete mat (ACM) similar to the Cole's Bayou Restoration Project (TV-63). The need for ACM will be re-evaluated during the candidacy phase.

3. Approximately 19,880 linear feet of terraces will be constructed. This includes 14 emergent acres of terrace and 295 acres of terrace field.

Preliminary Project Benefits

1) What is the project's estimated total net acres after 20 years?
Net Acres: 278

2) What is the estimated construction cost plus 25% contingency and the estimated fully funded cost?
The estimated construction cost + 25% contingency is $27,462,382 ($25M - $30M).
The estimated fully funded cost is $40,187,229 ($40M - $45M).

3) What is the project cost effectiveness using fully funded cost/net acres"
Total Fully Funded Cost ($27,462,382) / Total Net Acres (278 net acres)

4) To what extent does the project provide synergistic effect with other approved and/or constructed restoration projects? (Provide details including proximity, funding/project status, and how the projects collectively contribute to restoration benefits larger than their individual footprints).

Refer to Figure 2 (appended) for the following projects that have been constructed in the immediate proximity of the proposed project:

- ME-04 (CWPPRA) - (CWPPRA) Freshwater Bayou Wetland Protection Hydrologic Restoration Project. To protect and enhance the Freshwater Bayou Wetlands Complex approximately 28,000 linear feet of freestanding, continuous rock dike was built along the west bank of the FWBC to reduce shoreline erosion. Additionally, the landowner elected to install several water control structures identified in the plan to manage water levels and salinities in the unit.
    - Located on the west bank of the FWBC approximately 0.3 miles from the proposed project.
- TV-11B (CIAP) Shoreline Protection installed seven miles of rock revetment shoreline protection along four critical areas of the Freshwater Bayou navigation channel.
    - Located on the east bank of the FWBC approximately 0.3 miles from the proposed project
- ME-13 (CWPPRA) - (CWPPRA) installed approximately 23,193 linear feet of freestanding continuous rock dike was built along the FWBC to reduce shoreline erosion.
    - Located on the west bank of the FWBC approximately 0.3 miles from the proposed project
- The Freshwater Bayou North American Wetlands Conservation Act (NAWCA) grant authorized funds for DU to restore and enhance the FWBC Wetlands Complex along the western shoreline of the FWBC.
    - Phase I of the earthen shoreline enhancement work was completed in October 2016 to restore the hydrologic integrity of this tract and stabilized the shoreline of the navigation channel.
    - Phase 2 was completed in 2021 and included strategically placed shoreline berms

and breakwater recapping of ME-04
    - Located on the west bank of the FWBC approximately 0.5 mile from proposed project
- TV-11 Freshwater Bayou Bankline Protection
    - Located on the east bank of the FWBC approximately 0.7 miles from the proposed project
- ME-25 Freshwater Bayou Marsh Creation (2007 surplus project) recreated ~96 acres of freshwater marsh near the intersection of Humble Canal and Freshwater Bayou.
    - Located on the west bank of the FWBC south of Humble Canal approximately 1.9 miles from the proposed project

5) *What is the interior loss rate and/or shoreline loss rate? And what is the source of the data?* The interior loss rate is -0.62 %/yr based on USGS data from 1984 to 2019 from the PPL30 North Marsh candidate which overlaps this nominee. The FWBC shoreline erosion rate is 12-15 ft/yr.

6) *Do any project features maintain or restore structural components of the coastal ecosystem such as barrier islands, natural or artificial levee ridges, beach and lake rims, cheniers, etc or is it part of a land bridge feature?*
None identified.

7) *Does the project have a net positive impact on critical and non-critical infrastructure?*
The project would provide substantial net positive impacts by creating marsh to restore a near continuous corridor along the eastern bank of the FWBC. Such may reduce erosion of interior marshes and deposition of sediment in the FWBC.

Other Considerations
The project may have issues with land rights and pipeline/utilities.

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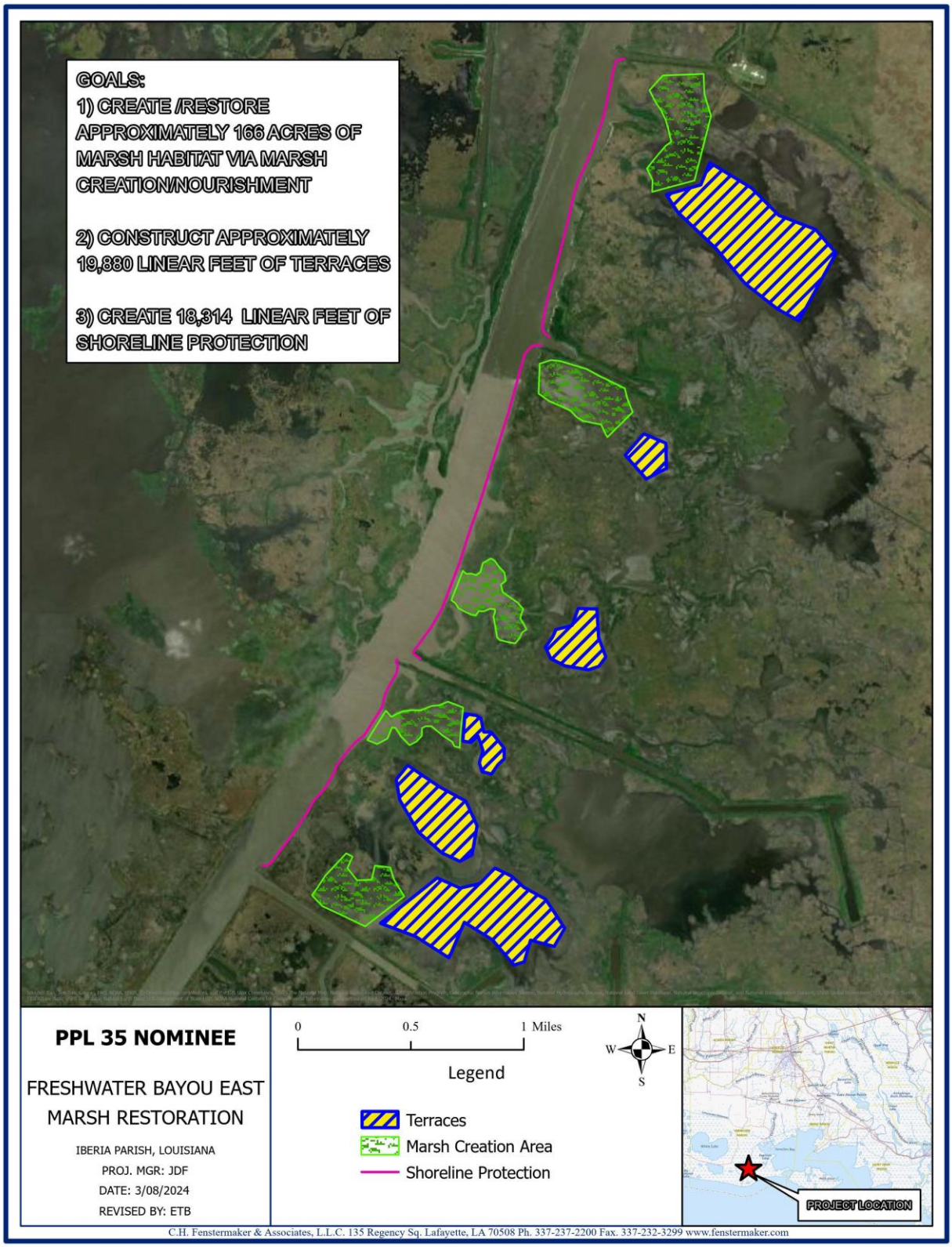


Figure 1. Project Map.

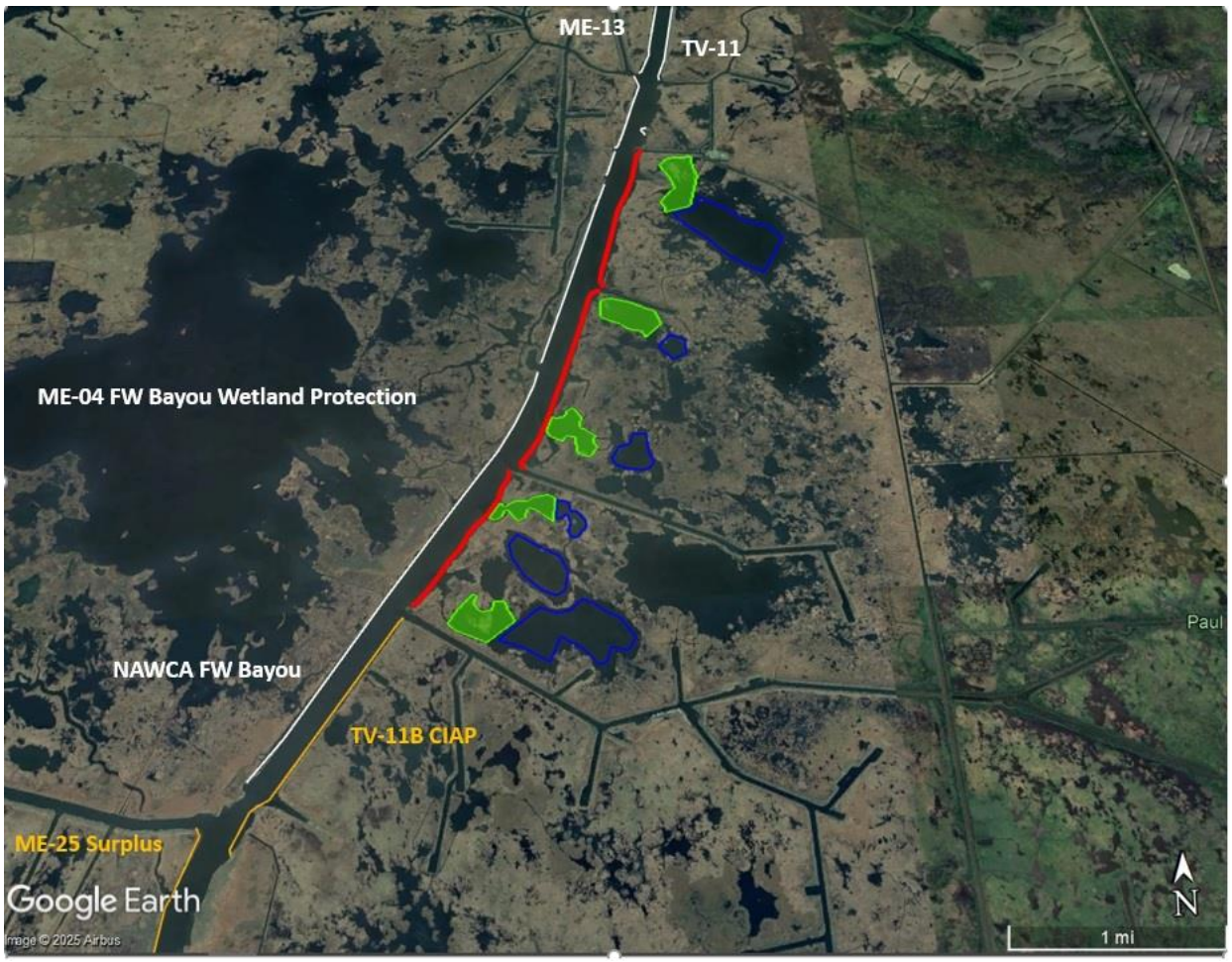


Figure 2. Synergy, Critical Infrastructure, and Critcial Landscape Feature

Freshwater Bayou East Marsh Restoration Project

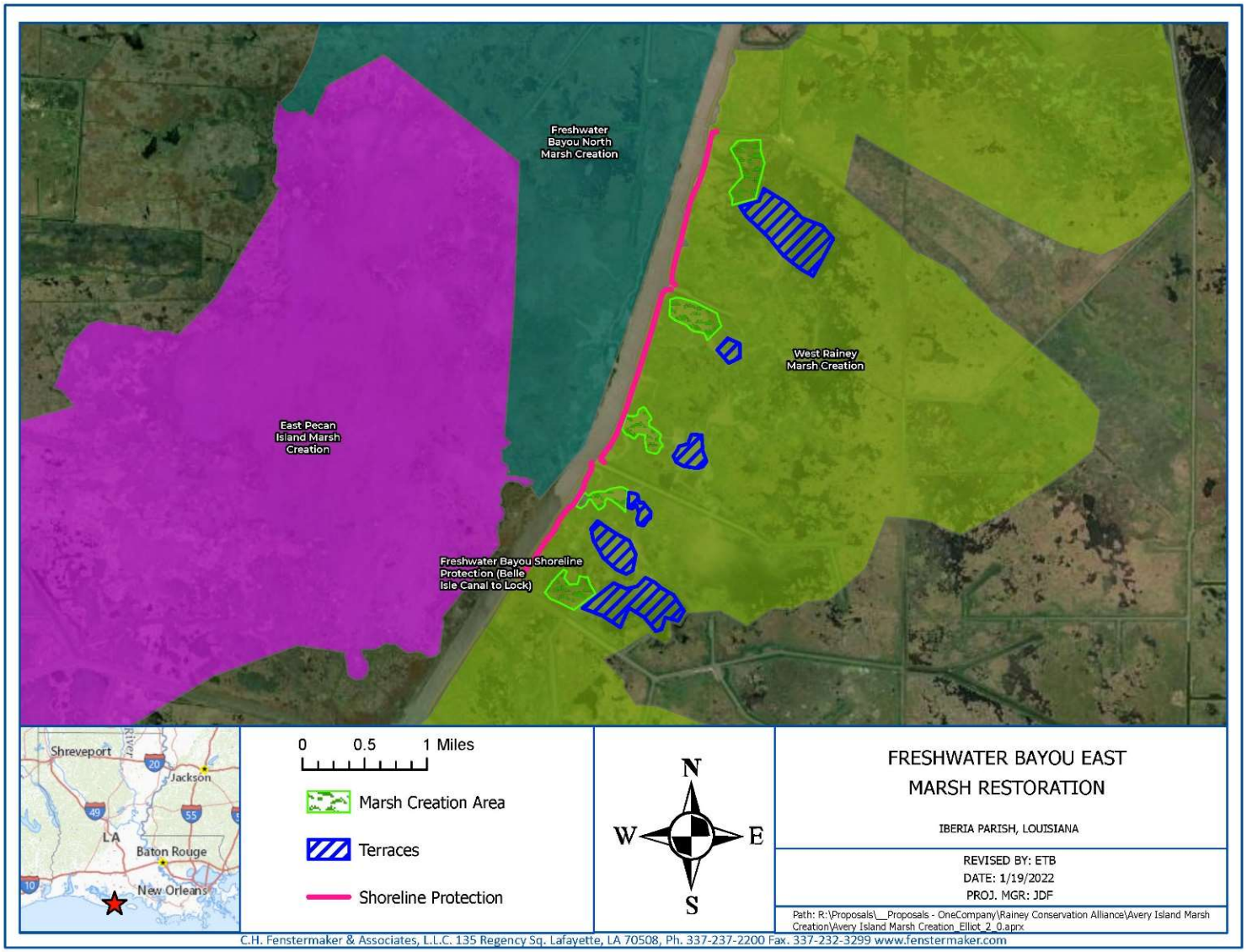
CWPPRA Project Priority List 34, Region 3 Nomination

February 5, 2025

Freshwater Bayou East Marsh Restoration Project

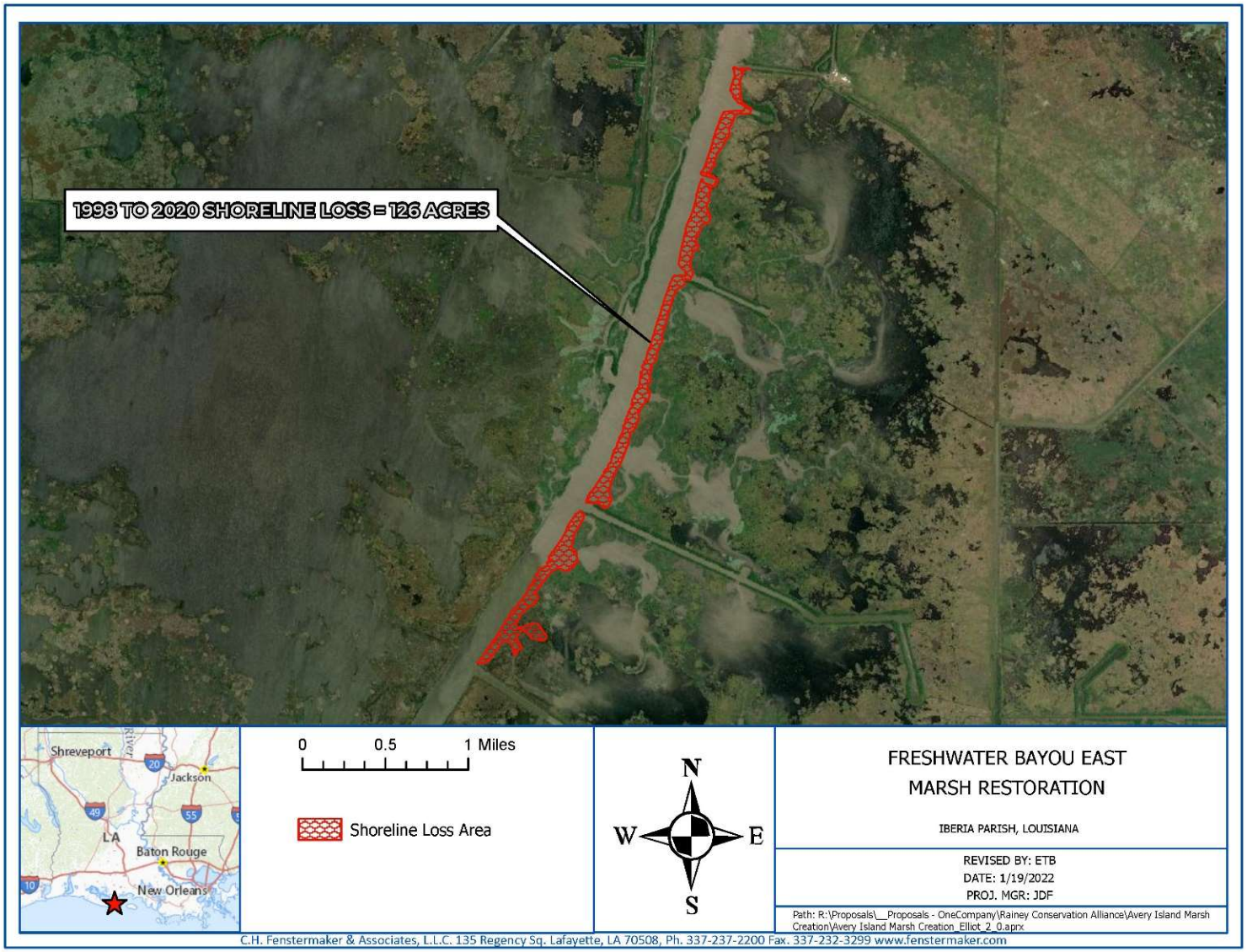
Consistent with Louisiana's 2023 Coastal Mater Plan

Project Location:
Region 3, Teche-Vermilion Basin, located on East bank of Freshwater Bayou about 4-6 miles north of the Freshwater Bayou lock system



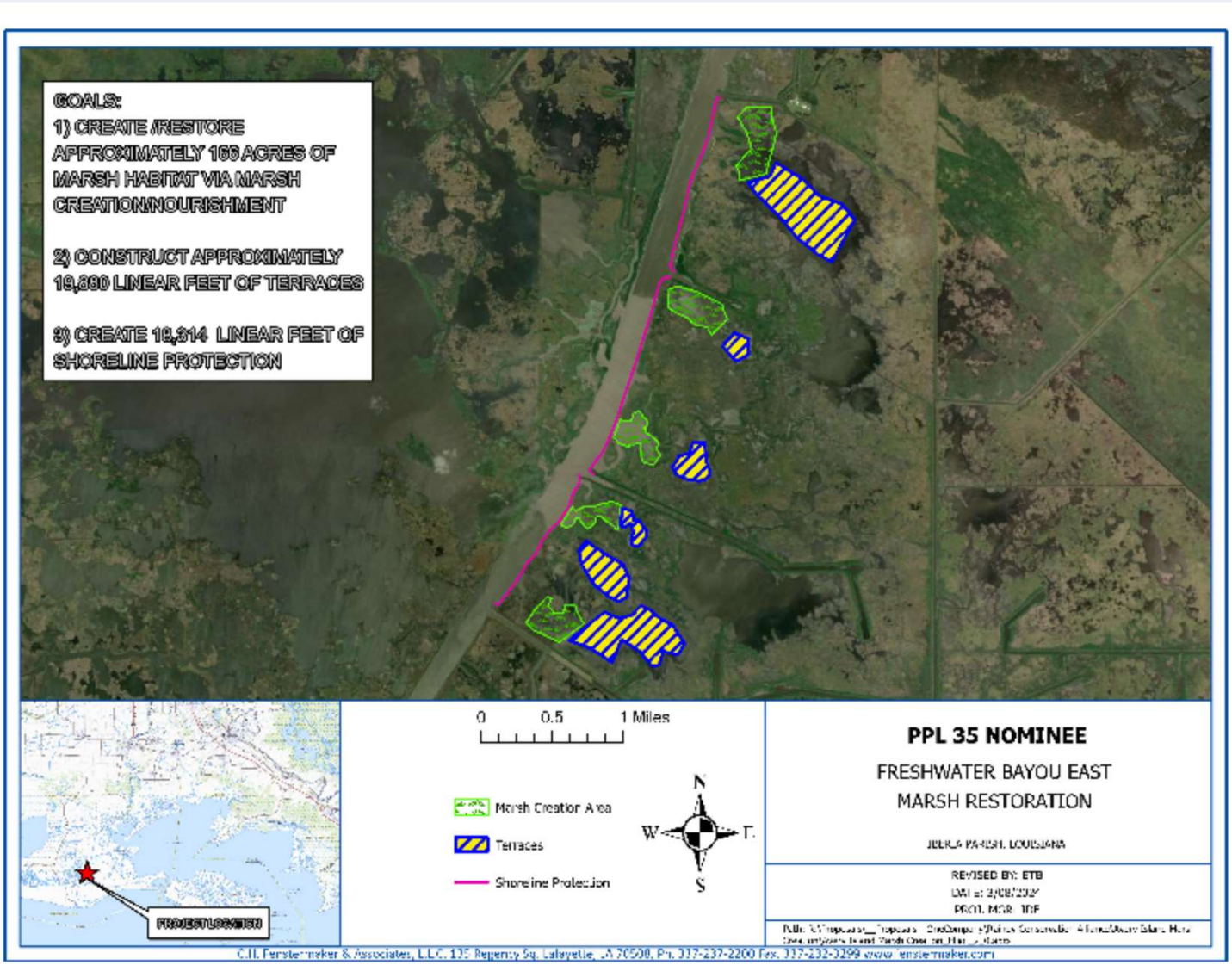
Problem:

The marshes adjacent to FWB have degraded significantly by a combination of natural and man-induced conditions. Hurricanes has scoured out large areas very quickly, but numerous anthropogenic activities and alterations have allowed the area to be much more vulnerable. The proposed location for this project is one that has not been addressed by previous restoration measures and continues losses. USGS estimates that the area has a loss rate of about -0.62 %/y and the state estimates deep subsidence at about 2.4 mm/yr. Additionally, that location being adjacent to the navigation channel experiences significant bankline erosion (12-15 ft/y).



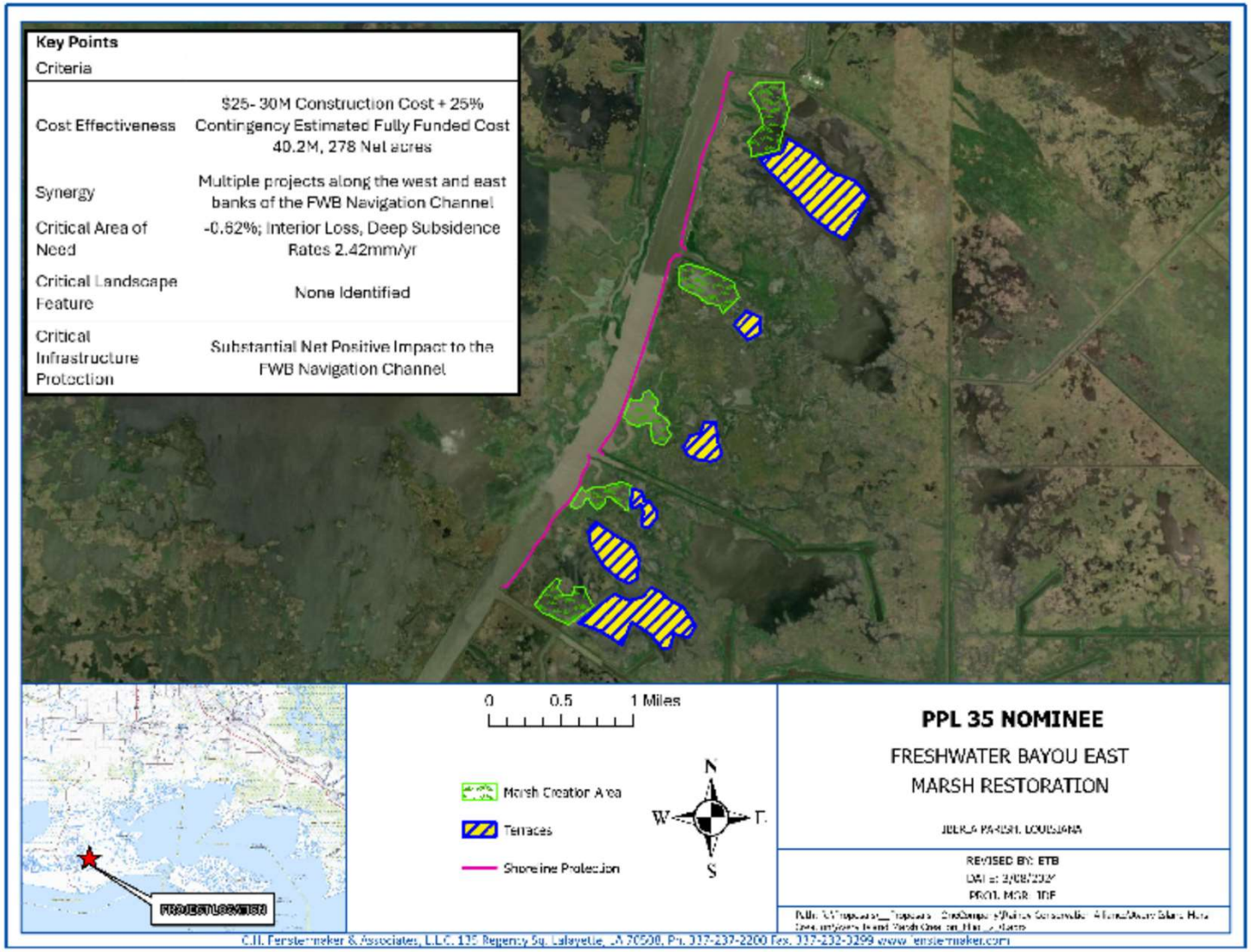
Goals: Create/restore approximately 166 acres of marsh habitat in the open water areas via marsh creation/nourishment, reduce fetch and wave energy in open water areas via the construction of terraces, and preserve approximately 124 acres of marsh along the bank of the channel through shoreline protection and help stabilize interior marsh.

Proposed Solution: Sediments will be hydraulically dredged and pumped via pipeline from a borrow site located in the Freshwater Bayou Canal to create/nourish approximately 166 acres of marsh. Construct approximately 19,880 linear feet of terraces. Construct 18,314 linear feet of shoreline projection along the Freshwater Bayou Canal.



Preliminary Construction Costs and Benefits:
The cost plus 25% contingency range is $25M - $30M and Fully Funded Cost range is $40M - $45M

The net benefit range is 250-300 acres (278 ac).



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CWPPRA RPT Region 3

Atchafalaya Basin

PPL35 PROJECT NOMINEE FACT SHEET
January 29, 2025

Project Name
Natural Re-Distribution of Materials to Mitigate Coastal Degradation

Project Location
Region 3, Atchafalaya and Terrebonne Basins, St. Mary and Terrebonne Parishes, from the Wax Lake Outlet at Hwy. 90 through Morgan City to Zacarter, the Wax Lake Outlet (WLO) and Atchafalaya Deltas, and near Bayou Penchant

Problem
The Louisiana Coastal Wetlands have lost many square miles of freshwater swampland regions, due to various factors including devastating hurricanes such as Betsy (1965), Katrina (2005), Rita (2005), Laura (2020), and Ida (2021), resulting in the conversion from swampland to freshwater marsh to saltwater marsh and to open water, in some cases directly from the former to the latter with no intermediate steps in between. Natural tree growth in areas of new land build such as the Atchafalaya Delta Region or in areas downstream of diversions such as Wax Lake and Caernarvon is generally made up of weaker-wooded, generally short-lived, and smaller trees such as willows rather than the more hardy bald cypress and different varieties of oak. Planting and growing of new trees requires large amounts of time, typically years, and significant human effort. Without the natural protection provided by freshwater forests, populated areas are directly vulnerable to coastal erosion, flooding, and wind and water impacts from coastal storms.

Goals
1) To grow trees more easily by eliminating seed incubation, hours of labor time and human power in planting, and the need for distribution sometimes by boat. 2) To create perhaps thousands of acres of freshwater wetland forest composed of trees more robust than those present currently, to better withstand wind/inundation impacts from hurricanes than those created directly from overflow of water channels in times of high water. 3) To strengthen the natural barrier between the Gulf of Mexico, saltwater marsh areas, and populated and industrial areas.

Proposed Solution
Thousands of seed pods from bald cypress trees and as of many as three varieties of native oak trees will be collected from native swamps and ridges, then prepared for transport and distribution, and finally, from launching points accessible by automobile, will be distributed via the natural flow of the Wax Lake Diversion Outlet, the Atchafalaya River, the Avoca Island Cutoff /Bayou Chene, and Black Bayou into the WLO Delta, the Atchafalaya Delta, and the Western Terrebonne Basin near Bayou Penchant at times when the surrounding wetlands are inundated from these sources, but only a few days prior to the onset of the expected return of each to within their respective banks. This will, over time, populate each region surrounding the outlet, river and bayous with stronger trees, able to greater withstand the impacts from coastal erosion/hurricanes, trap sediment, and greater protect areas inland from these areas than would weaker trees such as willow or would open marsh. Seed pods, potentially in groups wrapped in biodegradable material, will be distributed into the water from access points near the Hwy 90 corridor from WLO to Zacarter, including in Berwick, Morgan City, Amelia, and Beouf.

Preliminary Project Benefits

1) *What is the total acreage benefited both directly and indirectly?* Acreage benefitted directly in the first ten-fifteen years could be up to 43223 acres, with additional acres benefited indirectly and directly in the years thereafter as the Atchafalaya Delta increases in size.

2) How many acres of wetlands will be protected/created over the project life? Outside of the initial 43223 acres benefited, wetlands with acreage in the thousands or tens of thousands will be protected by the growth of bald cypress swamp and oak forested ridges.

3) What is the anticipated loss rate reduction throughout the area of direct benefits over the project life (<25%, 25-49%, 50-74%, and >75%)? Since it is anticipated that no additional wetlands will be lost following implementation of this project, with perhaps all current and future-created wetlands maintained, the future loss rate reduction, given the current undetermined but not zero loss rate for the project area, is 100% (>75%).

4) Do any project features maintain or restore structural components of the coastal ecosystem such as barrier islands, natural or artificial levee ridges, beach and lake rims, cheniers, etc? Yes, the embankment and adjacent wetland areas along the WLO and its delta, the Atchafalaya River downstream of its confluence with the Avoca Island Cutoff (AIC), the new Atchafalaya River Delta, the eastern embankment of the AIC roughly south of the lowest bend in Bayou Shaffer, and both embankments of upper portions of Bayou Penchant.

5) What is the net impact of the project on critical and non-critical infrastructure? This project would help to protect towns along the Hwy. 90 corridor extending from Patterson eastward to Gibson, including Morgan City, various industrial and navigational structures, portions of the GIWW, portions of U.S. Hwy. 90, LA Hwys. 182 and 662, and Morganza to the Gulf (MTTG) (2023 Master Plan (23MP) ID:110b) Hurricane Risk Reduction System.

6) To what extent does the project provide a synergistic effect with other approved and/or constructed restoration projects? The project will have a synergistic effect with a portion of MTTG, the completed Atchafalaya Sediment Delivery (AT-02), Big Island Mining (AT-03), Thin Mat Floating Marsh Enhancement (TE-36), the GIWW Bank Restoration of Critical Areas in Terrebonne (TE-43), and Atchafalaya Diversions (23MP ID:362).

Considerations

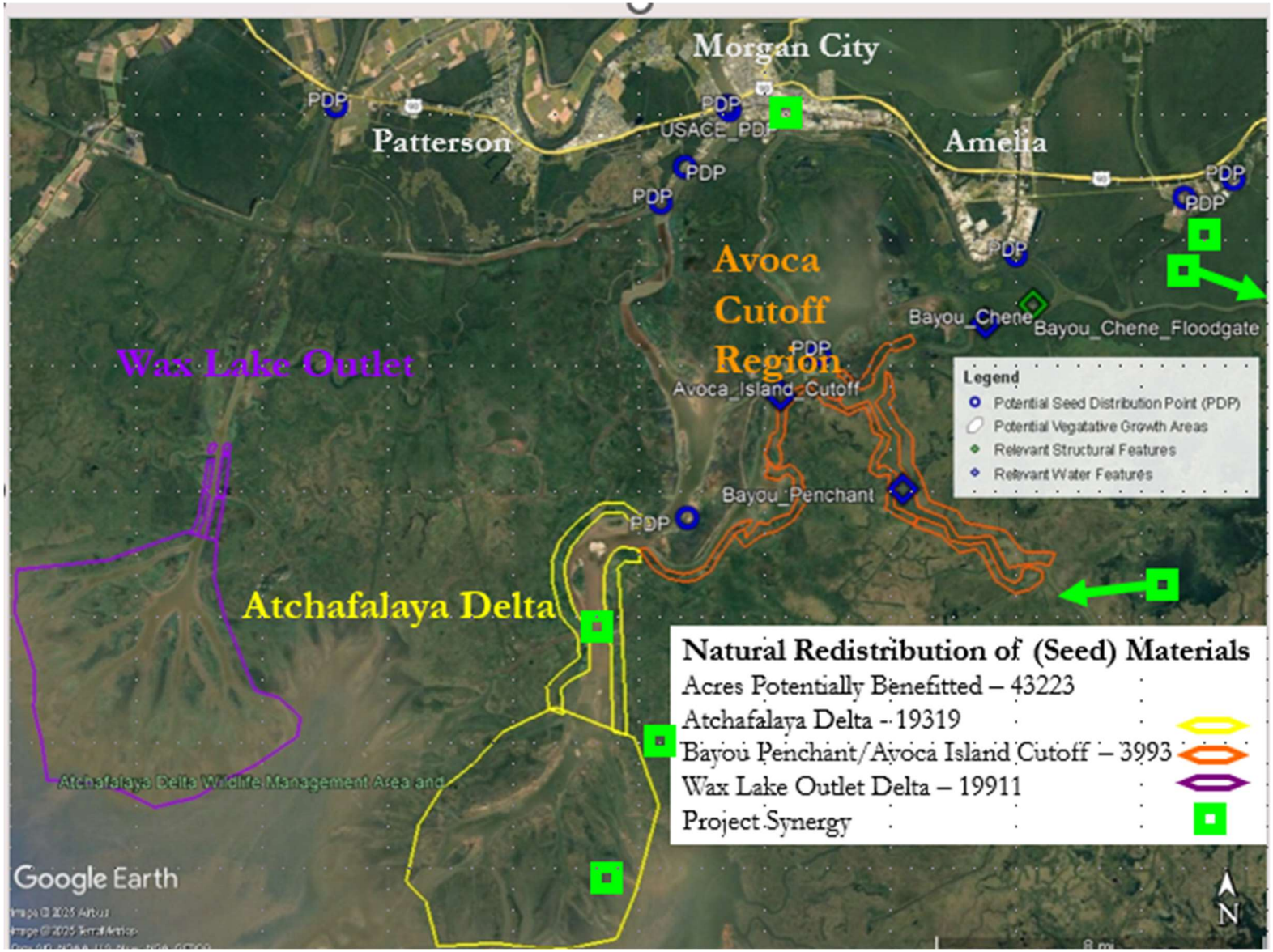
Volunteers would be required for seed collection, preparation, and distribution. Access to non-public areas for seed collection and distribution will require permission from business or land owners. For the Avoca Island Cutoff portion of the project, either the Bayou Chene Floodgate would need to be open or auto access to Avoca Road and Levee Road on Avoca Island provided.

Preliminary Cost

The estimated preliminary cost including 25% contingency is $5-10M.

Preparer(s) of Fact Sheet:

J. Rob Howard, Ph. D.; Scientist (Atmospheric and Otherwise), no affiliation; 985-974-3442; onceameteoralwaysamet@gmail.com


Morgan City
Patterson
Amelia
PDP
USACE_PDP
Avoca
Cutoff
Region
Wax Lake Outlet
Avoca_Island_Cutoff
Bayou_Chene
Bayou_Chene_Floodgate
Bayou_Penchant
Atchafalaya Delta
Atchafalaya Delta Wildlife Management Area and
Legend
Potential Seed Distribution Point (PDP)
Potential Vegatative Growth Areas
Relevant Structural Features
Relevant Water Features
Natural Redistribution of (Seed) Materials
Acres Potentially Benefitted – 43223
Atchafalaya Delta – 19319
Bayou Penchant/Avoca Island Cutoff – 3993
Wax Lake Outlet Delta – 19911
Project Synergy
Google Earth
N

Natural Re-distribution of (Seed) Materials to Mitigate Coastal Degradation (Tree Growth Project)

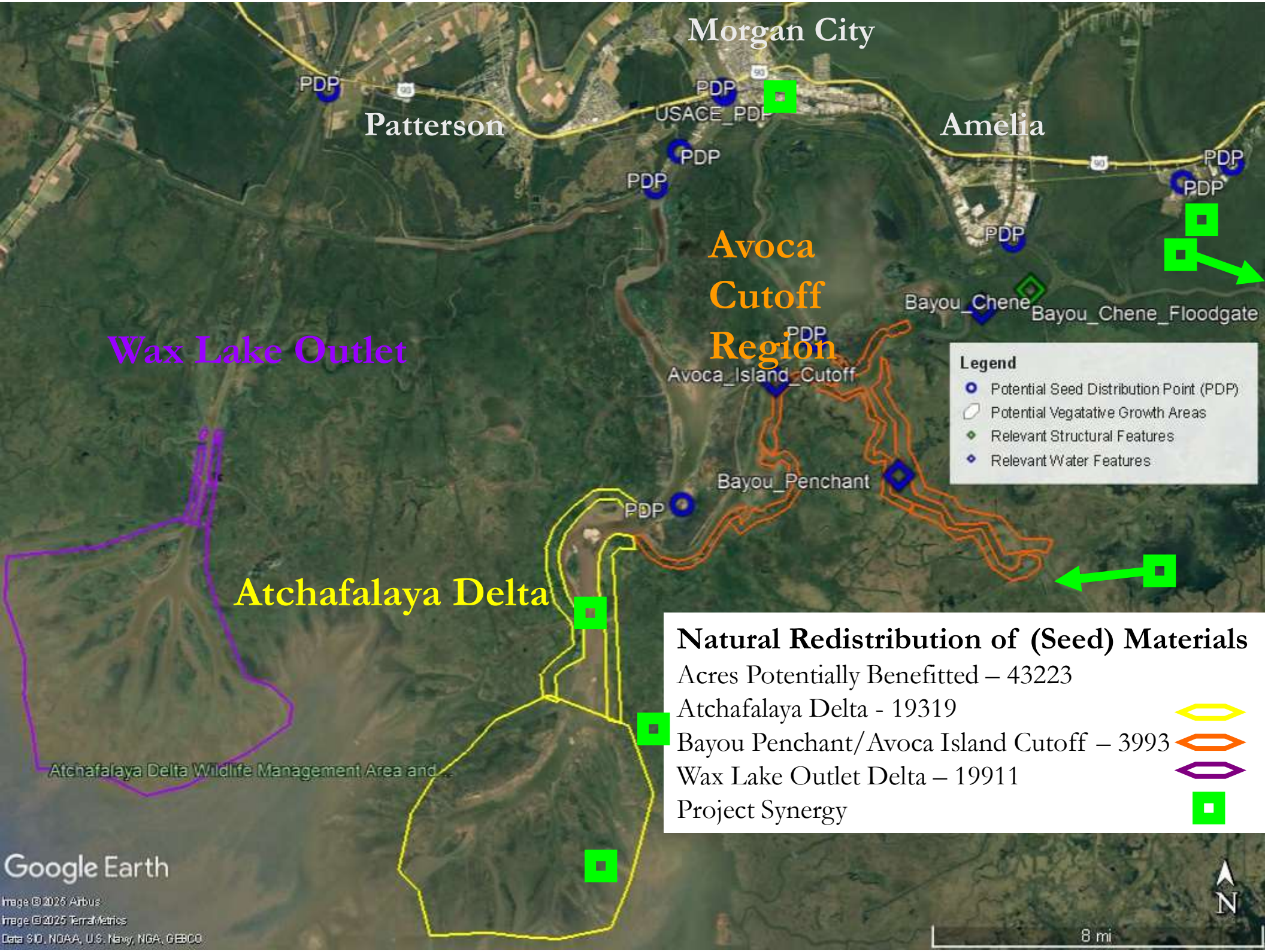
Rob Howard, PhD, Meteorologist and Scientist (Atmospheric and Otherwise)

CWPPRA Region 3 RPT Meeting – Norgan City, LA

February 5, 2025

Purpose, Scope, Process, and Location

- Tree growth of hardy, stronger trees
  - naturally beyond seed collection
  - Freshwater wetland areas, delta regions
- Lessen work involved with growing and planting, while growing more trees over a wider area
- 4 types: bald cypress, laurel oak, live oak, and water oak
- Seed collection from bottomland swamp and ridge areas in fall (volunteers)
- Seed distribution via automobile accessible locations into water outlets (volunteers)
- Natural dispersal into freshwater wetlands (rivers, bayous, channels) near end of freshwater flood events
- Timed so that overflow drops seeds over embankments as water recedes below flood stage
  - May include use of biodegradable delivery system
- Dispersal - Atchafalaya and Terrebonne Basins south of 90 corridor
  - Wax Lake Outlet and Atchafalaya Deltas
  - Bayou Black, Avaco Island Cutoff, Northwestern Bayou Penchant


Morgan City
Patterson
Amelia
PDP
USACE_PDP
Avoca
Cutoff
Region
Wax Lake Outlet
Bayou_Chene
Bayou_Chene_Floodgate
Avoca_Island_Cutoff
Bayou_Penchant
Atchafalaya Delta
Atchafalaya Delta Wildlife Management Area and ...
Legend
Potential Seed Distribution Point (PDP)
Potential Vegatative Growth Areas
Relevant Structural Features
Relevant Water Features
Natural Redistribution of (Seed) Materials
Acres Potentially Benefitted – 43223
Atchafalaya Delta - 19319
Bayou Penchant/Avoca Island Cutoff – 3993
Wax Lake Outlet Delta – 19911
Project Synergy
Google Earth
Image © 2025 Airbus
Image © 2025 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
N
8 mi

Benefits and Costs

- Up to 43223 acres of possible sturdier trees including
  - Wax Lake Outlet (19911)
  - Atchafalaya River and Delta (19319)
  - Bayou Penchant/Avoca Island Cutoff (3993)
- No Future Loss-rate anticipated
- Added Protection to Towns, Industry along 90-corridor
- Added Protection to Portions of GIWW and MTOG

(consistency with 2023 Coastal Master Plan)

- Maintenance, Protection of River/Bayou Banks, Adjacent Wetlands and possible sediment trap once trees established
- Preliminary Cost ~ 7.5 M (5-10 M) with 25% contingency

Considerations and Synergy

- Volunteer group needed
- Access for some private distribution sites needed
- Bayou Chene Floodgate or Avoca/Levee Road Access
- MTTG - 2023 Coastal Master Plan (CMP) ID: 110b
- Atchafalaya Diversions - 2023 CMP ID: 362
- AT-02 (Atchafalaya Sediment Delivery)
- AT-03 (Big Island Mining)
- TE-36 (Thin Mat Floating Marsh Enhancement)
- TE-43 (GIWW Bank Restoration of Critical Areas in Terrebonne)